

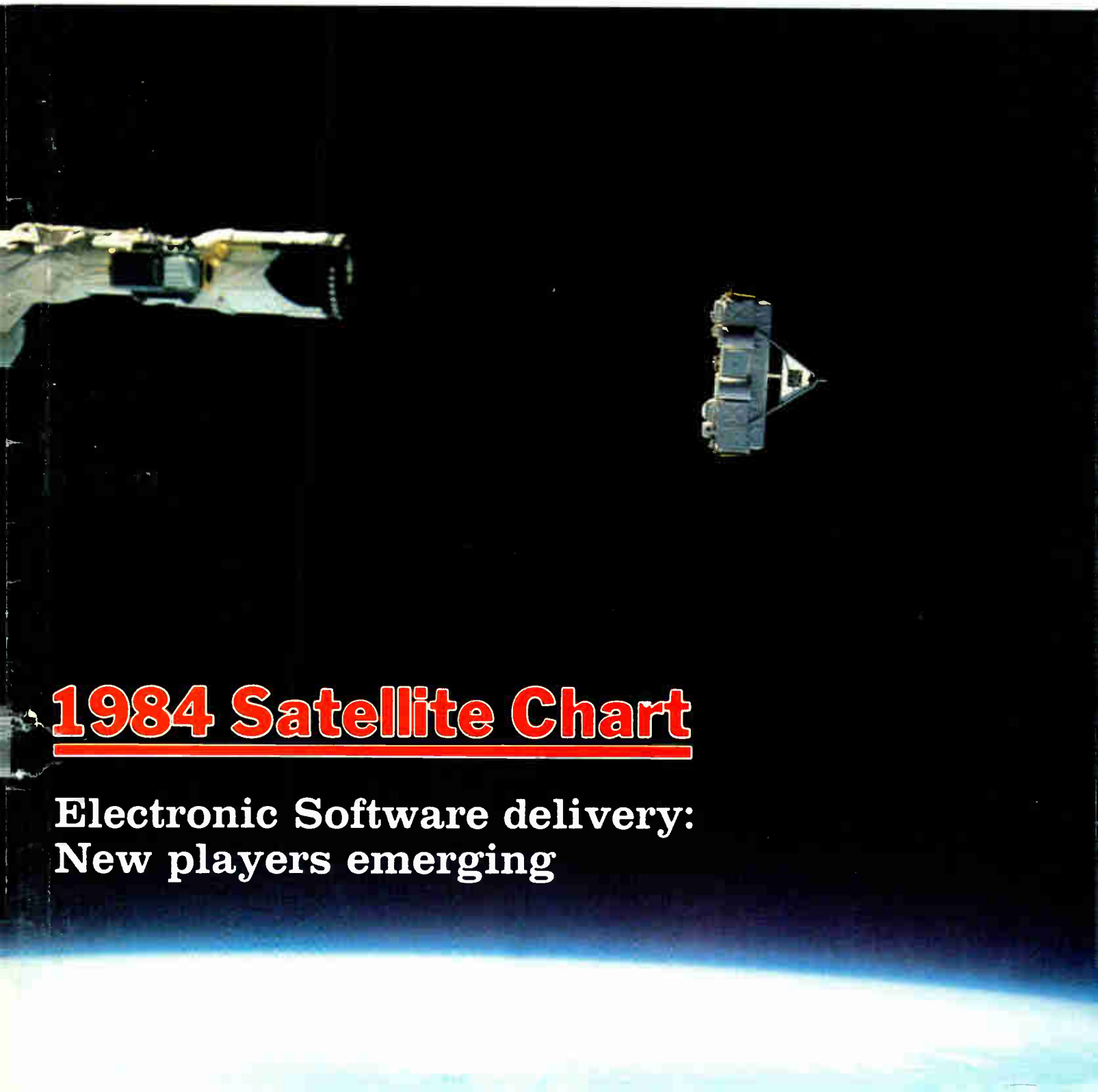
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Communications Engineering & Design/The Magazine of Broadband Technology


March 1984

TECH II
Satellite antennas



1984 Satellite Chart

Electronic Software delivery:
New players emerging



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Reader Service Number 2

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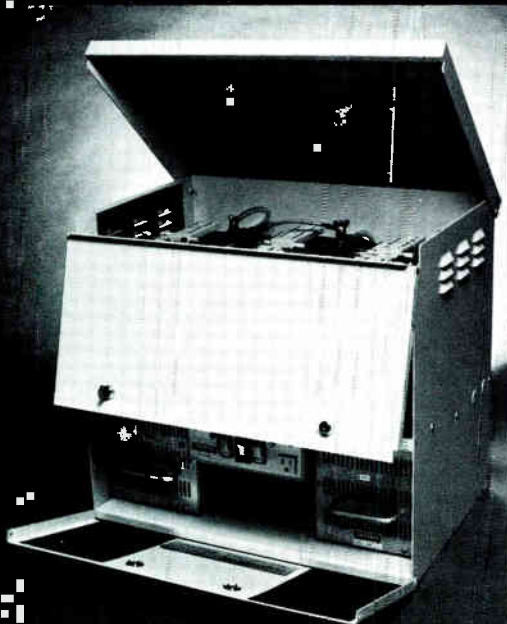
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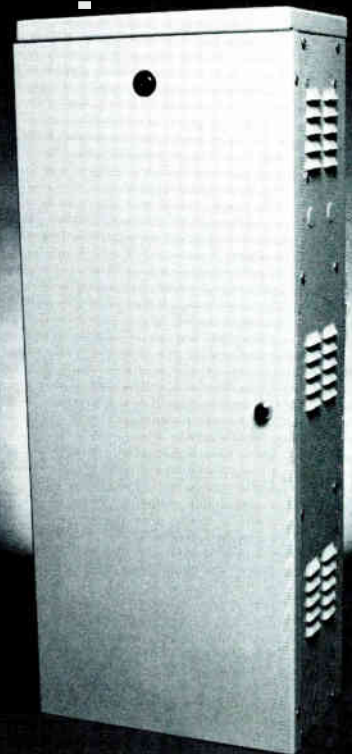
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College offering installer courses

Long Beach Community College has received a grant from the Chancellor of California Community Colleges, which has made possible the institution of a Cable TV Installer Program. Four six-week courses will be offered; the first began on Jan. 9. Training consists of pole and ladder climbing, job safety, fundamentals of electronics, elements of a cable system and installation techniques. The class meets 20 hours a week at the College's Pacific Coast Highway campus. For more information, contact Lynne Green or Les Harris at (213) 420-4571.

Whitmor Waveguides' tutorials

Whitmor Waveguides, the fiberoptic product division of Whitmor Wire and Cable Corp., is offering a series of tutorials to fiberoptic system designers and users. The intent of the tutorials is to provide the fiberoptic user with the knowledge necessary to select the components and system design best suited to meet his specific needs. The half-day tutorials, which will be held at various locations throughout the nation, will address practical, cost-effective purchasing requirements and analyze the optical, mechanical, physical and environmental conditions of each user's particular fiberoptic network. Further information can be obtained from Eric Pearson, Whitmor Waveguides, 13161 Sherman Way, North Hollywood, Calif. 91605, (213) 875-0011.

May launch date remains for Galaxy 3

The loss of two of Hughes Aircraft's newest satellites last week will not delay the launch of Galaxy 3, according to a

company spokeswoman. Both Western-Union-owned Westar 6, and Indonesia's Palapa bird failed to reach orbit after launch from the nation's Space Shuttle. Officials faulted the fuel that would have fired the birds' engines. Galaxy 3, while sharing the same type of payload, will be launched on schedule this May, utilizing a rocket, rather than the shuttle.

Bootleg cable operation shut down

Federal marshals shut down a bootleg cable TV operator on Long Island Feb. 2 under a court order secured by Cablevision Systems Development. The operator, Beeler Shoupe of North Patchogue, allegedly sold illegal decoders and descramblers to households at the rate of between 7,500 and 10,000 devices a month. Cablevision Systems officials claimed Shoupe ran one of the largest cable piracy operations on the East Coast. With a court order from judge Frank Altimari, marshals impounded equipment found at Shoupe's home, along with the contents of a warehouse in Holbrook.

New technique cuts wiring time in half

The \$2.5 million Sports Time cable production facility currently being built by Midwest Corp. in Cincinnati is employing a split cylinder wire termination technology, which the company claims, will cut its wiring time in half. The wire termination technology developed by ADC Magnetic Controls of Bloomington, Minn., uses an insulation displacement technique to eliminate wire-stripping or soldering. The ADC Ultra-Patch panel makes connections by baring the wire, locking it into the split cylinder contract and trimming off the excess length.

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Seminars

March

5-7: Cable-Tec Expo '84, sponsored by the **Society of Cable Television Engineers**, will be held at the Opryland Hotel in Nashville, Tenn. Contact (703) 823-1911.

7-9: A **Community Antenna Television Association** advanced technical training seminar will be held at the Ramada Inn South in Orlando, Fla. Contact (305) 562-7847.

8-9: A seminar on "Two-Way Cable TV Technologies and Opportunities" sponsored by **TeleStrategies Inc.** will be held at Stouffer's National Center in Washington. Contact (703) 734-7050.

8-9: A forum on "Communication Technologies and Politics" sponsored by **The Washington Program in Communications Policy** will be held in Washington. Contact (202) 484-2663.

12-14: A **George Washington University** course on Fiber-optics Systems Design will be held in Orlando, Fla. Contact George Harrison, (202) 676-6106 or (800) 424-9773.

12-15: **Business Week** and **Data Communications** will co-sponsor "Interface '84," to be held in Las Vegas. Contact Lewis Shomer, (800) 325-3330.

13: A meeting of the **International Association of Satellite Users** will be held at the Twin Bridges Marriott Hotel in Washington. Contact Donna McCaughey, (703) 437-5457.

14-16: A **Magnavox CATV** training seminar will be held in Houston. Contact Ms. Mancini, (800) 448-5171; in New York, (800) 522-7464.

15: A seminar on "The New Technologies: Changes and Challenges in Public Relations" hosted by **The Media Institute** will be held at the Hyatt Regency in Houston. Contact Sarah Midgley, (202) 298-7512.

18-20: **SPACE** will hold its Spring '84 Convention & International Exhibition in Las Vegas. Contact SPACE, (202) 887-0605.

19-21: A **Magnavox CATV** training seminar will be held in Houston. Contact Ms. Mancini, (800) 448-5171; in New York, (800) 522-7464.

20-22: A **Jerrold** technical seminar will be held in Chicago. Contact Kathy Stangl, (215) 674-4800.

27-29: A training seminar for chief techs and middle management sponsored by **Scientific-Atlanta** will be held in Phoenix, Ariz. Contact (404) 925-5847.

April

3-5: An International Teleconference Symposium sponsored by **AT&T, Comsat, ITT World Communications, MCI International, RCA Global Communications, Satellite Business Systems** and **TRT Telecommunications Corp.**—will be held in Philadelphia. Contact (800) 521-0810.

4-6: The **RF Systems Division of General Instrument** will hold a seminar on "BroadCom System Technology" in Mississauga, Ontario, Canada. Contact Joanne Wilcox, (602) 294-1600.

Looking ahead

April 10-11: Satcom '84, Washington, D.C.

May 5-7: Eurocast '84, Basel, Switzerland.

May 9-11: A Community Antenna Television Association technical training seminar, Philadelphia.

June 3-6: National Cable Television Association convention, Las Vegas (Nev.) Convention Center.

June 11-14: Canadian Cable Television Association convention, Capital Congress Center, Ottawa.

July 15-19: Community Antenna Television Association convention, CCOS-84, Tan-Tar-A Resort, Osage Beach, Mo.

Aug. 12-15: Cable Television Administration and Marketing Society convention, Waldorf-Astoria, New York.

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Reader Service Number 7

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Bird's eye view

It wasn't supposed to happen, naturally, but it did and probably grabbed more headlines than the more historical event that took place on the shuttle, the cordless space walk.

I'm referring to the loss of actually two satellites that are now spinning their \$75 million bodies in some useless position up there. It would be nice if some future shuttle mission could locate them, at least Westar 6, and repair or retrieve it.

But that doesn't do anything right now for Westar 6 or for Western Union. I can imagine that executives at the company, while publicly admitting that they will recover the value of the satellite from the insurance companies, are probably privately very disappointed about the loss. Little mention was made of the lost dollars in revenue from the companies that were to use the satellite for message traffic. The cable industry can feel glad that Westar 6 was not earmarked for its use, but other companies who had planned to use the satellites for long distance communications and digital termination services will feel its loss. Now, they'll either have to wait, or seek other birds to use.

Which leads me to ask: 'what is the fate of Westar V?' (I can't seem to settle on whether I should use Roman numerals or regular numbers for each satellite. There seems to be industry wide confusion on this matter.) It would appear that many of its residents are moving to Hughes Communications' Galaxy I, leaving Westar V with a number of vacancies. Actually, the same may be said for Satcom III-R. Most of its customers also have transponders aboard Galaxy I. For cable operators with three dishes, this poses little problem as each satellite will get its own dish.

Apparently, at present, the industry can support three birds. With the advent recently of a new superstation—WPIX in New York City—a transponder on Westar V has been chosen to carry the signal. So where there is space, it is used by new services and entrepreneurs. However, it's getting to the point where one really needs a program to determine all the satellites already up there or slated to become neighbors. What with DBS on its way, a number of new satellites will be used to carry the signals of this service. And from a higher revenue standpoint, long distance communication service, as presently supplied by Satellite Business Systems (SBS), will play an increasingly important role and utilize a number of satellites set to occupy space on both the C-band and Ku-band frequencies. Teleconferencing and message traffic are other services that can be easily and efficiently supplied by satellite and increasingly, the broadcast networks are finding that their needs are better filled by using satellites rather than sending their signals to affiliates by AT&T long lines. The escalating prices charged by AT&T have convinced each network to begin sending their signals by satellite.

With that in mind, and because of the rather timely, but unfortunate publicity surrounding Westar 6 and Indonesia's Palapa satellite, we present in this issue of *CED*, our 1984 Satellite Chart. We have expanded the number of participants as they have grown and broken down the categories to reflect both C-band and Ku-band birds. We've seen a lot of change in the past year since the adoption of 2-degree spacing by the Federal Communications Commission, and it has been very busy readjusting and allocating new frequencies to various satellites. There have been numerous complaints on that matter as questions of interference, higher costs and little information and time have been sounded by the various companies/operators affected. In fact, according to a spokesman for Western Union, the company was only notified 48 hours before the shuttle launch where its location would be for Westar 6. The slot it was to have taken was 91 degrees west, a position that had previously been reserved for GTE's Spacenet III. (GTE bought Spacenet's parent company Southern Pacific Communications, which includes the Sprint long distance phone service, last year and the satellites were part of the acquisition.) Now, it apparently is up in the air (no pun intended) as to the position for Spacenet III, a hybrid bird set to serve both C-band and Ku-band interests. A spokesman for GTE said that the company's plans are simply unknown now due to the loss of Westar 6 and intimated that GTE may appeal to the FCC to retain ownership of the 91 degree slot.

But a company should know the position of its satellite well in advance. Westar 6 was an unusual instance, but given all the shifting and transition going on in the satellite business, one does need a scorecard.

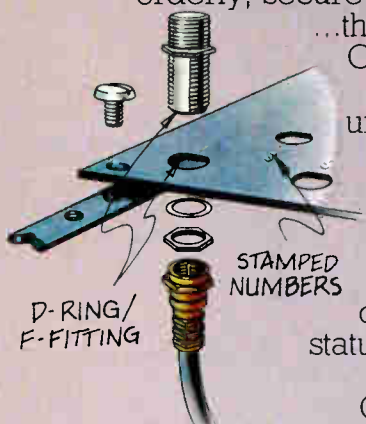
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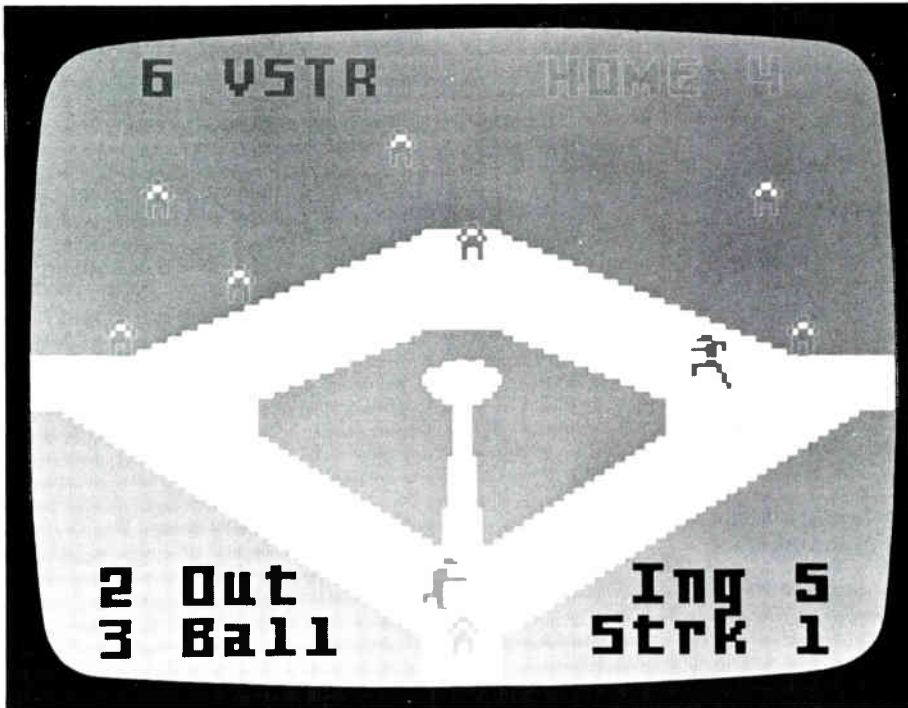
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Reader Service Number 8



PlayCable strikes out

Cable delivered electronic game channel terminates, decreasing interest in games cited

NEW YORK—Zapped by a general decline in video game consumers, PlayCable, the first attempt at a cable-delivered electronic game channel, will terminate at the end of this month.

Affiliates of the service, operated jointly by Mattel Inc. and General Instrument, were notified early last week that the service will cease its delivery of arcade-style and educational games to subscribers possessing Mattel's Intellivision units Feb. 29.

They received the news shortly after Mattel announced a signed letter of intent to sell its Intellivision electronics division for \$20 million. The buyer: a group of investors led by Terrence Valeski, Mattel's senior vice president of marketing and sales.

Offering 20 games a month to subscribers on a pay tier priced at about \$12 to \$15, PlayCable found only 20 systems willing to take it and only 5,000 interested subscribers. As early as last summer, rumors were spreading that the service would fold due to soft retail sales in video game products and shakeout in the video game industry.

General Instrument Corporation Communications Director Jim Hill cited decreasing interest in electronic games as a reason for the PlayCable turn-off. "We're suffering the same way as the

video game business in general," he said. "This was a pioneer venture; it was risky. It got caught up in a shift of consumer preferences and became a venture we didn't feel should continue at this point in time."

PlayCable may have been doomed from the start because subscribers needed Intellivision units to use the channel, maintained Alex Papagan, executive director of marketing at Colony Communications. Colony's system in Beacon, N.Y., introduced the system in 1981, hoping to achieve 2 percent penetration of its 40,000 homes. Starting with 500 homes at its launch, PlayCable will turn off there with less than it opened with—about 400 households.

"I said this from the beginning: it's very difficult to sell an Intellivision unit (and PlayCable) to a subscriber with an Atari unit," Papagan said. "There's declining interest in video games, and that's apparent with the way stocks in that field have been acting in the last six months."

Mattel and GI officials offered no comment on financial losses suffered by PlayCable. In its Intellivision sales announcement, Mattel said that it will report a negative net worth of about \$150 million for fiscal year 1983.

Fiberoptic system debut

United Cable's fiberoptic system is scheduled to be completed in March, after a six-month delay

ALAMEDA, Calif.—The nation's finest fiberoptic cable system is up and running. But the number of subscribers can still be counted on the fingers of a few employees' hands.

Construction of the system, which utilizes dual trunk coaxial cable and fiber from the Times Fiber mini-hubs to subscribers' homes, was originally due for completion last September. That date was moved back to Feb. 22 for aerial plant, and March 20 for underground.

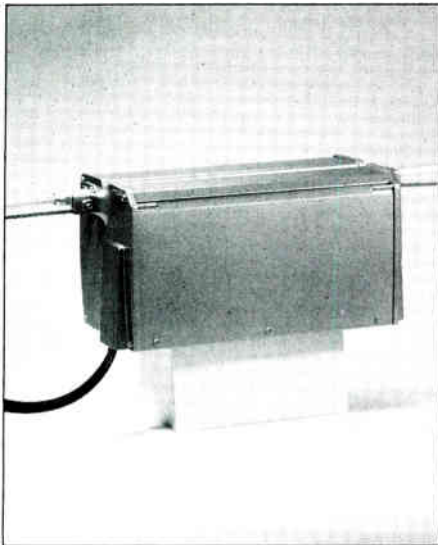
Less than a month ago, approximately 50 miles of plant were "substantially" built, according to a United official. Thirty of those miles were activated, with the exception of the TF mini-hubs, or "local distribution units (LDUs)." Two underground and five aerial LDUs pass 129 homes, with slightly less than half, 68 homes, buying the service. Pay-to-basic is 183 percent.

"This is absolutely the finest United system there is," stated Alameda's general manager, Terry Soley. A seven-meter Simulstat dish provides 28 satellite services among its 70 available channels, in this 108-channel capacity operation. When completed, Alameda will consist of 76 miles of aerial and 36 miles of underground plant. A 14-mile dedicated institutional network also has been activated.

"We've had very few problems with the plant," Soley said. "There's been very little hardware failure, and we're pleased with the technology."

With fiberoptic technology, subscribers are equipped only with a keypad as in-house equipment. The actual control of channels entering the home is centered in the mini-hub placed outside on a public easement.

It is precisely those easements that have given Alameda some of its bigger headaches. With underground LDUs running at five feet high and three feet wide, local residents are less than enthusiastic about allowing one of these green boxes on their front lawns. "We've spent a tremendous amount of time and energy to work with homeowners to allow us a private easement," Soley noted. The problem is compounded by Alameda's high population density of



Times Fiber's Mini-Hub II

220 homes per mile, because placement of an LDU on side of a house can be easily seen outside a living room window. To ease the pain, United is offering potential LDU guardians free three-tier basic service, for the life of the 15-year franchise.

According to one company officials, delays in construction have been caused, at least in part, to a lack of manpower. "There just aren't enough people familiar with fiber. We have 15 people working with fiber, but we need 25 more."

That's a complaint that the construction subcontractor reiterates. "I think United is correct," said Comco Inc.'s chairman of the board, Bill Jenkins. "Forty is the right number, and they're aren't 40 there. But it's not a situation where there is an otherwise available labor supply. We will have 40 qualified workers there by the end of this month."

The fiberoptic technology itself is more expensive than traditional coaxial cable, costing United an estimated \$1.5 million more than coax. But the company believes that the added expense will be made up over the life of the franchise due to "virtually no signal theft," and less hardware maintenance. One company official noted that, even if the LDU is broken into, the headend computer will note that service is being received illegally, and at what location.

But the allure of the new technology remains an in-house issue. While potential subscribers are told they will be purchasing service from the nation's first fiberoptic system, the technology is obviously not much of a selling point, system manager Soley noted.

—Eric Taub

FCC toughens leakage stance

Signal leakage and utilizing aeronautical frequencies to be scrutinized, penalties could increase

WASHINGTON — The Federal Communications Commission plans to take a much tougher stand against cable operators who violate the FCC's technical rules, says Ronald Parver, supervisory attorney for the Commission's Cable Television Bureau. Signal leakage and use of aeronautical frequencies will receive particularly close attention, FCC sources say.

Although it is not clear when the stepped-up enforcement efforts will begin, penalties for rule infractions have increased in recent months. Since mid-December 1983, fines ranging from \$2,000 to \$10,000 have been levied against six cable systems, and in some cases, channels have been shut down.

Signal leakage problems are extraordinarily widespread, according to Richard Breen, investigations specialist with the FCC's Houston area office. "We find leaks in excess of 20 microvolts per meter in over 95 percent of all systems we check," he says. "In southern Texas, we're issuing about 20 to 25 citations a year, and last year, four operators were fined over \$6,000."

Cable operators paid more than \$200,000 in fines in 1983, and Steve Effros, president of the Community Antenna Television Association, says system monitoring and maintenance has to be the industry's "A-1 priority."

"The mere threat of FCC penalties isn't the main issue," Effros says. "The point is that if we abuse frequencies then we're out of business."

Maintenance is the key to a tight, clean, system, says FCC Chief Scientist Robert Powers, who authored a key commission study of leakage problems in 1979. "The systems with radiation problems are those which are not well-maintained," Powers says. "A typical pattern we found was hundreds of leaks in the one to 600 microvolts per meter range, primarily from connectors."

Frank Settle, general manager of the Texas Cablevision system in San Angelo, Texas, found out the hard way that Powers is right. About 18 months ago, as he was preparing a system upgrade requiring use of mid-band frequencies, he discovered a massive leakage problem. Old connectors and passive taps proved to be the main problem, and so the



Steve Effros

entire system was electronically rebuilt.

"About 85 percent of our taps weren't RF1-shielded, and we had to change every single one of our connectors," he says. F-fittings proved to be another culprit.

It cost Texas Cablevision about \$875 to \$890 per mile to re-engineer the 350 miles of system plant, and Settle emphasizes that constant sweeps of the network and investment in maintenance are essential. "In the long run it pays off," he says.

While in extreme cases the FCC can issue cease and desist orders, levy hefty fines or even shut a system down, Breen emphasizes that such drastic actions are taken only after repeated and willful refusal to clean up a problem. And most cable operators comply voluntarily, he says.

But FCC officials left little doubt that enforcement efforts would in the future include random audits of systems. In the past, the agency has only checked systems when complaints have been received.

—Gary Kim

Cable Tec Expo '84

SCTE expecting banner conclave with hands-on focus

NASHVILLE, Tenn.—The SCTE anticipates a minimum of 1,000 cable engineers and technicians to attend its "Cable-Tec Expo," to be held at the Opryland Hotel here March 5-7.

The show, which Stephen Cox, executive vice president for the association, expects to be a "banner expo for the organization," will ascribe to last year's

"hands-on" format. Differences, however, will be noticed in the nature of the topics to be discussed, which will cover addressability, digital transmission and cable's involvement in the data arena more extensively than last year's expo. Another novel topic added to the technical session list is feedforward. Other sessions will cover FCC com-

pliance; construction practices; TVRO maintenance; amplifier fundamentals; installation practices; test equipment; cable converters; system design; the ARRL; training and development; "super systems"; and the technical and manpower requirements involved in constructing and operating a major metropolitan newbuild and LANs.

A spring conference in which technical papers will be presented will kick off the show on Sunday. In addition, a guest speaker, whose identity Cox refrained from divulging, will address the assembly, consisting primarily of vice presidents, senior engineers and chief technicians.

Among the various exhibits to be shown on the 75,000-square-foot convention hall floor will be a Magnavox van in which eight amps will be set up in cascade—training and diagnosis will be offered. The FCC will provide an equipment test facility van. Cox said engineers can actually bring their equipment to the hall to have it tested free of charge. At least 175 exhibitors will be present.

Twenty representatives from Overseas Industries Research Organization of Japan, and technicians from Argentina and London are expected to attend the show as well as the traditional manufacturers and operators.

—Constance Warren



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Reader Service Number 10

NewsSweep

■ Scientific-Atlanta has agreed in principle to a deal involving the acquisition of its Burlington Instrument Division by Teradyne Inc. Under the terms of the agreement, the S-A division will be incorporated into Teradyne's component test group. No price was disclosed.

■ PTS Corp. has concluded warranty repair contract negotiations with Tocom Inc. This agreement authorizes PTS to provide warranty repair on all Tocom block converters, line amplifiers and headend equipment. Another consequence of the pact is to position PTS as the exclusive servicer of Tocom headend equipment. PTS officials said line amplifier warranty will be operational by the first of this month.

■ The Jerrold division of General Instrument Corp. has formed a telecommunications sales division, which will oversee the international distribution of Jerrold cable productions as well as the national distribution of Jerrold telecommunications systems resulting from Jerrold's joint ventures with the General Electric Co. of the U.K. and the Thomson-CSF Co. of France. John P. Forde will head the group as vice president and general manager. The division will be based at Jerrold's Hatboro, Pa., headquarters.



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S-A, Jerrold unveil off-premise units

S-A's Series 2470, Jerrold's Omnitel designed for the multiple dwelling unit market

DENVER—New products aimed at the multiple dwelling unit market have been introduced by Scientific-Atlanta and Jerrold. All of the systems provide off-premise addressability.

Specifically designed for the SMATV market, S-A's Series 2470 addressable tap system can handle as many as

16,000 homes, with up to eight locations controlled by a single outdoor tap.

Aside from the taps, the Series 2470 consists of a microprocessor-driven controller and a rack-mounted cable signal insertion unit.

Jerrold's star-switched Omnitel

system can handle up to 400,000 subscribers, and can be expanded from an entertainment-only to a fully interactive telecommunications network featuring voice and data services.

Omnitel uses a synchronous data transmission format with speeds up to two megabits. Jerrold expects to have the system ready for delivery by the first quarter of 1985, although voice transmission capability may not be available for six years.

The company also expects to have its new Starcom IntraNet system ready by the third quarter of 1984. Based on the Starcom 450 RF addressable converter, the 550 MHz, 80-channel network consists of four basic components.

The Subscriber Converter Module contains the converter electronics. As many as 16 SCMs are controlled by an Addressable Converter Cluster, a 200-pound locked steel cabinet designed for placement in a basement or service closet.

Each SCM is matched by an in-home Subscriber Channel Selector, which provides automatic fine tuning.

The headend computer completes the system, which employs dynamic sync suppression scrambling and is upgradeable for impulse pay-per-view and dual cable plant.

Jerrold estimates an initial per-subscriber cost of between \$150 and \$160.

—Gary Kim

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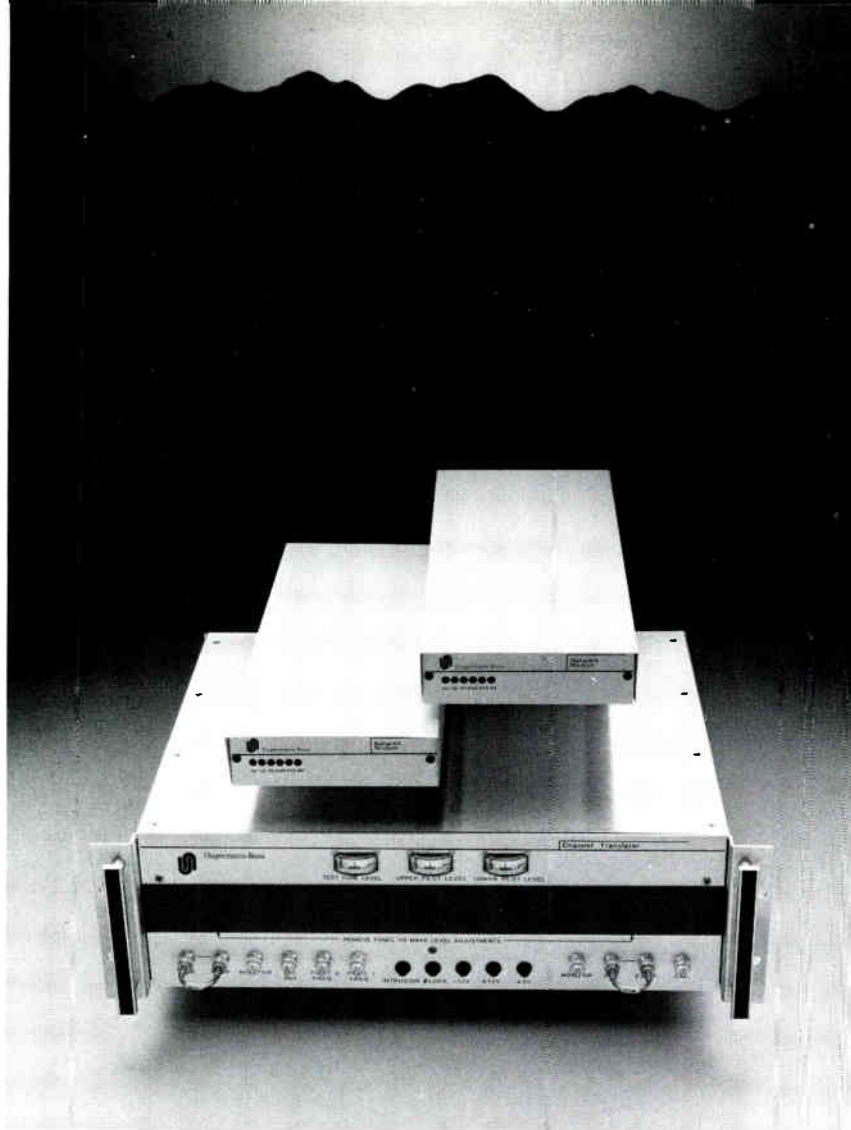
Ku-band development: On its way

Announcements involving Ku-band development suggest growing interest in the high-powered space-craft

TORRANCE, Calif.—United States Satellite Systems Inc. (USSSI) is negotiating a contract with Hughes Aircraft Co. for construction of two high-powered Ku-band USAT satellites.

USSSI is one of three companies granted Ku-band orbital slots by the FCC last April. According to Irv

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Both the 19.2 and 56 Kbps models are available for immediate delivery. Please call or write for Broadband Network Modem specifications: Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111. Or call our Broadband Technical Support Group, Burlington, Massachusetts, (617) 273-5858.

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Dostics, USSSI executive vice president of engineering and the principal force behind the USAT system design, the Hughes' HS 393 spacecraft is more powerful than other birds currently in operation.

USAT-1 and USAT-2 each will have at least 20, 40-watt transponders and will transmit voice, data and video signals in both analog and digital form. The satellites, scheduled for launching in the fourth quarter of 1986 and first quarter of 1987, will be

positioned at 85° and 125° West longitude.

In a related news item, RCA Astro-Electronics disclosed details of a contract it struck with Rainbow Satellite Inc. for the design and construction of two Ku-band birds.

The contract, which RCA officials claim represents a sales potential in excess of \$150 million, also includes provisions for telemetry tracking and control equipment, launch services and operator training and an option

for additional spacecraft to be built at a later date. Each satellite will feature 24 channels, operating in the 14/12 GHz band and 32, 40 watt traveling wave tube amplifiers for coverage of the 48 contiguous states. A 16 to 12 redundancy plan will be implemented. Proposed applications for the birds are video, voice and data transmissions for SMATV and common carrier use. The first launch for the 10-year life span birds is scheduled for 1986.

Bypass myths dispelled

Cable seen as attractive bypass technology

WASHINGTON—What are the “five great myths” of telephone bypass? According to Joseph Kraemer, a partner in the management consulting firm of Touche Ross & Co., they are that:

- “bypass doesn’t exist—the local loop is a monopoly.”
- “regulators can’t affect the level of bypass.”
- “bypass is a high-technology business.”
- “the maximum potential for bypass is limited.”
- “bypass has always been with us.”

Those oft-stated assertions are all wrong, Kraemer told participants at a national conference on “Bypassing the Local Telephone Exchange Today and Tomorrow,” co-sponsored by Touche Ross and Phillips Publishing Inc. here last month.

Kraemer came to his conclusions after a 16-state study released last fall. Up until the Touche Ross study, says Kraemer, “There has been very little data” on the controversial practice of large business bypassing their local telephone service. Congress has been concerned that rising rates for local service brought on by the recent divestiture of AT&T will encourage more and more big customers to drop their local telephone service in favor of cheaper or more efficient alternatives. That, in turn, Congress reasons, will drive up the price of service for everyone.

In exploding the five myths of bypass, Kraemer indicates that Congress has every reason to fear.

Moreover, says Kraemer, high penetration cable systems will be an attractive bypass technology to *small* business and residential users as well.

—Brooke Gladstone

Don't sell cable security because you promised it. Sell it to make money.

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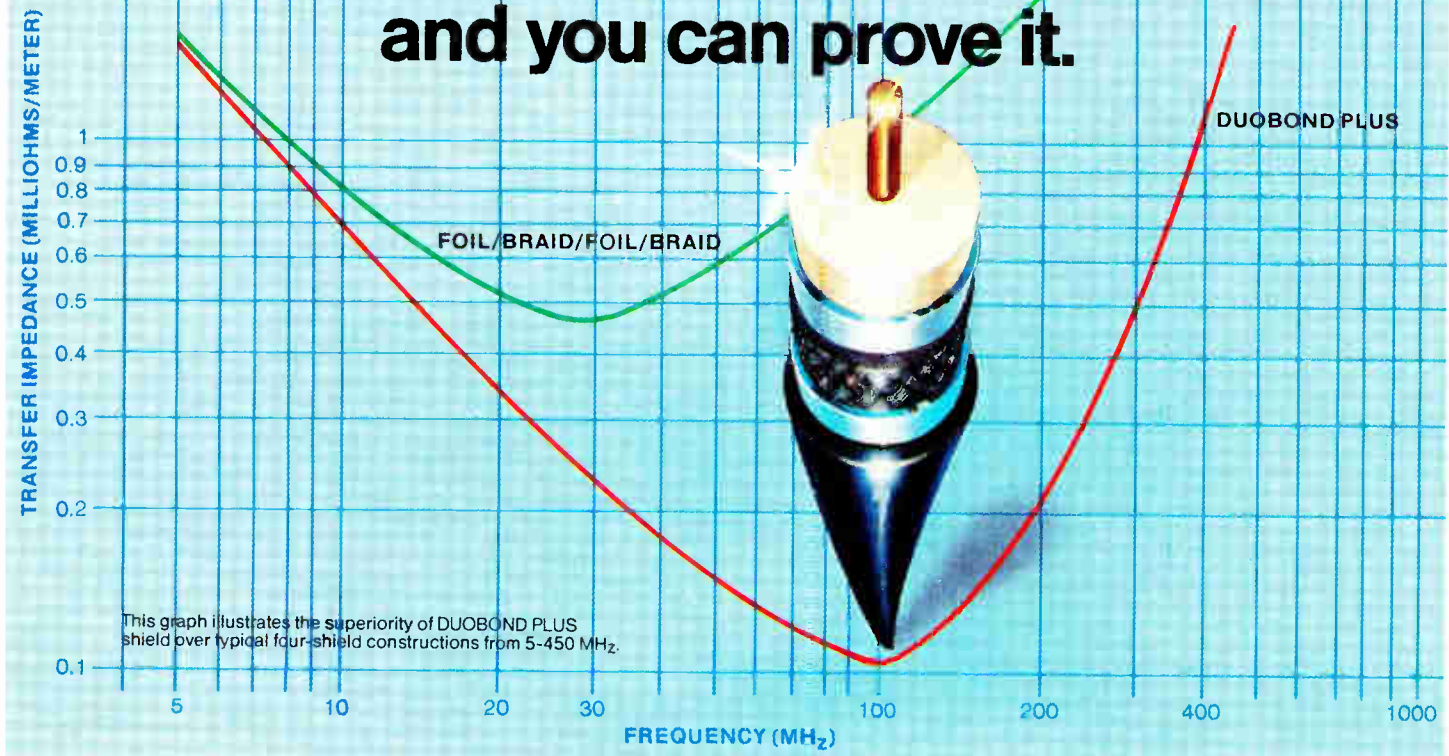


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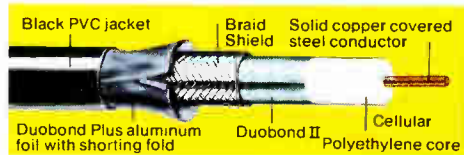
Reader Service Number 14

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This graph illustrates the superiority of DUOBOND PLUS shield over typical four-shield constructions from 5-450 MHz.

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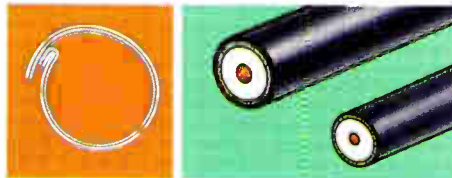
This protection from signal ingress and egress helps you meet the current FCC requirements limiting radiation from your CATV system. Try it in your toughest interference locations. You'll find that DUOBOND PLUS shield offers the kind of performance you—and your customers—demand from a CATV drop cable.

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Unlike foil/braid/foil/braid cable constructions, the DUOBOND PLUS cable shield does not require expensive oversized connectors. The cable is made to standard industry size to use any popular, commercially available connectors (RG 59, .242" O.D./RG 6, .275" O.D.). Also, the inner foil of the DUOBOND PLUS shield is bonded right to the cable core. That

means there's no chance for foil pushback and the signal leakage that frequently results from pushback.

DUOBOND PLUS shield features a unique shorting fold in the outer shield. This fold gives metal-to-metal contact for reduced slot radiation effect.



DUOBOND PLUS shield offers better shielding than this bulkier, more expensive foil/braid/foil/braid cable. The larger cable also requires special, non-standard connectors.

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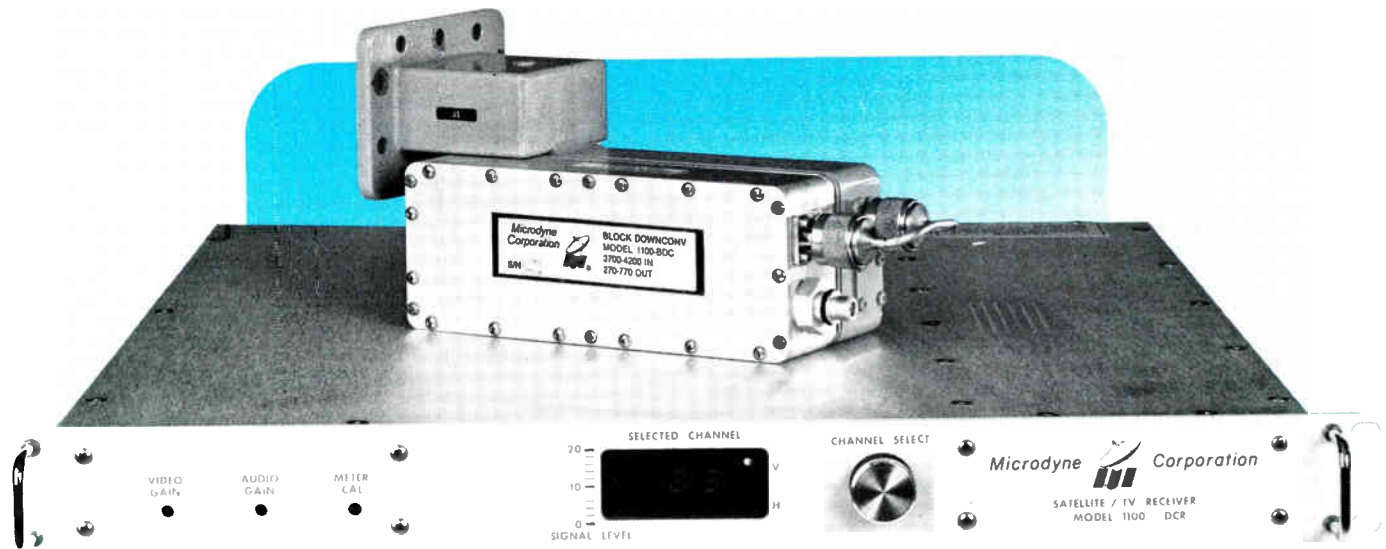
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replacement for Scientific-Atlanta's 360 Series and can be connected directly to S-A's 6650 receivers.

So if you have been having trouble getting an S-A block downconverter, use ours. We don't mind if you mix brands — it just may convince you to try the rest of our TVRO equipment.

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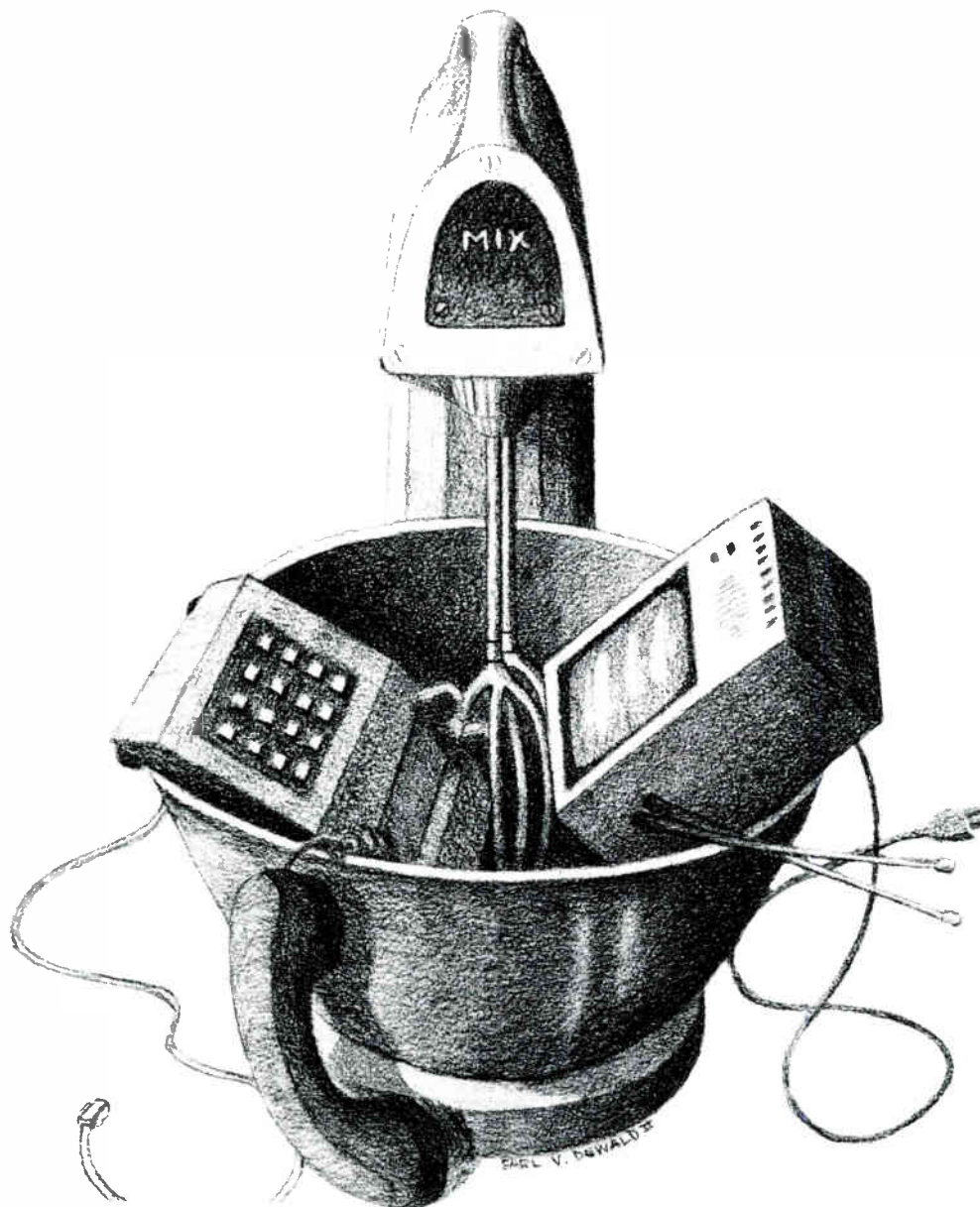
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Reader Service Number 16



Two-way transmission: Will the cable, telco mix jell?

Hybrid systems are presently scarce but the AT&T divestiture could create new opportunities

By Gary Kim

Videotex may never become a financial gold mine. But if it does, there are only two serious contenders for the role of delivery system: the cable and telephone industries.

Although there has been some talk of hybrid systems using cable downstream and telephone upstream architecture, few practical examples exist. Warner Amex Cable had been studying hybrid systems for the delivery of videotex, but

killed its Electronic Home Services division in January.

Knight-Ridder's Viewtron system, which is currently operational in south Florida, uses a telephone-based system centered on the Sceptre terminal made by AT&T. Times-Mirror will also use the Sceptre terminal when it launches Gateway, the company's commercial videotex service, in Southern California in mid-1984.

To date, the cable industry has likewise used its own plant for both upstream and downstream transmission.

But some of the newly divested Bell operating companies have expressed interest in joint ventures with cable operators, and some analysts think the cable industry should respond.

Both the Yankee Group and the ELRA Group, for example, have urged the cable industry to consider tie-ups with

FEATURE

BOCs, and Bell Atlantic, BellSouth and Ameritech would probably be willing to entertain such discussions.

"We have what we believe to be expertise in the building of transportation and switching facilities, and that ideally prepares us for the building and managing of cable systems," says Jack Baird, a Bell Atlantic spokesman.

The company already has spoken to the Baltimore and Philadelphia city councils and cable television companies about its interest.

"We stand ready to respond to whoever would join in," Baird says.

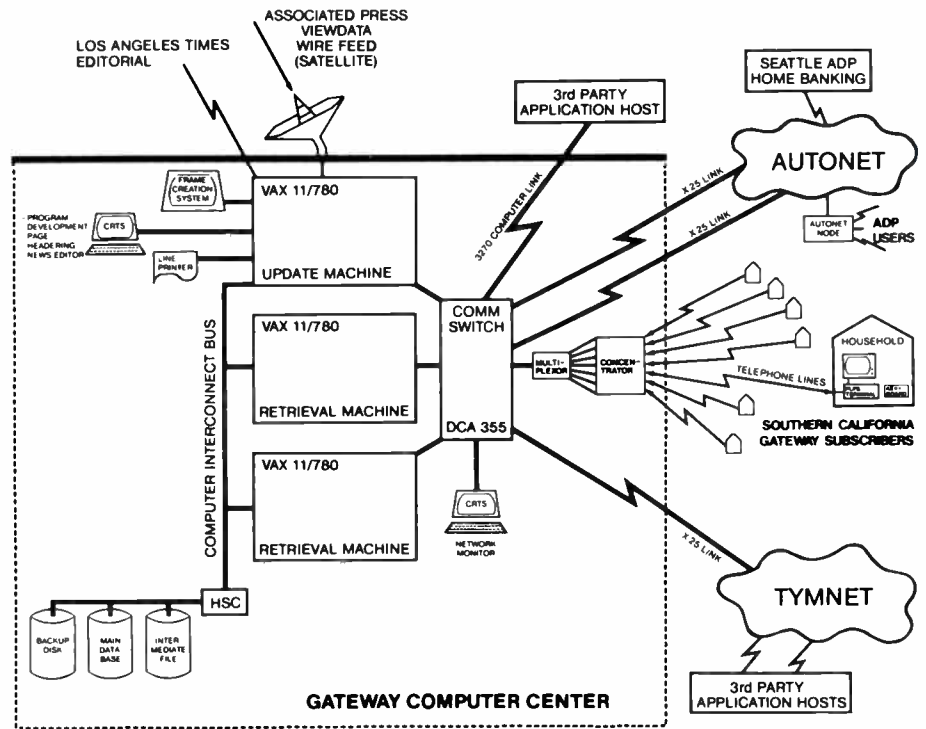
BellSouth hasn't made any decisions about cable-related business, but is definitely looking into it, according to Larry Shealy, operations manager for the firm.

The boldest move has been taken by Pacific Telesis, which serves California and most of Nevada. In Palo Alto, the company is proposing construction of an 80-channel, fiberoptic and coaxial, 422-mile subscriber network that would be leased back to the city.

Pactel would also construct an all-fiber digital institutional network offering high speed data and full-motion video services to business, government and educational institutions in the mid-peninsula area, according to



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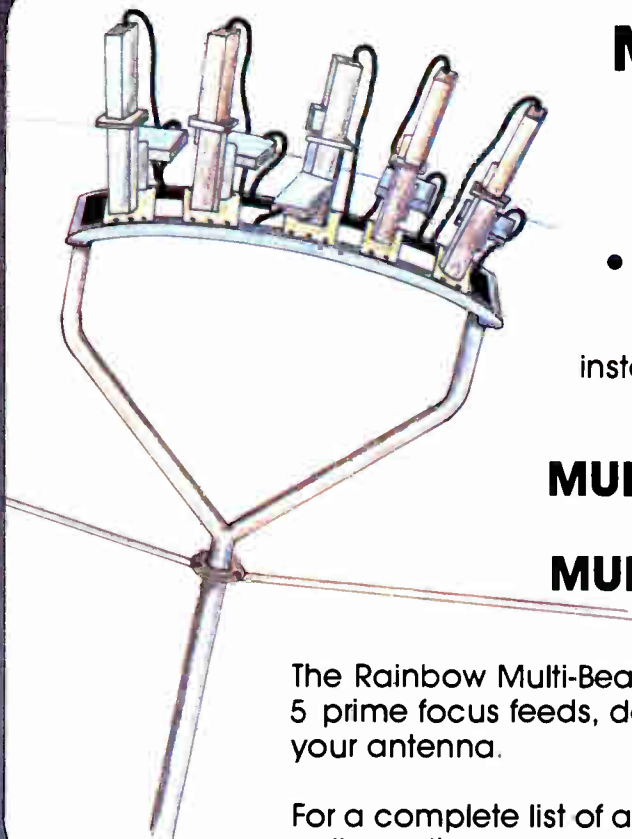
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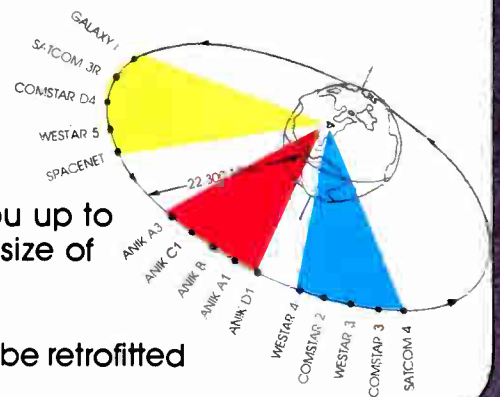
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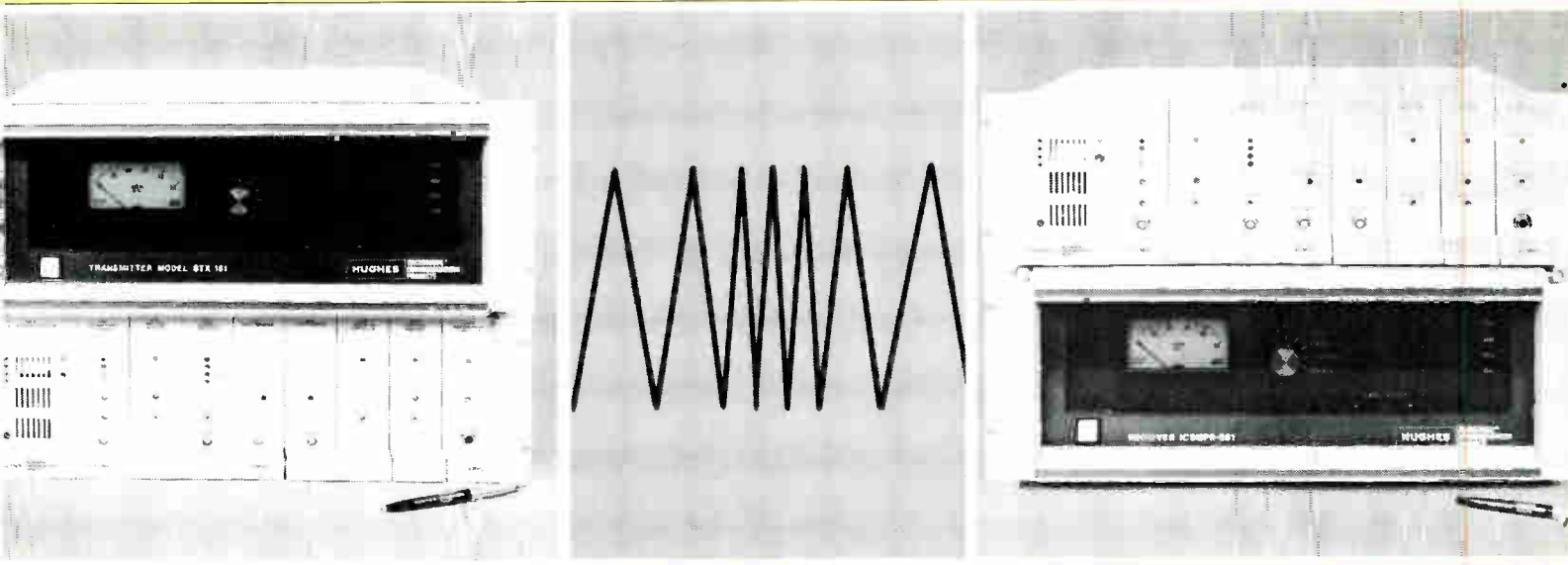
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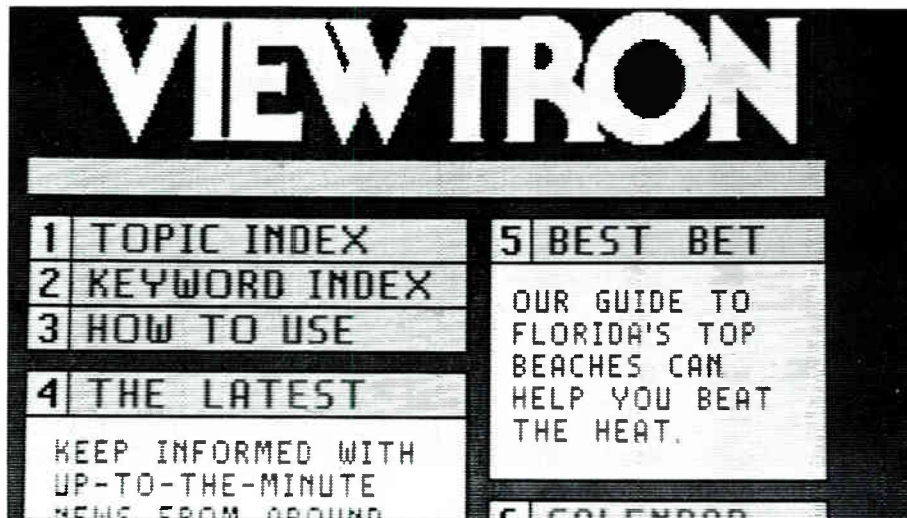
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Knight Ridder's Viewtron utilizes AT&T's Sceptre terminal

Scott Smith, a Pactel spokesman.

"The city of Palo Alto would select the programming to be carried on the 80 subscriber channels," Smith says. "Instead of being limited to programs which one cable company might want to offer, the city could pick and choose."

While cable industry supporters might find the prospect unnerving, a new system being developed by Cox Communications and Jerrold may offer cable operators new flexibility in two-way plant design—as well as peace of mind.

Designed as a replacement for the Indax interactive system that Cox has tested in San Diego, the new two-way system is built around Jerrold's Communicom terminal. What makes the system interesting is that it can tie together an entire metropolitan area, including sections of a city not wired for cable.

The Communicom terminal functions as a conventional converter, but can also be outfitted with a telephone modem. In cabled areas, both upstream and downstream transmissions are carried on the system operator's cable. In non-cabled areas, the telephone line serves as the pipeline into the home.

But the Cox-Jerrold tie-up is interesting for reasons other than the partners' ability to deliver videotex services by both cable and telephone lines. It also pits Jerrold against AT&T in a head-to-head contest over videotex standards and phone vs. cable technologies.

"AT&T is worried that our Sytek local networks and Communicom terminal are a serious competitive threat to the AT&T Sceptre terminal and local switched telephone network," says William Freeza, Jerrold engineer.

Formerly a researcher with Bell Laboratories, Freeza helped develop

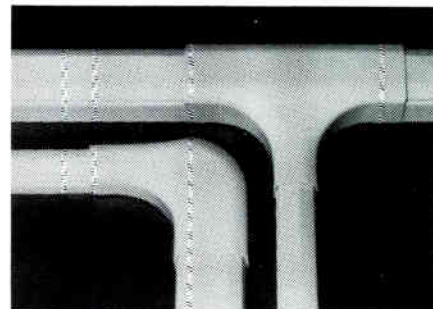
'The telcos naturally see their role as providers of the local communications transport system. And a two-way cable plant has to be seen as a threat.'

AT&T's North American Presentation Level Protocol. AT&T hopes to gain widespread acceptance of NAPLPS as the North American standard for videotex transmission, and the company's Sceptre terminal will only accept NAPLPS.

The Communicom terminal, on the other hand, is not locked into any particular protocol, and can accept NAPLPS, Prestel and Telidon.

The Communicom's versatility derives from a major difference in terminal

Molding Duct, Directional Guard, and Adapters.



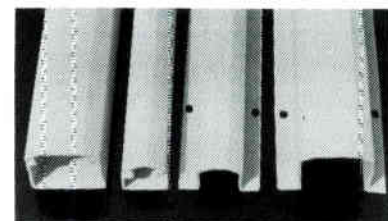
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FEATURE

design. The AT&T Sceptre terminal's operating system is stored in read-only memory—it cannot be altered or changed by the user.

But the operating system for the Communicom is stored in random access memory. It is loaded completely fresh each time the terminal is turned on, and as a result, Communicom is transparent to the protocol used. All modifications of operating and graphics software are controlled from the head-end.

Freeza says Communicom has several advantages over the Sceptre, among them cost and data transmission rates. "The twisted-pair phone network can run data at 1200 bits per second. Communicom runs at 128 kilobits per second," he says.

RF Cable is also cheaper. "On a dollar-per-minute basis our network can run at 1/10 the cost of the Sceptre/phone network," Freeza says.

Which isn't to say that the Sceptre terminal-based systems have no advantages. Communicom can't compete with Sceptre on a voice basis, and the broadband nets the Jerrold product is used with don't have the geographical coverage of the phone network, Freeza says.

"We can't effectively cover a large

region, but head-to-head within a region, it's no contest," Freeza claims.

Jerrold plans to use the NAPLPS protocols, but is also planning on writing new software better suited to high-resolution graphics applications, Freeza says.

An advantage of the Communicom over the Sceptre terminal is that such new programs can be downloaded at any time. To change the software encoded in Sceptre will require physical replacement of the chip containing NAPLPS, and that could mean sending a truck out to each subscriber's home.

None of which is likely to kill telephone company interest in new business ventures related to cable television. The telcos naturally see their role as providers of the local communications transport system. And a two-way cable plant has to be seen as a threat.

With the breakup of the old Bell system, the 22 basic operating companies will aggressively seek new business opportunities for their unregulated units, and broadband technology is a logical extension of their present activities.

Ameritech's John Wray reports that the company has definitely considered new ventures related to cable. "We're looking at a variety of ways to comple-

ment our present business," Wray says. The company would seriously consider a joint venture whereby Ameritech provides the upstream link for a two-way hybrid system, he says.

The company found a favorable reception for some of the ideas it is developing when Ameritech visited MSOs at the Western Cable Show last year. Although no formal announcements have been made yet, the firm is working on systems which might be of interest to cable system operators.

Wisconsin Bell, part of the Ameritech family, currently is awaiting Federal Communications Commission permission to begin construction of a cable system in Brookfield, Wis., a suburb of Milwaukee. Under terms of an agreement with the locally franchised cable company, Michigan Bell will construct, operate and maintain the system, while the cable operator leases a portion of the channel spectrum for its own use. Although the city council and other government officials are being kept abreast of developments, Michigan Bell actually doesn't need approval to begin construction, according to company spokesman Vyto Kapocius.

Illinois Bell also is exploring construction and lease-back arrangements in Chicago, according to Wray.

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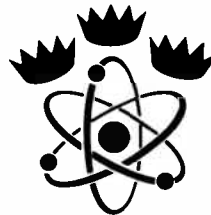
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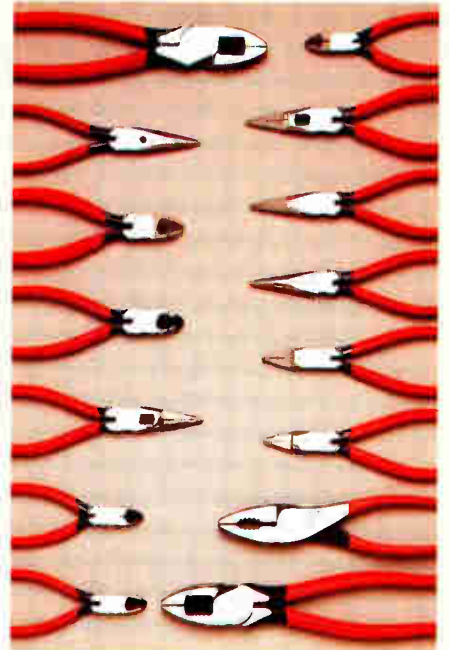
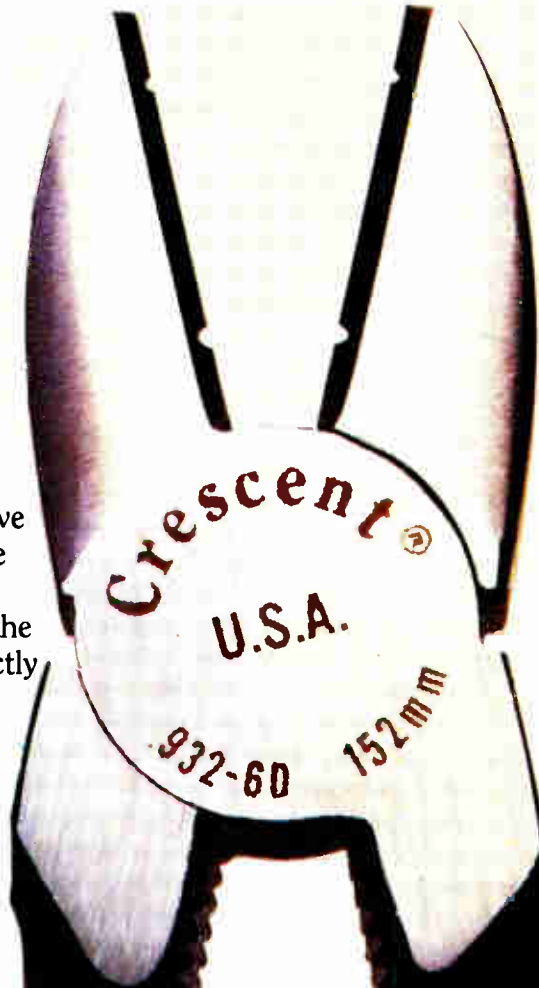
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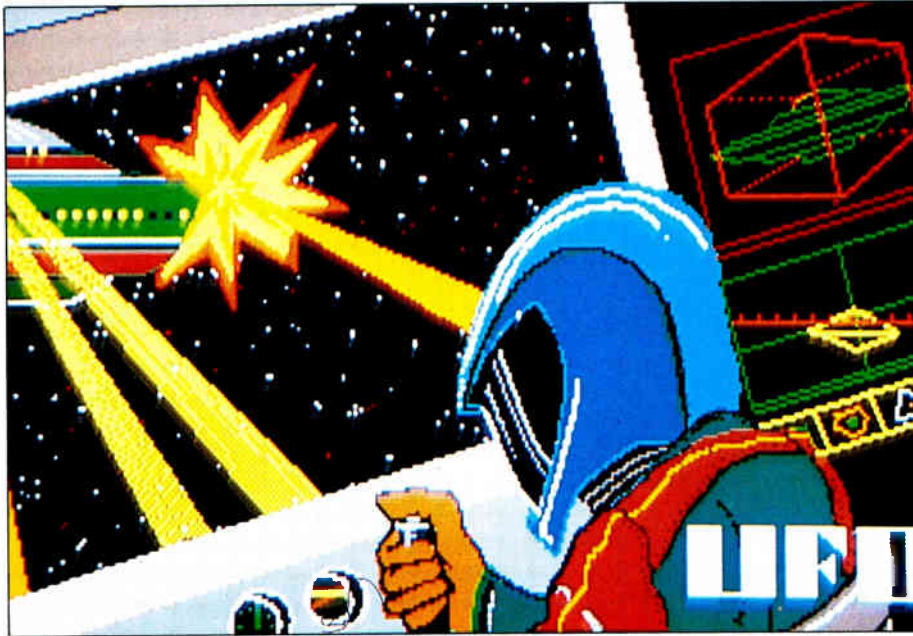
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Reader Service Number 22



New players emerging in video game arena



Electronic software delivery competition heating up with addition of The Games Network, NABU and Jones International

By Gary Kim

Despite the popularity of fast-paced video games like "Centipede," many software packages moved like slugs last Christmas. And despite the microcomputer industry's perch on the leading edge of high-tech, marketing and distribution methods for software have remained doggedly low-tech. Most consumers have gotten their games from store shelves and mail carriers.

But several new electronic delivery systems are on the way, and a slew of companies are jumping into the business, hoping to snare a healthy chunk of the potentially lucrative traffic.

The current market for video games stands at \$1.5 billion, while the market for home and personal computer software amounts to an additional \$2.1 billion each year. Surprised by the initial success of his Softyme Inc. electronic software distribution system, Thomas Hargadon, the company's chairman, expects the new distribution technology to grab between 15 and 25 percent of the total market.

Although few of the participants have launched their services, some knowledgeable industry observers are bullish about the budding business.

"Electronic distribution of software seems inevitable," says Esther Dyson, editor of *RElease 1.0*, a computer industry newsletter. "The only questions are how and when."

There are three answers to the question of how. Some players, like AT&T/Coleco Industries; Campbell, Calif.-based Romox; Redmond, Wash.-based Romlabs; and Xante Corp. of Tulsa, Okla., plan to use phone lines to deliver their programs. Atari and Activision, the two software heavyweights, plan to broadcast their programs directly to subscriber terminals.

Still others, like Jones International, the NABU Network and The Games Network, will deliver their programs by cable television lines. Playcable, the joint venture between Mattel and General Instrument Corp., has been doing so since 1981, although the service will fold at the end of February.

While it's no secret that Playcable has fallen far short of its goals, having signed fewer than 3 percent of its potential cable subscribers, the number of companies jumping into the business suggests that the time for electronic distribution has arrived.

Supporters of Playcable argue that the firm's problems can be blamed not on a

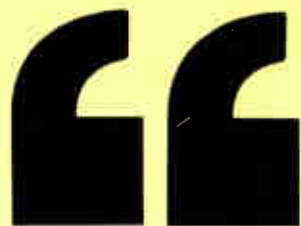
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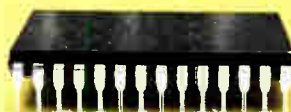
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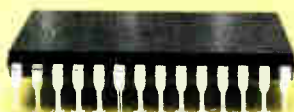
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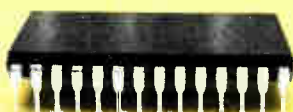
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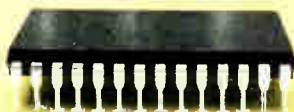
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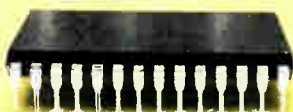
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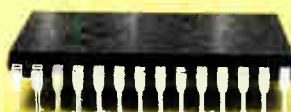
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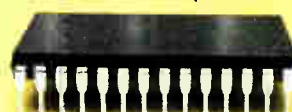
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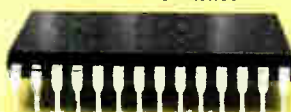
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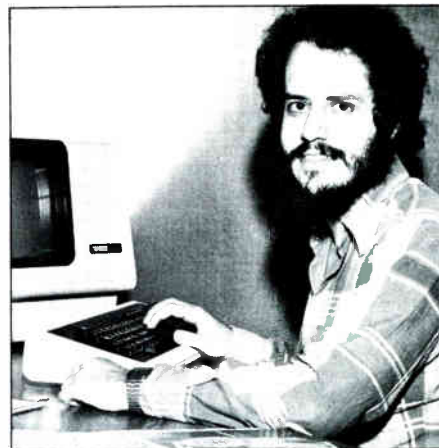
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Barry Megdal, vice president of engineering for The Games Network.

drives and high-speed modems. The low-speed port is a standard serial bus, while the high-speed port is a parallel connection similar to an RS-232 interface, but using a customized data format.

Unlike many other microcomputers designed for the home market, the Window uses a CMOS chip for its random access memory. The complementary metal oxide semiconductor consumes very little power, and is ideally suited for applications requiring computer portability. CMOS is also ideal for applications requiring that information in RAM be maintained while power is shut off.

The advantages for the games player are clear. Many TGN games feature higher levels of difficulty, which are grabbed off the cable when a player reaches a certain level of proficiency. Execution of any game can also be halted and resumed later.

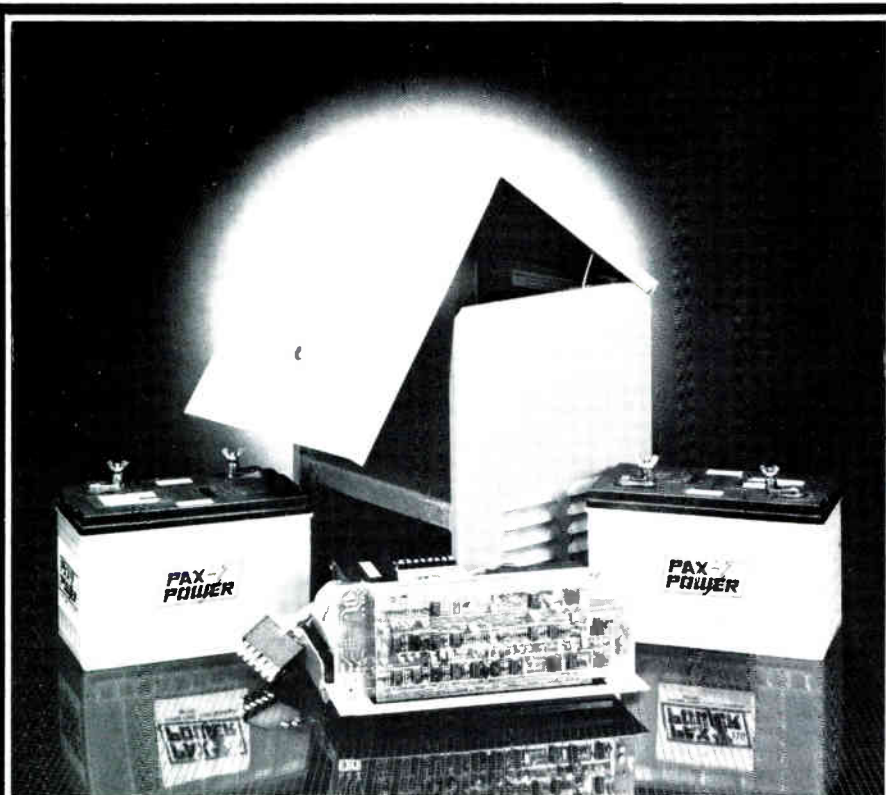
"If a subscriber is three-fourths of the way through level five of a game and decides to stop, he or she can come back later and resume where the game ended," according to Megdal.

Megdal likens TGN to radio, and software sales to records. "We give the software exposure, and customers who like the programs can buy them from retail vendors."

The company hopes to launch TGN services early next year.

Atari and Activision have also teamed to deliver video games directly to the home, but will do so using broadcast technology. Although the company will initially pitch its service to owners of the 14 million Atari VCS 2600 game units, it may eventually market software to owners of other games machines or microcomputers. The company has been tight-lipped about the technical details.

The NABU Network, currently offering computer software to 85,000 homes in Ottawa, is testing the waters for its



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FEATURE

cable-delivered service on the Tribune Cable system in Alexandria, Va. Like TGN, NABU will offer educational software, although on a much more extensive basis.

About 30 percent of TGN's programs will be educationally oriented, and the firm may add other services at some time in the future.

NABU, on the other hand, has made education its flagship. The company offers about 17 different educational systems. Among them is LOGO, a computer language especially well-suited for use by children.

Like NABU, Jones International plans

to deliver a wide range of computer-based information to the home using cable plant. And like TGN, Jones has developed its own hardware for subscribers to its Mind Expansion Channel.

But not all the players in the electronic delivery business plan on downloading software to subscriber homes, and for some, the making of copies is part of the plan.

Instead of imprinting the game or program code on a semiconductor chip or storing it on a floppy disk, the new distribution system transmits the same code over telephone lines. With store-based systems, like the Romox, a cust-

omer chooses a program shown on a video display terminal.

An in-store computer then makes a copy, either from on-site memory or by modem connection with an off-premise computer.

With direct-to-the-home formats, programs are downloaded by means of a special device attached to the computer or game player.

AT&T and Coleco Industries are developing this type of system. The two partners are also developing a modem that will allow owners of different machines to play games with each other over phone lines. **CED**

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IN CALIFORNIA:
The Converter People

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TECH II

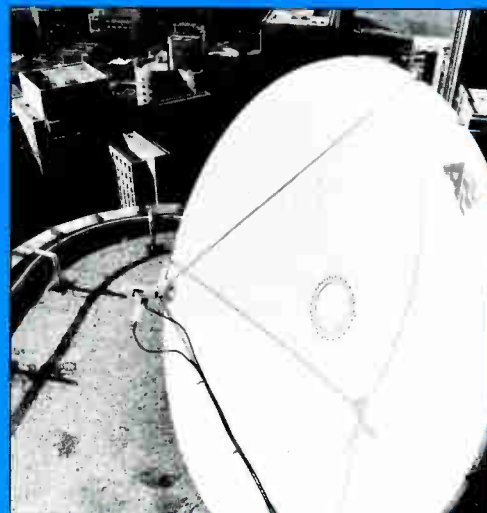
CED's feature supplement and Product Profile

March 1984

- **Planning for addressability: considerations and worries**
- **Product profile: 5- and 7-meter single feed antennas**



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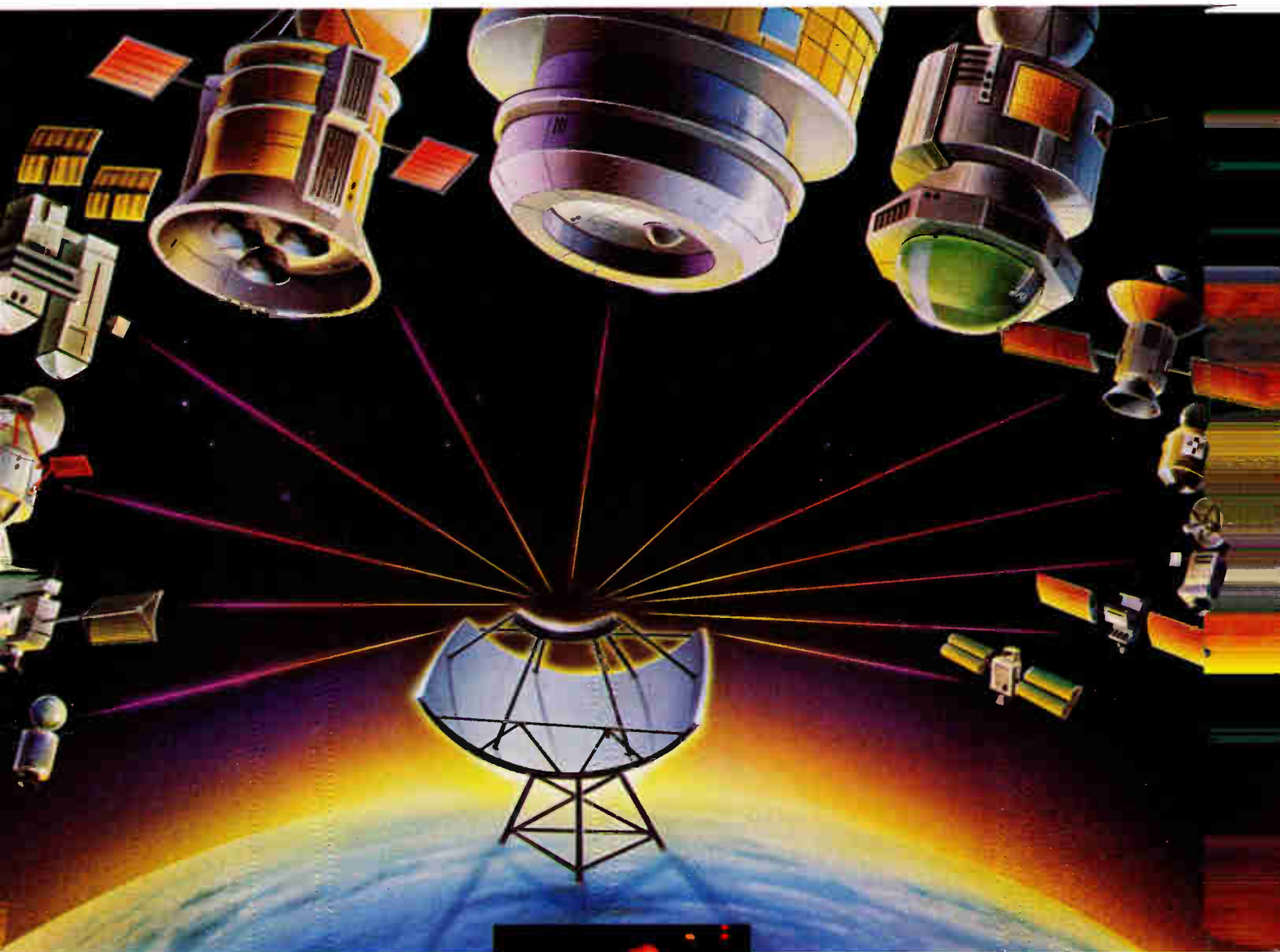
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Reader Service Number 27



ADDRESSABILITY— impact and control planning, Part Two

By Franc Stratton

The following are parts two and three of Franc Stratton's feature on addressability, which first appeared in the special Winter 1983 issue of *CE*. Stratton is a corporate staff engineer for interactive services, Comcast Cablevision.

Procedural considerations QC inventory

The major impact of addressability on this area is controlling and processing the large inventory of converters. Using the physical separation of converters during each step in the QC process facilitated by the equipment mentioned in *CE*'s Winter 1983 issue, audit trails and accountability are insured.

Converters should be received, tagged and stored in a secure area. Next, the converters should be unpacked, checked for physical damage and logged into inventory by serial numbers. Then, the converter is placed in a warm-up, meaning that it is plugged into an electric outlet for a period before testing. Next, the converters enter the QC testing phase (systems may differ here over sampled or comprehensive testing procedures). If failure of the QC test results, boxes should be logged and tagged with the reason for failure, repacked and sent to warranty repair service.

If QC is passed, then the box is stored in the good stock, ready for issuing by serial number to installers and technicians. Converters that are returned from the field (tagged by installer or having a tech detecting problem) should be placed in a pest extermination box, then processed through normal QC (see above) with a converter status verification check to assure that it is properly in the audit trail process.

If applicable, prom programming in the QC process should be as tightly controlled as the converters. QC personnel (and everyone else responsible for addressability) should sign a written guarantee not to misuse converters or give away any proprietary information or equipment that would compromise the manufacturer's or cable operator's scrambling and addressable security.

Many systems will choose not to QC boxes. Based on a low failure rate (less

than 1 or 2 percent), they probably will not justify a QC function. Care should be taken when choosing this route, however, since warranty guarantees become very important (see "Negotiating a warranty").

Monthly or weekly inventory of converters should be by status; i.e., new stock, truck, house, at vendor, lost, stolen, etc. Disconnect days of high converter field retrieval should be staggered so as not to overload the QC processing stages.

Marketing

One sizeable effect of addressability on marketing strategy is subscriber uncertainty and confusion created by allowing uncontrolled selection of program services. Subscriber confusion increases the need for more information; which causes more telephone traffic; which creates pressure for more phone lines; which increases the need for more phone Reps, ad infinitum.

For many systems, the well-conceived program for packaging and providing support information necessary for subscriber choice simplifies the selection process for both the subscriber and system personnel. Packaging strategy should provide identifiable incentives and perceived value for taking a package and an identifiable deterrent for breaking the package. This Long Island approach increases subscriber perceived value and satisfaction, while reducing churn and the related problems mentioned above.

Packages should be based on local demographics, marketing surveys, franchise requirements, system limitations and a thorough understanding of the reasons for local churn. Packages can include pay programming, remotes, FM hook-ups, cable guides, VCR hook-ups, etc.

Loss leaders should be used at the point in packaging of subscriber pain, thus raising the point of pain. For two-way systems, security, IPPV and other ancillary services could be part of the package. One-way systems could include games, FM or other incentives appropriate for their local packaging strategy.

It is extremely important that each local system employee with subscriber contact know the selection and under-

stand the pricing of each package. Every field salesperson, installer and service technician also should hand out a well-written and simple package flyer when making each subscriber contact.

The same package explanation should be well understood by CSR and repair service representatives so that each system employee has the same simple information necessary for customer packaging selection. Selection information can also be on loop players used as a background for subscriber education during telephone "on-hold" periods. Local avails such as advertisements near the local paper's cable guide, radio advertising, system guide advertising and local origination generated commercials inserted strategically are only a few of the methods for use by the local manager for maximizing the subscriber exposure to information necessary for package selection.

All information sources, however, should present the same informational content so that unnecessary confusion is minimized. Handout and local origination tapes could also contain pertinent subscriber information necessary for converter, TV and VCR operation; in other words, what to do before you call the cable repair service.

Some systems may want to consider churn and spin as a revenue source, rather than just the necessary cost of upgrading, downgrading or changing to an equal service. In this case, higher than normal fees may help discourage simple churn.

A la carte selection should not be ruled out, however, as this may be the only way to get some subscribers to sample programs. One way of implementing a *la carte* selection is to give the customer all services for a specified period, then downgrade to a personal package. Since this process is expensive for the operator, it should be expensive for the customer and should not include benefits offered other subscribers choosing pre-selected packages.

Impulse pay-per-view (IPPV) implemented with either cable return or phone return should simplify pay-per-view and packaging considerations for the future. New revenue sources may be gleaned from the ability to target a larger number of pay events to a smaller segment of a subscriber base (narrow-

Antennas

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Anixter Mark								
ES-40200CD	@ 3.7 GHz: 44.0; @ 4.2 GHz: 45.1	3.7—4.2 GHz	(cross) 30 dB min.	70 mph	125 mph	5-meters	(subsystem) @ 10° elevation: < 34° K; @ 40° elevation: < 18° K	N/A
ES-40200SD	@ 3.7 GHz: 44.0; 4.2 GHz: 45.1	3.7—4.2 GHz	(cross) 30 dB min.	70 mph	125 mph	5-meters	(subsystem) @ 10° elevation: < 31° K; @ 40° elevation: < 18° K	N/A
Antenna Development & Manufacturing								
ADM 20	46.3 dBi @ 4.0 GHz	3.7—4.2 GHz	N/A	N/A	N/A	6.1-meters	N/A	Ø 3 dB = .85°, Ø 10 dB = 1.20°
ADM 16	44.1 dBi @ 4.0 GHz	3.7—4.2 GHz	N/A	N/A	N/A	16-feet	N/A	Ø 3 dB = 1.15°, Ø 10 dB = 1.91°
Blonder-Tongue								
6018/6018LS	(@ midband) receive: 44.5 dBi; transmit: 47.3 dBi	3.7—4.2 GHz, receive; 5.925—6.425 GHz, transmit	between ports (Std. feed) linear receive: 30 dB min.	97 Km/h	200 Km/h	5-meters	5° elevation: 44° K; 40° elevation: 18° K	(mid-band) nom. -3 dB @ .86° receive & .63° transmit; -15 dB @ 2° receive & 1.25° transmit
6022	(@ midband) receive: 47.5 dBi; transmit: 49.4 dBi	3.7—4.2 GHz, receive; 5.925—6.425 GHz, transmit	between ports (Std. feed) linear receive: 30 dB min.	72 Km/h	200 Km/h	7-meters	5° elevation: 46° K; 40° elevation: 19° K	(mid-band) nom. -3 dB @ .70° receive & .5° transmit; -15 dB @ 1.3° receive & 1.0° transmit
Comtech Antenna								
5-meter elevation/azimuth	(@ 4 GHz) 44.9 dB	3.7—4.2 GHz, receive; 5.9—6.4 GHz, transmit	between ports: 35 dB min.	85 mph	120 mph	5-meters	N/A	1.1° (half power)
7.3 meter dual axis, polar mounted	(mid-band) receive: 48 dBi; transmit: 50.7 dBi	3.7—4.2 GHz, receive; 5.9—6.4 GHz, transmit	(cross) 35 dB min.	65 mph	120 mph	7.3-meters	10°: 36° K; 30°: 24° K	.65° (3.95 GHz); .45° (6.175 GHz) half power
Conifer								
AN-1200	(@ 4 GHz) 42.3 dB	3.7—4.2 GHz	between ports, min.: 40 dB	60 mph	100 mph	12-feet	100° K max.	3 dB = 1.5° nom.
Gabriel Electronics								
SES-49	@ 4 GHz—44.0 dBi	3.7—4.2 GHz	between ports: 35 dB	80 mph	125 mph	4.9-meters	N/A	1.1° half power
Harris								
5246	@ 4.6 GHz: 47 dBi, receive; 49.5 dBi, transmit	3.7—4.2 GHz, receive; 5.925—6.425 GHz, transmit	(port-to-port) TX to RX: 30 dB, transmit; RX-RX, linear: 35 dB, receive	45 mph	125 mph	6.1-meters	5°: 49° K; 40°: 22° K	@ -3 dB: .85°, receive; .56°, transmit, @ -15 dB: 1.7°, receive; 1.2°, transmit

Model	Gain	Frequency	Isolation	Wind operational	Wind survival	Reflector size	Noise temperature	Beamwidth
Lindsay LD-15	42.0	N/A	N/A	wind loading: 100 mph		4.6-meters	N/A	1.2°
M/A-COM Prodelin 5-meter	mid-band gain: 44.4 dB	3-7—4.2 GHz	(feed port) 39 dB	60 mph	125 mph	5-meters	5°: 44° K; 40°: 18° K	mid-band half power: 1.1°
Microdyne 5-meter TVRO	4 GHz @ input flange: 44 dB; 12 GHz @ input flange: 53.5 dB	3.7—4.2 GHz; 11.7—12.2 GHz	N/A	100 mph	125 mph	5-meters	10°: ≈ 40° K; 50°: ≈ 50° K	(mid-band) 4 GHz @ -3 dB: 1.1°; 12 GHz @ -15 dB: .7°
7-meter	4 GHz @ input flange: 47 dB; 12 GHz @ input flange: 56.5 dB	3.7—4.2 GHz; 11.7—12.2 GHz	N/A	100 mph	125 mph	7-meters	10°: ≈ 25° K; 55°: ≈ 15° K	(mid-band) 4 GHz @ -3 dB: .75°; 12 GHz @ -15 dB: .50°
Pico SAR-14	mid-band gain: 43.6 dBi	3.7—4.2 GHz	(X-pole) > 30 dB	104 Km/h	200 Km/h	4.2-meters	N/A	3 dB half power: 1.27°
RF Systems Division, General Instruments 15-foot model	(mid-band) 44.2 dB;	N/A	N/A	N/A	N/A	15-foot	@ 30°: 20° K	-3 dB: 1.2°; -15 dB: 2.4°
SatCom Technologies 550KS	mid-band: 55 dBi, receive; mid-band: 56.2 dBi, transmit	11.7—12.2 GHz, receive; 14—14.5 GHz, transmit	(feed-port) 35 dB; cross: 35 dB, on; 30 dB, off	80 mph	25 mph	5.5-meters	10°: 38° K; 30°: 25° K	-3 dB: 30°, receive, .25°; transmit, -15 dB: .60°, receive, .50°, transmit
700CH	mid-band: 47.6 dBi, receive; 50.3 dBi, transmit	3.7—4.2 GHz, receive; 5.925 —6.425 GHz, transmit	same as above	45 mph	125 mph	7-meters	10°: 36° K; 30°: 22° K	-3 dB: .69°, receive; .48°, transmit, -15 dB: 1.41°, receive; .96°, transmit
Scientific- Atlanta 8008/8008LS	mid-band: 44.5 dBi, receive; 47.3 dBi, transmit	3.7—4.2 GHz, receive; 5.925 —6.425 GHz, transmit	between ports (Std. feed): 30 dB min.	60 mph	125 mph	5-meters	5°: 44° K; 40°: 18° K	-3 dB: .86°, receive; .63°, transmit, -15 dB: 2°, receive; 1.25°, transmit
8010C	mid-band: 47.7 dBi, receive; 51.1 dBi, transmit	same as above	between ports: 30 dB min.; transmit to receive; 35 dB min.	N/A	N/A	7-meters	5°: 45° K; 20°: 22° K	-3 dB: .7°, receive; .5°, transmit
Standard Communications 5-meter	44.2 dBi	3.7—4.2 GHz	N/A	N/A	N/A	5-meters	N/A	N/A

casting). Billing computers once again, however, prove to be the limiting factor for this development. The IPPV implementation could be funded by subscriber rentals of an IPPV add-on or standard converter. Opinion polling side benefits could be very valuable feedback for cable marketing, sales and advertising efforts.

Customer service

The greatest impact of addressability on business office CSRs is customer confusion over program and package selection. Using identical material prepared by marketing for field sales, CSRs should be able to explain courteously, but briefly, the program packages and other services offered by the local cable system. Confused customers and lengthy phone conversations are counter-productive and result in needless telephone system overload.

CSRs need extensive training reinforced with an on-hand reference manual serving as the "bible" for local system procedures, policy and pricing. Training and reference should include a working introduction to cable and its terminology; a courteous but controlled

telephone manner with "canned" responses; and a familiarity with local installation practices for VCRs, cable ready TVs, video projectors, FM receivers and CATV ancillary services.

If the system is on-line, then the CSR also needs training in data entry and a limited introduction to data systems. The reference material also should contain serviceable area streets, addresses, extension numbers, the names of local personnel who can help solve a customer problem, construction schedules for new build or rebuild areas and sample forms.

Repair service reps (dispatch)

The main impact of addressability upon dispatch personnel is customer confusion with the operation of high tech equipment. Well conceived hand-outs and local origination ads can help alleviate this problem. The dispatch or repair service rep should rarely need to further clarify or answer questions not covered by the two information sources, if these sources have been well-developed.

Repair service reps need training and reference manuals that cover mar-

keting's current program package and pricing, telephone courtesy and psychological training for handling difficult subscribers. They need an operational knowledge of TVs, converters, FM receivers, video projectors, CATV systems and other applicable subscriber equipment. Dispatch personnel also need a thorough understanding and reference examples of all CSR, installation and maintenance scheduling forms with a list of names and extension numbers of system persons who can help with a customer's problems. CSRs need well-defined procedures for handling outages and other emergency "fail-safe" procedures necessary on certain occasions.

If on-line, then service reps need limited DDP/CRT training. Finally, they need "canned responses" and simplified troubleshooting methodology so that the need for a service call is well-defined and not a subscriber operating error.

Installers/technicians

The complexity of addressability may burden local cable technician personnel not familiar with digital RF communi-

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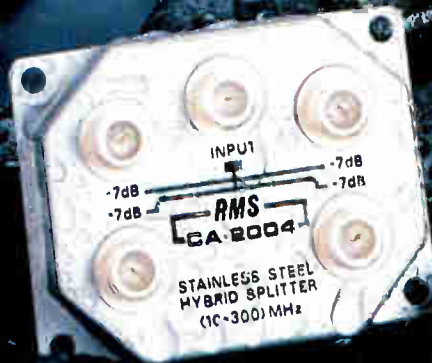
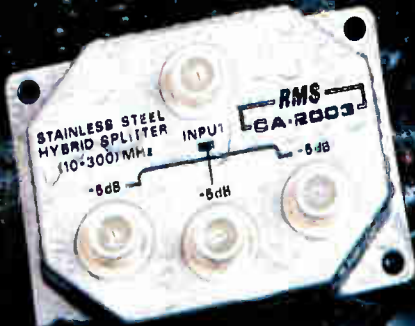
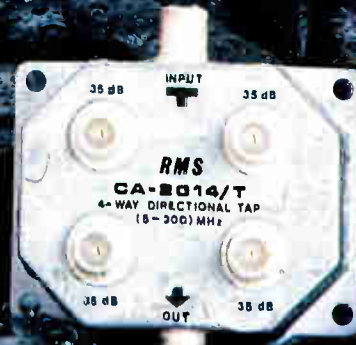
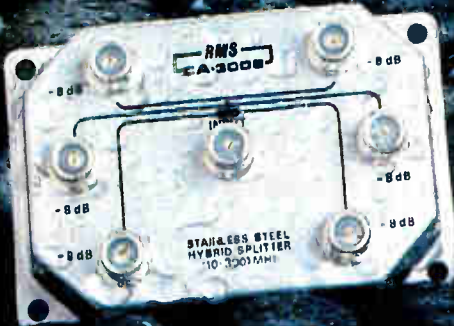
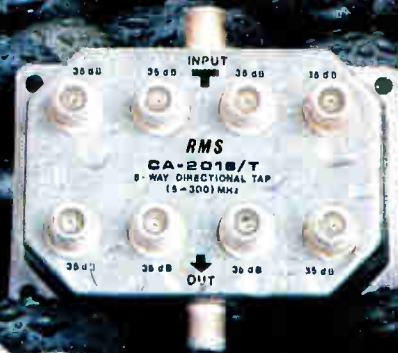
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TECH II

cations or computer technology. Training is the only procedural answer to this problem.

Installation personnel, of course, need training in local installation practices, generalized cable operating and trouble-shooting procedures, good customer relations and a thorough knowledge of program packages and prices. They also need beginning electrical, electronic and digital training. NCTI and Heathkit offer excellent introductory courses in these areas, and these courses are inexpensive, graded and credited upon completion. This gives installers needed training for advancement to technicians; but it also does not overtrain them so that the local systems lose them to other job opportunities.

Technicians not only need traditional cable training already provided by many MSOs and the NCTI, but they need high-tech digital RF and computer training. Fortunately, companies like Heathkit offer electronics, math and digital training that is inexpensive and self-paced so that conflicting schedules don't upset technical production. A side benefit is that you don't overtrain techs so that you lose them, but the courses sufficiently expose them to practical theory so that they have a thorough knowledge of digital electronics necessary for defining, isolating and repairing subscriber and cable system problems.

Technical personnel also need a thorough operational knowledge of TV receivers, TV projectors, VCRs, FM receivers and the home electrical system. Techs need a thorough understanding of emergency procedures for standby, system outages, computer failure, headend failures and others. A fast reaction and cure for system failures directly affect customer satisfaction, which relieves churn pressures.

Service call records become more important for addressability than for traditional cable operation since statistical problem analysis and customer refunds often depend upon service call information. Service call forms should at least have customer name; current program package; date call taken; date call scheduled; initial of scheduler; lower and highest channel levels; data carrier levels; audio and video RF levels on scrambled channel with problem; serial numbers of converter swapped; reason for call; what actually found; customer signature of satisfaction; and other information deemed appropriate. The converter should be tagged by technical personnel and turned into QC technician for analysis.

Common bonding is not only a National Electric Code requirement necessary for insurance liability, but it also protects valuable converters. Traditional pole bonding also protects converters and system from surge damage.

Technical personnel need to be especially aware of subscriber misuse or theft-of-programming services. These employees (and anyone else associated with addressability) need to sign an agreement with the local cable system not to be careless and compromise proprietary information or equipment, which may result in theft-of-service.

Part Three

Final considerations Security

The security planning for addressability is highly subjective and depends largely upon size, education, social level and the moral makeup of the local subscriber base. Budgetary limitations also greatly impact the local system's ability to prevent and then, if necessary, react to a theft-of-service problem.

As mentioned earlier, planning and channel line-up for the possibility of future trapping is highly advantageous as a fail-safe technique. Basic theft of service also can become less attractive if VHF channels 2-13 contain only scrambled pay service and/or scrambled off-air must-carries.

As a minimum, this author suggests that multiscrambling techniques with at least three choices of scrambling modes switchable at the headend be a feature of any addressable product chosen for system use. Multiple mode scrambling choices allow the cable operator to play one-upmanship games with black box pirates. Creative techniques for change-over during soap opera prime time have proven effective for uncovering a portion of the illegal box problem. Tagging non-scrambled channels or impressing AM modulation on non-scrambled channels will likewise offer the operator security tools for uncovering theft potential with some security schemes.

Closely monitoring system downgrades with billing system data can reveal patterns such as an entire neighborhood downgrading to basic where historical data indicates a higher penetration of pay-to-basic. Fail-safe traps can be temporarily installed in this neighborhood, and operators may then

uncover the pirate box source or at least limit further activities in this neighborhood.

Some systems may want to have on-board a security person or at least appoint a person responsible for the security planning for the pay services. Box retrieval procedures should also be the responsibility of such a person.

The box serial number should be tied to a specific subscriber or state of system processing at all times. One of the most difficult tasks in a theft-of-service case is proving that the customer tampered with the system's box or introduced an outside pirate box. In fact, if each system and manufacturer kept accurate serial number records, then tampered-with pirate boxes could be traced to the source. Conscientious manufacturers have legal teams that will aid systems in tracing the source of that manufacturer's boxes being modified for theft of service.

Converter hard security should prevent the "honest" subscriber from tampering with the box to defeat the security electronics. Eccentric screws, color coded pop rivets and even electronic latches can prevent or record unauthorized box tampering.

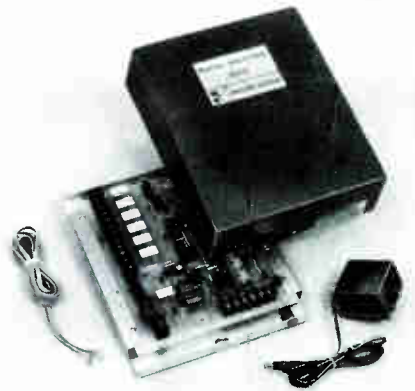
One recent theft-of-service problem has emerged involving remotes. Many systems offer remotes as part of a package or as a monthly rental. Smart subscribers have then called the system, claimed remote theft or loss, and either downgraded or stopped remote rental. The subscriber then has permanent use of the remote with only a minor forfeiture of deposit.

One method of combating this remote theft-of-service is to disable the IR circuit on a converter and swap boxes anytime a subscriber cancels remote service. Some manufacturers have anticipated this problem and provide converters with IR disabling from the headend computer.

Discounted box migration for second sets occurs when the subscriber pays for a second outlet and loans or sells the discounted box to a neighbor as a first service. As long as the second set is paid for, the system never discovers the migration. Manufacturers with master-slave converters have already addressed this potential revenue drain.

Some manufacturers allow systems great flexibility in planning for future theft-of-service problems. Downward-compatible baseband converters can descramble RF sync suppression while allowing future services to be added with baseband security. As a matter of fact, the baseband converter manufac-

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TECH II

turers are currently offering RF sync suppression compatibility with other manufacturers. The gradual transition to random baseband security could be funded by increased remote rental charges justified by the better audio-adjusting remote.

Transactional audit trails generated by the billing or controlling computers can prove very effective toward thwarted internal theft-of-service problems. Billing system transactions should be compared with control computer transactions.

Another feature of some of the newer converters called channel mapping can also reveal pirate boxes. By changing the video modulators and channel line-up, the system could receive calls from persons with unauthorized boxes complaining about channel reassignment. Authorized boxes with dynamic channel mapping will never notice the channel change.

Choosing a converter

Since each system and MSO differ so greatly, this author suggests that the potential addressable user should evalu-

ate each manufacturer and addressable system by utilizing a weighted point system. The following is a suggested outline for beginning the evaluation:

- List those features that the system considers important enough to demand from each addressable vendor.

- Weigh these features by order of importance by assigning the most points to the most important and the least points to the least important features.

- Rate the addressable system on a feature-by-feature basis with the most points given to those manufacturer features that most closely meet the systems needs.

- Multiply the features weighing factor by the rating points, total the result and pick the manufacturer with the highest overall rating.

A condensed version of a generic rating for one vendor under consideration is presented on page 66.

Spreadsheet projections

Having decided upon a marketing plan, formulated a program line-up and selected among addressable vendors, prepare a paper on microcomputer

spreadsheet projection. Though it is beyond the scope of this article to review, many good microcomputer spreadsheets exist that allow interactive projection. Some of the more familiar ones are VisiCalc™, SuperCalc™, Multiplan™, PeachCalc™ and Microplan™.

Because of the current rules for depreciation and investment tax credits (ITCs), most systems will benefit from a 7- to 10-year useful life projection for the converter. Useful life is the basis for three depreciation methods (declining balance, straight line and sum-of-the-years-digits) with ACRS standing alone. An accountant can pick the best depreciation method for the system.

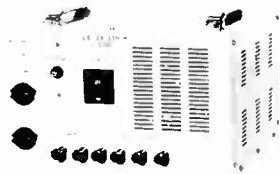
From the marketing plan for future service introduction and subsequent revenues will come the following assumptions necessary for the projection:

1. Basic subscribers in each year.
2. Pay subscriber at each level (from pay/basic ratios).
3. Pay churn/spin rates and revenues.
4. Basic churn rates.
5. Upgrade/downgrade/spin revenues.
6. Additional outlet number and

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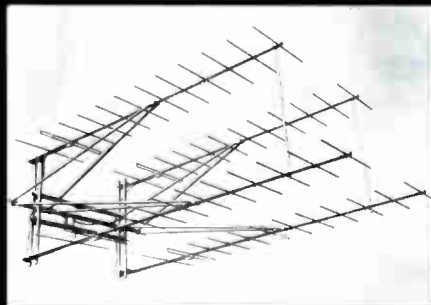
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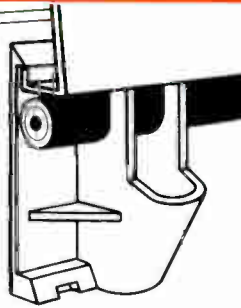
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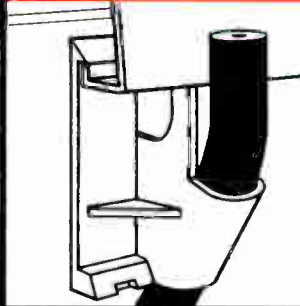
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Reader Service Number 35

TECH II

Manufacturer: J-Brand
Converter: Model XYZ

Feature	Points(1-4) X	Weight(1-15)=	Subtotals
Converter Price	2	15	30
Converter Delivery	4	11	44
Converter Warranty	2	12	24
Scrambling Security	3	14	42
Computer/Controller Costs	2	9	18
Costs per Channel	4	10	40
Product Line Compatibility	2	3	6
Remote Price/Features	2	4	8
BW/No. of Channels	4	2	8
Parental Control	4	1	4
No. of Systems Installed	3	7	21
Converter Failure Rates	1	13	13
Billing System Interface	2	5	10
Vendor Financial Strength	3	6	18
Hard Security	2	8	16
TOTAL VENDOR POINTS:			302

By comparing vendors with this rating system, clear choices usually emerge:

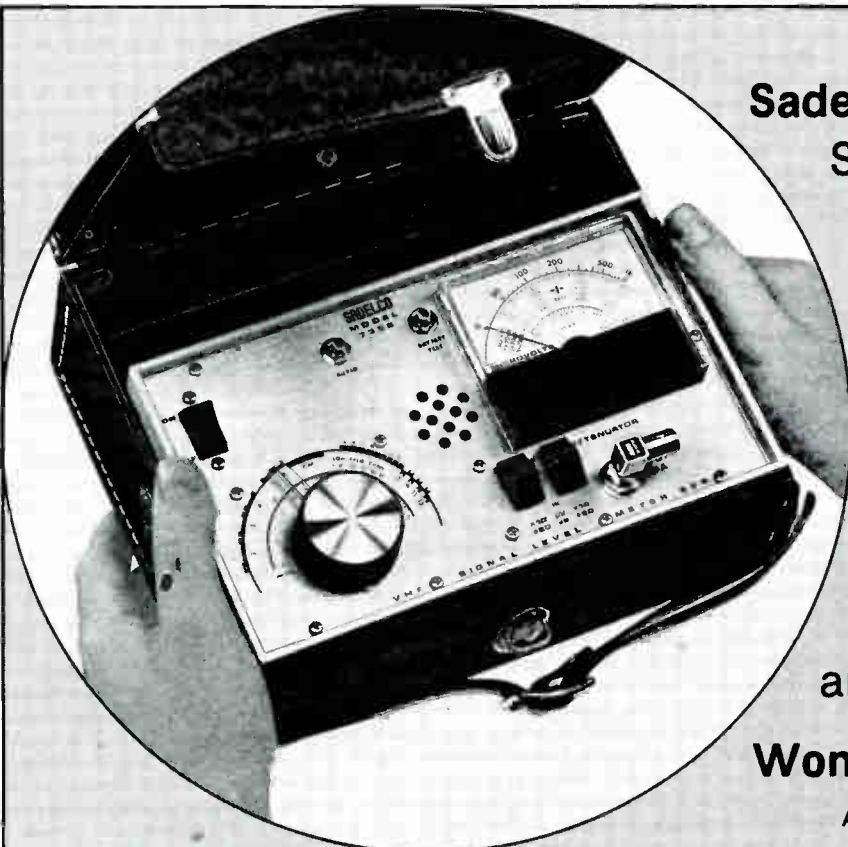
Manufacturer	Points	Choices
1. J-Brand	302	X
2. Z-Brand	300	X
3. T-Brand	200	
4. O-Brand	150	

revenues.

7. Pay-per-view events and revenues.
8. Installation rates and revenues.
9. Service call level increased based on a percentage of total subscribers.
10. Additional operational people necessary to implement marketing plan.
11. Number of scrambled channels needed.
12. Remote penetration and revenues.
13. Advertising and information costs.
14. Telephone system upgrading.
15. Other additional revenues and expenses.

Based on the manufacturer choice, the following assumption should be considered:

1. Cost per converter.
2. Cost per channel, including encoding, fail-safing and other headend equipment.
3. Cost for headend equipment, including computer and/or controller.
4. Cost for environmental conditioning for headend.
5. Maintenance costs.
6. Repair, warranty and replacement costs.
7. Out-of-box and field return rates.



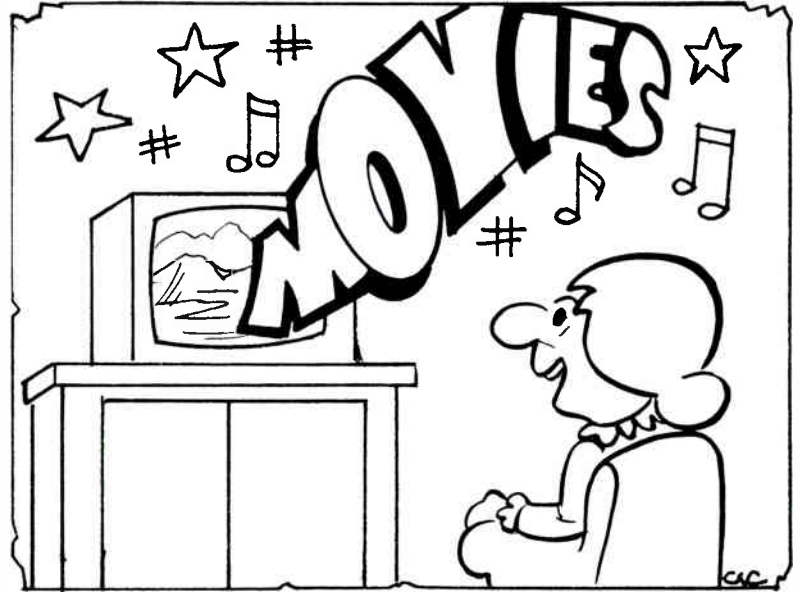
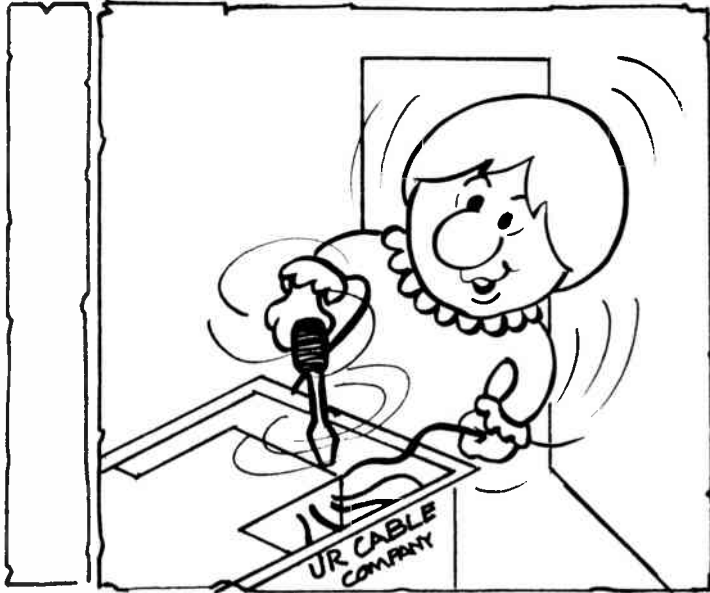
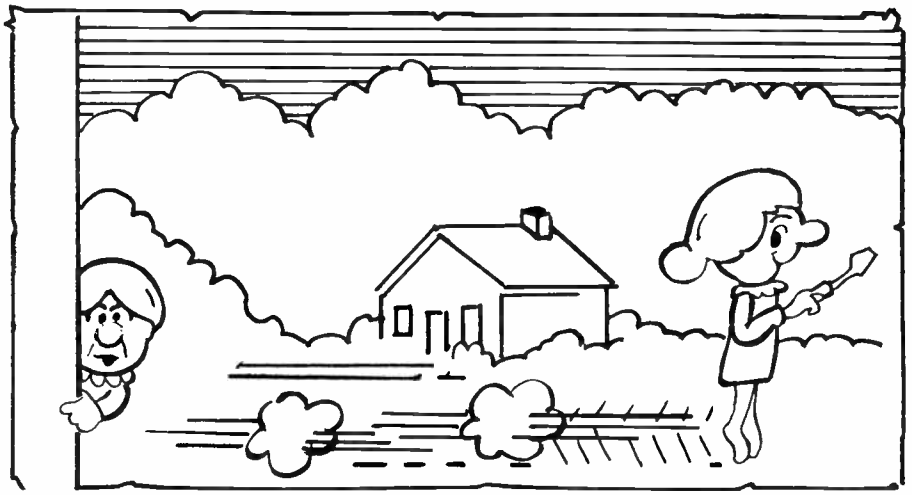
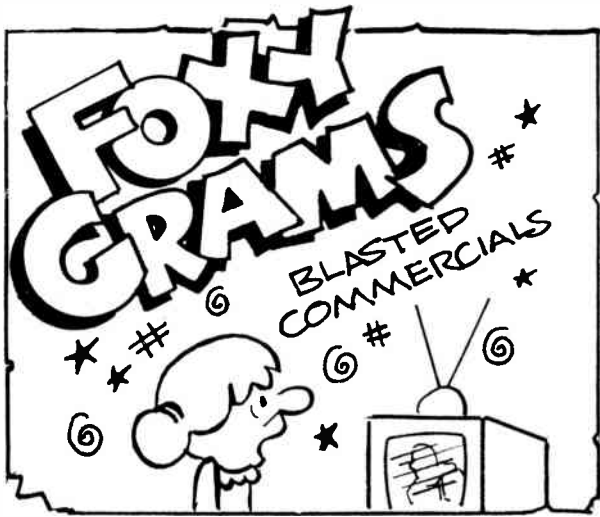
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Wade Communications has developed, fielded tested and put into operational use an externally mounted device that allows the operator to initiate or terminate all services — plus — three predetermined, individual services per spigot. This is accomplished from your head-end or other central location. Our system will interface with two-way systems or one-way systems without major retrofit and it does not require change-out of existing convertors. System software is strong and flexible with a cost-per-subscriber that is substantially lower than any other "out of the residence" technology available today.

Hard to believe? Give us a call for more information or to schedule viewing the technology in operation at (713) 784-1095 today or write Wade Communications, 3535 Briarpark Drive, Suite 260, Houston, Texas 77042.



WADE COMMUNICATIONS

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713 785-3143

8. Converter inventory and QC processing costs.
9. Training costs.
10. Remote and other converter feature costs.
11. Billing interface costs.
12. Test equipment costs.
13. Other costs.

The above is useful for projecting capital needs and revenue levels. However, now the difficult task of projecting operating expenses lies ahead. Operating expenses should include:

1. Salaries for extra people and equipment necessary to implement, operate and maintain the more complex system (don't forget benefits).
2. On-line billing charges if applicable.
3. On-going training expenses.
4. Equipment leasing charges, if applicable.
5. Equipment maintenance and warranty expenses.
6. Converter replacement expenses due to failure, on-going loss, theft and damage.
7. On-going remote replacement expenses.
8. Added operating supplies expenses (computer paper, diskettes, etc.).
9. Additional programming costs.
10. Extra copyright fees.
11. Extra bad debt expenses.
12. Additional telephone line leasing.
13. Depreciation expenses.
14. Other applicable expenses.

Hopefully from all the above, gross revenues can be estimated for each of the projected years with addressability. Now depreciation, ITCs, taxes (local, state, federal), and other items claim their part of gross.

If a positive cash flow results from all the above, then compare these rate-of-return results with any other method of increasing your revenues from subscribers. Then, if addressability has a higher incremental return on investment than non-addressability, compare the rate-of-return to a reasonable interest rate return. If still positive, figure out a way to finance it. Otherwise, deposit your revenues in the bank and forget addressability. (See "long-term considerations below.")

Note: The above is a very simplistic overview of a very complex forecasting model involving input from operations, finance, strategic management, accounting, engineering, human resources and others. A committee made of these type of persons should all have input.

Negotiating a warranty

In the past, MSOs and system oper-

ators have not made a good manufacturer's warranty and guaranteed minimum specifications part of the addressable system purchase order. The bare P.O. then served as the only document for the basis of redress for perceived non-performance or unreliability. Warranties thus become negotiable and manufacturer's specifications were classified as reasonable expectations, not guarantees.

Warranties should cover the following:

1. A warranty period for new boxes (some manufacturers have a one-year warranty that may be extended for a fee), with return shipping borne by the manufacturer.
2. A maximum out-of-box failure rate for both new shipment, warranty repair, and out-of-warranty repair (if applicable). Less than 2 percent for each shipment should be reasonable; but remember, a 2 percent out-of-box maximum failure rate means that 2 percent more converters may have to be ordered to cover this rate. Remember to make return shipment costs the responsibility of the manufacturer.
3. The field-return-rate for converters due to a manufacturer's component failure or design defects should never exceed 1/2 of 1 percent (.5 percent) of the monthly total of boxes issued to the field (6 percent annualized). The field-return-rate directly affects subscriber satisfaction, service call levels, product marketability and thus, monthly P/L statements. Some manufacturers have improved QC and currently are experiencing less than 1 or 2 percent annualized (not monthly) field failure returns. This low figure, if guaranteed, means that systems may opt not to QC new boxes before issuing to the field, thus lowering QC manpower requirements.

4. Make the manufacturer's published specifications an implicit part of the purchase agreement. Furthermore, make outside promises and an enumeration of operational expectations and subsequent resources also part of the agreement.

5. Tie converter and encoding equipment repair to a specific guaranteed turn-around time. Converters lost to repair float cannot be used to generate revenues or make service calls.

6. Make third party vendors (such as the computer suppliers) part of the warranty and purchase process. Twenty-four-hour computer servicing is a must for many systems.

7. If percentages for warranty guarantees fall short of expectations, then provide for specific monetary obligations for the percentage that exceeds a

guaranteed maximum or minimum. For example, if the field-return-rate exceeds 2 percent, then the manufacturer should also assume the added monetary responsibility of field retrieval for that excess percentage. Remember, it may only cost the manufacturer \$10-\$15 to cover the expense of box repair, but it costs the system operator \$15-\$30 to retrieve a bad converter.

8. Make off-site and on-site training a specific part of the agreement with dates spelled out clearly. Support documentation also should be guaranteed by the manufacturer.

9. If the addressable system is turnkey, then specify the installation methods with a level of workmanship consistent with industry practices.

10. Let the manufacturer guarantee that your needs will be met with this system based on the criteria specified in the purchase document. Remember, you are purchasing a working and workable system for a specific subscriber base, and you don't want any expensive surprises later when you want to increase that subscriber base.

11. Finally, pass the document to your lawyer to put the appropriate legal sting to it. Local, state, federal, and the Uniform Commercial Code legalese should help guarantee that what you are buying is what you get, and if not, then you have specific recourse.

Final implementation planning

A carefully devised plan for the implementation of a new addressable system needs thoughtful consideration prior to introduction. An important reason for this concerns the effect of the new system on personnel. The necessary changes should be introduced only after considerable training, planning and feedback from those involved. The way that the change is introduced can be as important as the change itself.

Bad employee impressions arising from poor training, bad operation, excessive errors, long down-times and other problems may jeopardize personnel support and cooperation, and probably will require much work to overcome morale problems. Actual operational implementation methodology should rank with system choices and marketing plans in importance. The high cost of the project should be incentive enough for planners to concern themselves with the success of operational acceptance.

Careful implementation planning should include:

1. The time-critical nature of many

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Reader Service Number 24

RELIANCE
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12 facts you should know about our addressable system

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2 It is the most convenient addressable system to install in your cable system, normally requiring less than an hour for Customer Service Representative training.

3 It is the only addressable system configured individually for small, medium and large size cable systems.

4 Pioneer's small headend finally makes addressability affordable for the small cable operator.

5 The Pioneer system—the headend, the converter and the software—were all developed in an actual operating environment.

6 Pioneer's software was not purchased from an outside source like most addressable software in the industry.

7 The software screens actually provide easy step-by-step instructions.

8 The system is designed to allow for change and growth. It will not become obsolete.

9 The Pioneer system includes a convenient, controllable remote unit for the home which makes illegal usage of the wireless remote impossible.

10 Pioneer has the highest proven reliability record of any converter manufacturer in the cable industry.

11 The Pioneer system offers a choice of scrambling methods, including one mode that is Jerrold compatible.

12 Our price. Call 1-800-421-6450



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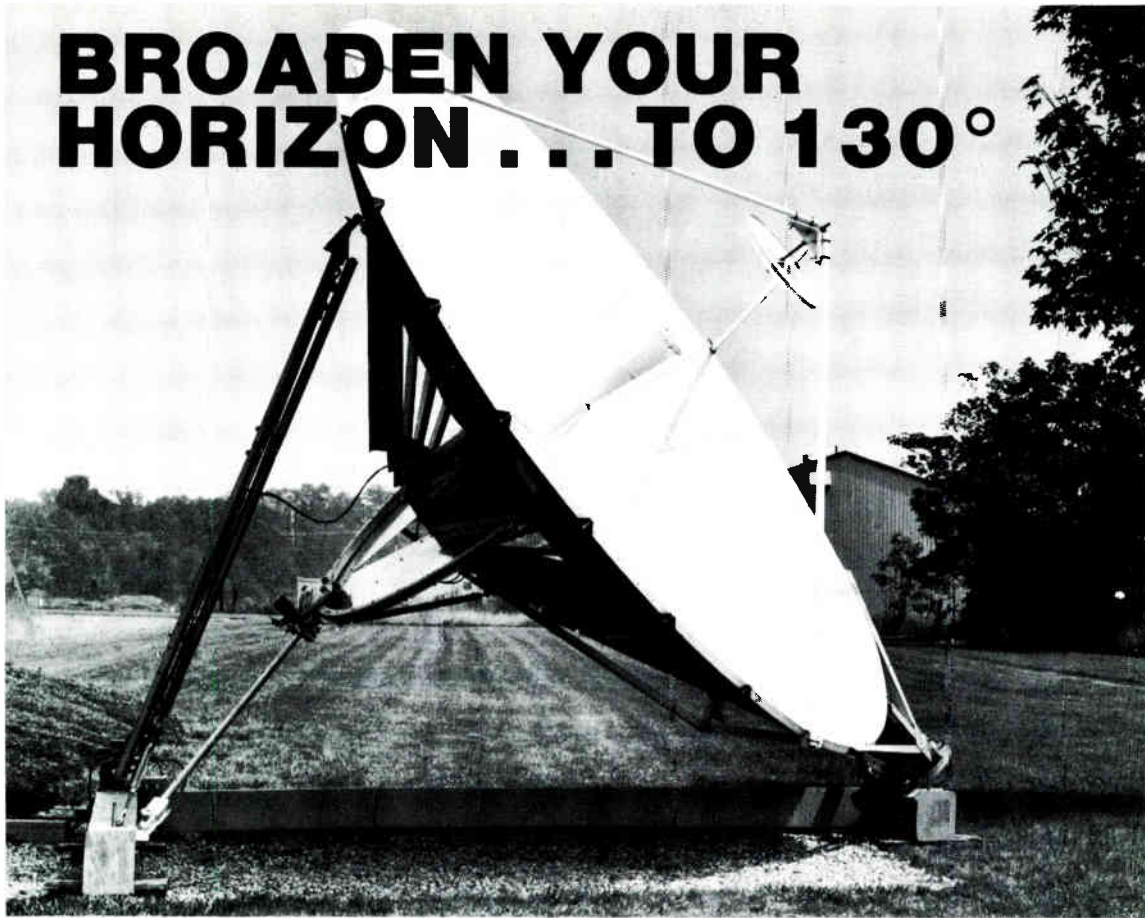
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Reader Service Number 38

BROADEN YOUR HORIZON . . . TO 130°



At our Connecticut Plant we can automatically reposition our 5 meter from Galaxy I to Russia's Gorizont In 48 seconds — at the flip of a switch.

Announcing Quadrant Steering

We've developed a new rotary actuator to complement the assets of our Zero-Offset Polar Mount! It features a continuous 130 degree arc not possible with linear actuators. A hydraulic motor rotates the antenna at a uniform speed of $2.5^\circ/\text{second}$. We chose hydraulics for the same reasons that they are used in heavy duty manufacturing and construction equipment which must endure rugged use in harsh environments. When we say "operational in 70 m.p.h. winds" — we mean it!

Zero-Offset Concept

When confronted with the design problem of a large heavy object which must rotate to function, a competent mechanical engineer will strive to keep the axis of rotation as close as possible to the center of gravity (C/G). The rotational axis of the Zero-Offset Polar Mount (patent applied for) is coincident with the C/G of the antenna, producing a perfectly balanced structure. The only loads imposed on the steering device are winds and friction.

Simplified Controls

The simple electronic control module allows programming up to twenty satellite positions in under ten minutes (without any special skills). Our memory principle is permanent, no batteries are required for backup during power outages. Because of this design simplicity, it will be operational when you need it — we've never had a service call.

Industrial Quality

The Magnatech Zero-Offset Polar Mount with Quadrant Steering is a rugged commercial quality system. This is not more home market 'junk' using flimsy electronic screwjack actuators with motors borrowed from automotive applications and assembled into sheet metal stampings.

Contact Magnatech for programmable antenna positioning systems or complete 5 meter* earth stations . . . innovative design from a Connecticut company in business over 40 years.

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Reader Service Number 44

Hardware Hotline

Options offered on oscilloscopes

Tektronix Inc. has announced two measurement options for use with its 2400 series portable oscilloscopes. These options, the GPIB, which provides programmability of the scope and a television option equipped with trigger and vertical functions can be ordered either individually or together; neither one can be retrofitted into the 2400 series oscilloscopes after purchase. The GPIB (IEEE-488) option operates with the 2445/2465 and the TV option, provides remote control of all front panel functions and can be operated by less-skilled technicians.

For more information, contact Tektronix Inc., P.O. Box 1700, Beaverton, Ore. 97075, (800) 426-2200.

Micro Plastics' cable clamps available

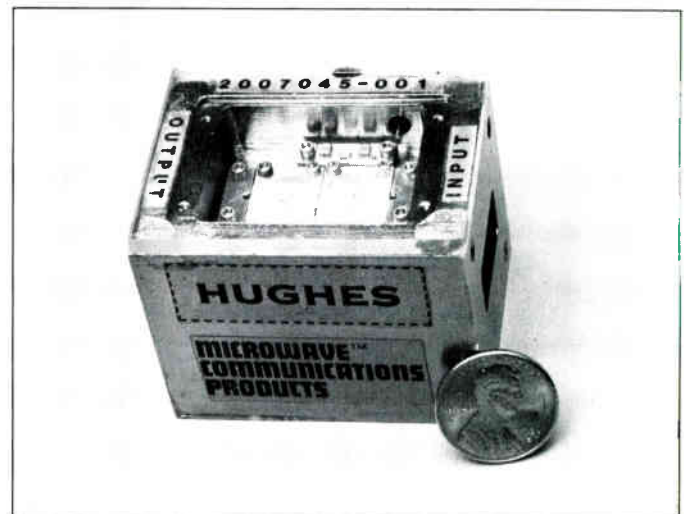
Micro Plastics Inc. has announced the availability of molded cable clamps in flame retardant Nylon 6/6, which meets Underwriters' Laboratories' flammability ratings while maintaining the toughness, rigidity, electrical insulation and corrosion resistant qualities of standard Nylon 6/6. The company says the parts show improved ductility, greater temperature range and can be color coded. The cable clamps range in size from 1/8-inch to 1 1/2-inch in diameter.

For more information, contact Micro Plastics Inc., Hwy 178 North, Flippin, Ariz. 72634, (501) 453-2261 or (800) 643-2356.

LNAs developed for CARS receivers

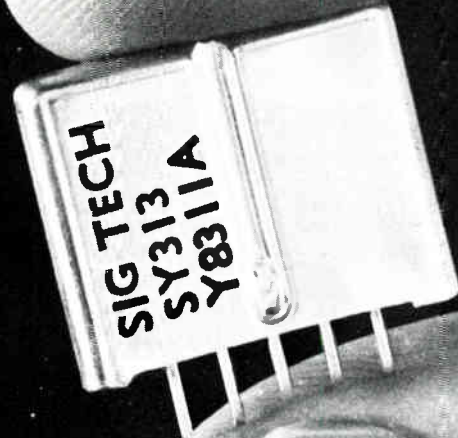
Hughes Aircraft Co. has designed a new series of LNAs for their CARS-band receivers. The new units, which consist of a single-stage (7 dB gain) and two-stage (14 dB gain) amplifier and automatic bypass LNA subsystem, purportedly reduces system noise through the provision of a 3.5 dB noise figure. Other system features include increased fade margins, path reliability and channel capacity. The single-stage LNA fits inside all Hughes AML receivers; retains AGC at the receiver input, thereby helping to minimize intermodulation products; and contains an image rejection filter. The two-stage amplifier is for outdoor mounting behind the antenna.

For more information, contact Hughes Aircraft Co., Microwave Communications Products, P.O. Box 2999, Torrance, Calif. 90509, (213) 517-6233.



Hughes' LNA operates in CARS

continued on page 80



SAW devices with mass appeal.

Produced by Signal Technology

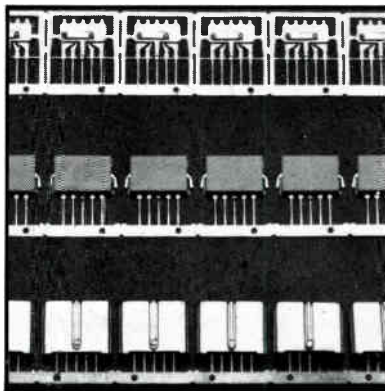
Now you can enjoy all the benefits of acoustic wave technology at the lowest possible price, thanks to the mass production capabilities of Signal Technology Ltd, our sister company in Swindon, England.

Signal Technology is the largest independent manufacturer of commercial SAW devices in the world. Their fully automated production facility includes 100% computer testing that records the performance of every device. And their special assembly equipment produces up to 2,000 finished devices per hour (that's one device every two seconds).

Large Volume, Large Selection

These devices are available in either 5- or 8-lead TO-8 cases or in proven, single-in-line (SIP) metal cases that

provide unequalled electrical and environmental performance. These single-in-line devices can save you important space on your PC boards. They're auto insertable. And they've passed 96 hours of autoclave tests (four times



better than the industry's most stringent requirements).

Available from Andersen

These devices are distributed in the U.S. and Canada by Andersen Laboratories. We're a leading manufacturer of SAW devices ourselves (we were the first commercial

producer of sideband filters for CATV). And we're ready to put our acoustic signal processing expertise to work on any application you might have.

We have SAW devices for all international broadcasting standards at common IF frequencies, as well as low band VHF filters. Many devices are available from stock. Just call Don Lowcavage at (203) 242-0761.



ANDERSEN LABORATORIES

Andersen Laboratories, Inc., 1280 Blue Hills Avenue, Bloomfield, CT 06002 Telephone (203) 242-0761/TWX 710-425-2390
Andersen SAW products are available in the United Kingdom and Europe through our sister company, Signal Technology Ltd., Swindon, Wiltshire, UK

See you at the NCTA

Reader Service Number 54

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Compucon	RCA American

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Comm-duct is an innovative installation concept. Virtually any configuration of coax, fiber-optic or telephone cable can be supplied by Tamaqua to the installation site in a flexible polyethelene duct system ranging in nominal pipe sizes from 0.5 to 4.0 inches. Tamaqua warrants the entire system, duct and component cable.

Comm-duct is superior to rigid conduit systems because it can be plowed-in avoiding trenching, select backfill, tamping and re-seeding. Where trenching or concrete cutting is required, trench or cut widths can be greatly reduced since working space for system assembly is not required.

Comm-duct used in conjunction with the appropriate installation practices has proven installed cost savings of 25% to 40% over other conduit systems without giving up the advantages of extended cable life or the ability to replace or add cables without disturbing underground plant.

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CABLE PRODUCTS  CORP.
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Reader Service Number 55

continued from page 74



Ditch Witch 110SX vibratory plow

New plow digs without trenching

Ditch Witch's compact vibratory plow, the 100SX, measures 24 inches wide by 40 inches high and can install underground cable, plastic pipe and other materials at depths of six, eight, 10 or 12 inches without requiring trenching. In addition, only one blade is needed. Other features include a 10 horse power class air-cooled engine, variable speed hydrostatic ground drive, a removeable chute-back for ease of cable installation and cleaning and rubber tires to reduce disturbance to the turf.

For more information, contact Ditch Witch, The Charles Machine Works Inc., P.O. Box 66, Perry, Okla. 73077, (405) 336-4402.

Alpha standby power

Alpha Technologies has debuted a series of standby power sources, collectively referred to as the AP-CG series. These units are being marketed as an "economical alternative to conventional uninterrupted power sources" and are targeted for the data processing and telecommunications markets. Transfer times of up to 2 msec are attained. The units are protected against prolonged overloads and short circuits and can handle "in rush" currents of most equipment. Model AP750CG provides 120 VAC at six amps.

For more information, contact Alpha Technologies, 1305 Fraser St., D-5, Bellingham, Wash. 98226, (206) 647-2360.

LNA line extended

Winegard Co. has extended its LNA line with the addition of a 100-degree system that features a gain figure at 20°C of 53 dB minimum and noise figure, at the same temperature, of 1.3 dB maximum. Input VWSR registers at 1.25:1 maximum and output VSWR at 1.5:1 maximum.

The LNA circuitry offers protection against reverse polarity voltage, surge voltage and lightning. Each unit is enclosed in a rugged one-piece cast aluminum weatherproof housing.

For more information, contact Winegard Co., 3000 Kirkwood St., P.O. Box 1007, Burlington, Iowa 52601, (319) 753-0121.

DBC home drop amp

Delta Benco Cascade Ltd. has introduced a home drop amplifier that consists of a "splitter-sized" amplifier and an AC/DC transformer/power inserter. The system, which can be connected anywhere in the subscriber's home, provides instant forward signal amplification as well as passive bypass of return signals. Other features include a built-in grounding block, two-way splitters, 50-450 MHz bandwidth, 13 dB gain on each output and signal return capability.

For more information, contact Delta Benco Cascade Ltd., 124 Belfield Rd., Rexdale, Ontario M9W 1G1, Canada, (416) 241-2651.

Addressable system unveiled

Electroline Television Equipment has unveiled an addressable cable television delivery system labeled the "Tier Expander." This system features reduced component size, reduced installation time, reduced delivery time and reduced bandwidth capacity waist.

For more information, contact Electroline Television Equipment, 8750 Eighth Avenue, Ville St. Michael, Montreal H1Z 2W4, Canada, (514) 374-6335.

Belden clamp tests cable

The Technical Research Center of Belden Electronic Wire and Cable has developed a transfer impedance test clamp for use in evaluating electronic wire and cable. The device, which is patent pending, employs a computerized test method that company officials believe will permit more exacting measurements of cable shielding effectiveness. The company also designed software for the clamp. Cable performance against ingress and radiated emissions coupling at a range of 5-1000 MHz can be tested by the tool.

For more information, contact Belden *Shield Performance and Selection Guide*: Director of Marketing Communications, Belden, 2000 S. Batavia Avenue, Geneva, Ill. 60134.

Vibra King's "Accu-Punch"

Vibra King Inc. has introduced an underground boring tool, called Accu-Punch, which is for use in laying pipe and cable underground. The tool is a one-piece assembly that uses compressed air to bore its way through soil, rock or masonry. Depending on soil conditions, the chisel head hammers out a borehole at 20 to 200 feet per hour. The tool travels both horizontally and vertically and in reverse as well.

For more information, contact Vibra King Inc., P.O. Box 247, Kingswood Rd., Mankato, Minn. 56001, (507) 387-6574.

Enclosure protects addressable converters

Reliable Electric/Utility Products' TV1228HP was designed as a means of securing and protecting remote addressable converters. The enclosure mounts as many as two amplifiers and features heavy-gauge steel construction and locks for security. Screen and louvers provide efficient heat dissipation.

For more information, contact Reliable Electric/Utility Products, (312) 455-8010.



Comtech Antenna 3.8-meter antenna

Comtech's 3.8-meter antenna

A new 3.8-meter transportable earth station has been unveiled by Comtech Antenna Corp. Through the use of a fold-up design, the unit reaches a maximum over-the-road height of 8½ feet. The feed assembly also folds in. Other system attributes include a receive gain of 42.9 dB, a dual receive motorized feed with control unit and an optional transmit feed for audio uplinks.

For more information, contact Comtech Antenna Corp., 3100 Communications Rd., P.O. Box 428, St. Cloud, Fla. 32769, (305) 892-6111. **CEd**



Broadband's VRA-200 & VFA-450: New Versatility for Your Headend

New VRA-200 and VFA-450 are state-of-the-art, rack-mountable amplifiers designed for a variety of headend applications

Introducing the VRA-200: With 20 to 40 dB of gain in the 5 to 200 MHz range, the VRA-200 amplifies return signals at the headend in two-way cable, SMATV and local area network systems.

The VFA-450: This unit offers 20 to 40 dB of gain in the 5 to 450 MHz range. It provides amplification for the combined headend signals before insertion into the trunk cable.

The Pair: Working together, the VRA-200 and VFA-450 provide two-way amplification of forward and return signals. The forward and return bandwidths depend on the plug-in filter in the VFA-450, Sub-, mid-, and high-split filters are available.

The VFA-450 is also ideal for sweep systems, bench-test situations and field-sweep applications.

Broadband Engineered and Guaranteed: The VRA-200 and VFA-450 are quality engineered and equipped with push-pull hybrid circuitry for maximum output with minimum distortion. Tough and dependable, they deliver state-of-the-art performance and flexibility.

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Other Features:

- Plug-in pads & equalizers.
- Variable gain & slope controls.
- -20 dB test points at input & output.
- Response equalization for flatness control.
- 120 VAC or DC power. DC may be connected permanently as standby power.
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- Return Loss:
 - VRA-200: 18 dB typical (16 dB worst case)
 - VFA-450: 18 dB minimum
- -12 dB directional coupler for inserting sweep or other signals at output. (VFA-450 only)

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Reader Service Number 45

Dawson: CED's consulting engineer

CED is pleased to announce the addition of John Dawson as CED's consulting engineer. Dawson currently is director of engineering at Mile Hi Cablevision, the 60-channel, two-way Denver new build that, upon completion, promises to become one of the most sophisticated systems in the country.

According to Dawson, he "never wanted to be in anything else but cable," even though his entrance into the field was circuitous, starting as a radio/TV repairman at the age of 17. Dawson took the knowledge of TV amplifiers that he acquired at the repair shop to Jerrold, where he became a mechanical assembler on Feb. 11, 1963. Two months later, he was promoted to bench technician and from there, he worked his way up through the ranks to QC tech. In 1967, he left Jerrold to take over as a TV tech for Marco Electronics.

After a two-year stint at Marco, where he applied his cable and MATV experience to SMATV, he accepted a post as line tech for Rollins in Delaware. Eight

months later, he was the chief tech for all of Newcastle County.

Despite rapid advancement at Rollins, Dawson returned to Jerrold in 1972 because, he said, "I liked activating systems." Five years later, he assumed a field engineering position at ACS Enterprises, the company that, interestingly enough, owned Marco Electronics.

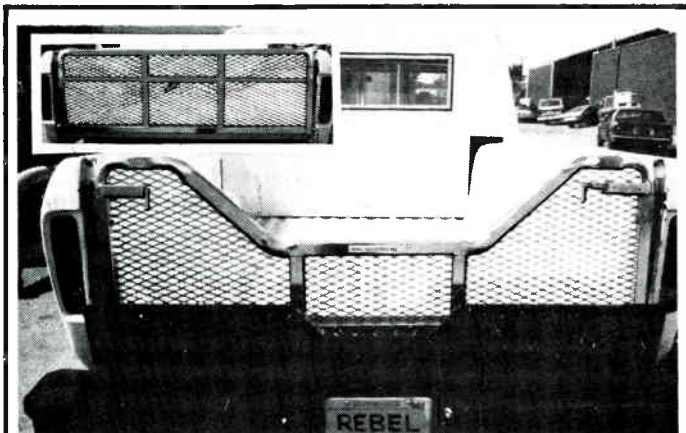
Dawson, however, had not yet quenched his thirst for new opportunities. In 1978, he became chief technician for Continental Cablevision, and realized that he "liked new builds and getting them off the ground."

After that he moved to Pottstown, Pa., where he rose from chief engineer to general manager and arrived at an important conclusion: "The customer is the most important part of the system."

After stints at Dickenson Pacific as technical operations manager and as district engineer for Heritage Communications, he "made up his mind that Mile Hi Denver would be his last big build."



At Mile Hi, he oversees engineering and also teaches a basic orientation course to salespeople. He says that he "doesn't know where he'll go from here" but isn't sure "if the challenge (at Mile Hi) will ever disappear."



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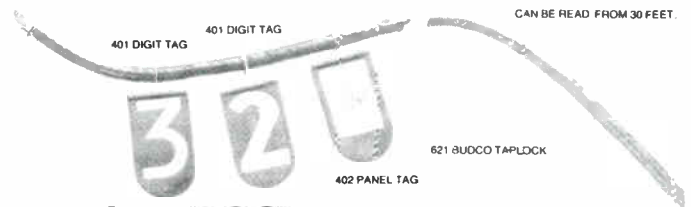


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The New 402 Panel Tag – Custom fit your service with 5 color-coded tags with easy-writing surface. Weather resistant!

The BudCo Subscriber/Service Taplock – Ten years proven quality in the field. Unique serial numbers. 9 colors.

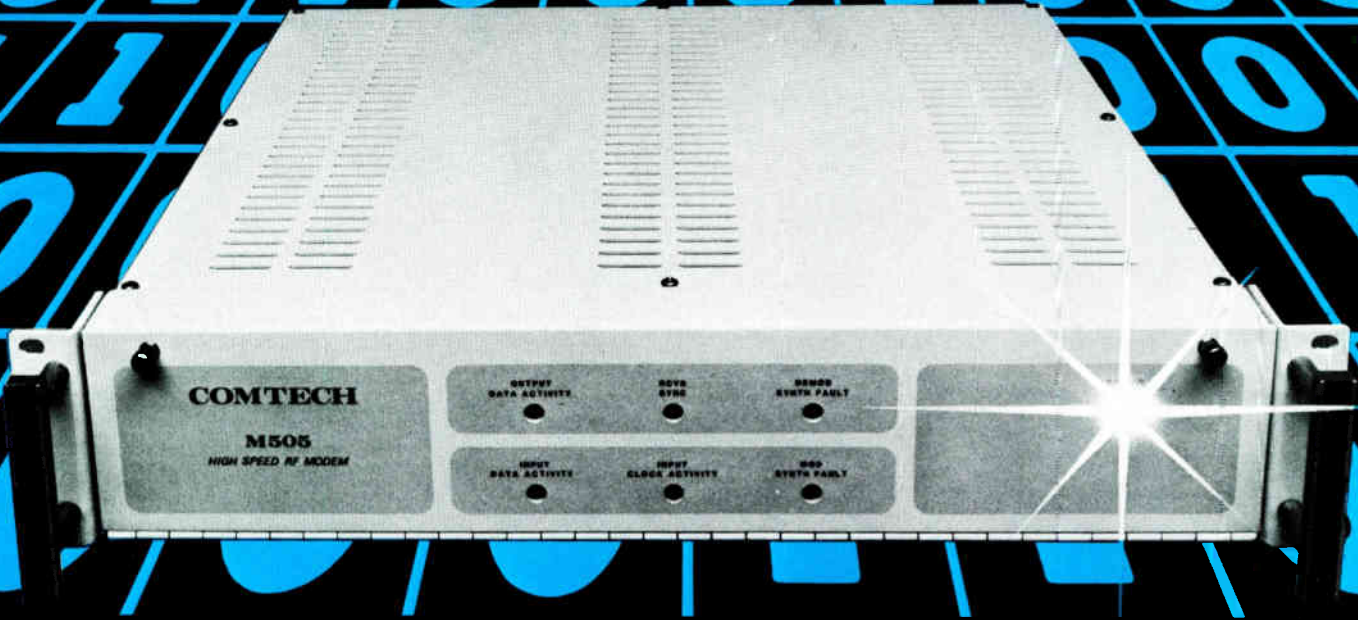
Remember Budco – The One With The Hold-Tight Hasp.

budco Incorporated

The Original.

4910 East Admiral Place Tulsa, Oklahoma 74115
1-800-331-2246 In Oklahoma Call Collect 1-918-836-3111
See us at Booth # 104 Reader Service Number 48

THE BROADBAND MODEM.



Over 8,000 Carrier Frequencies in One High Speed Broadband Modem.

The company that has produced and shipped more high speed broadband modems than all of its competition combined now offers the ultimate in advanced (and deliverable) technology. Here's what our new 505 high speed broadband modem offers:

Frequency Agility—Comtech's 505 Frequency Agile High-Speed Modem is more flexible than ever with 8,000 field-selectable carrier frequencies available (up to 400 MHz). This means more on-line time covering more applications with a minimum of spares required.

Changeable Data Rates—Unique plug-in modules permit selectable data rates between 56 KBPS to 10 MBPS. Aggregate rates of up to 500

MBPS are possible. You select the rate that fits your system.

Increased Output Levels—The greater signal strength output of the 505 permits extended cable runs without the need for trunk amplifiers.

Low Spurious Signal Content—With fewer stray signals, there is less interference with other signals on the cable.

Advanced Diagnostics—Convenient network system diagnosis is now possible using the 505's numerous test points, indicators, signals and built-in test equipment.

Multiple Power Sources—Options include 110 VAC, 230 VAC, 48 VDC and 24 VDC.

Cost Effective—The improved 505 is the most economical high speed digital broadband modem on the market with the most wanted features and the highest through-put.

The 505 can make your coaxial cable or local area network system operate better, faster and more efficiently. Current worldwide applications using Comtech Broadband Modems include: PBX interconnection, CAD/CAM remote graphics, remote terminals, process automation, robotics and data acquisition and control. Let our 505's increase the productivity of your system—call or write: **Comtech Data Corporation, 350 North Hayden Road, Scottsdale, AZ 85257, (602) 949-1155 or TWX 910-950-0085.**

COMTECH Data Corporation

A Subsidiary of Comtech Telecommunications Corp.

Reader Service Number 46

Our Track Record Shows

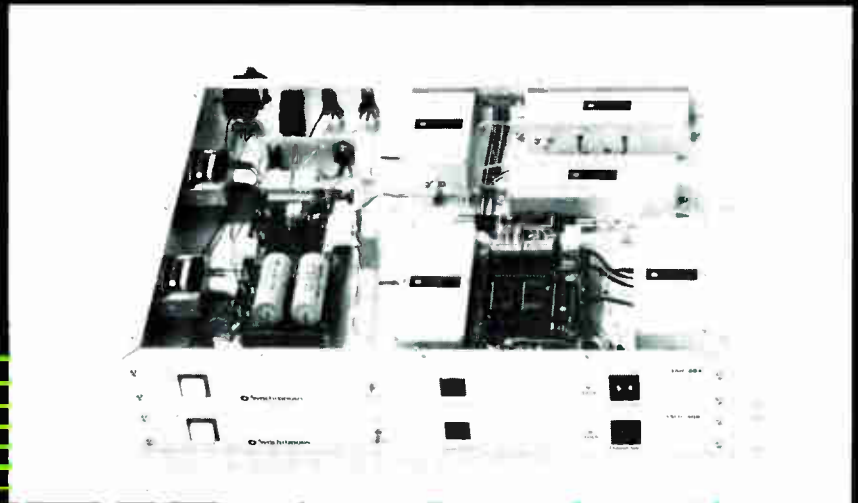


Since 1975, **CED** has been providing you with the latest information in cable engineering. We have dedicated ourselves to our readers' concerns and maintaining quality. Reliability and innovative direction has kept **CED** on the inside track.

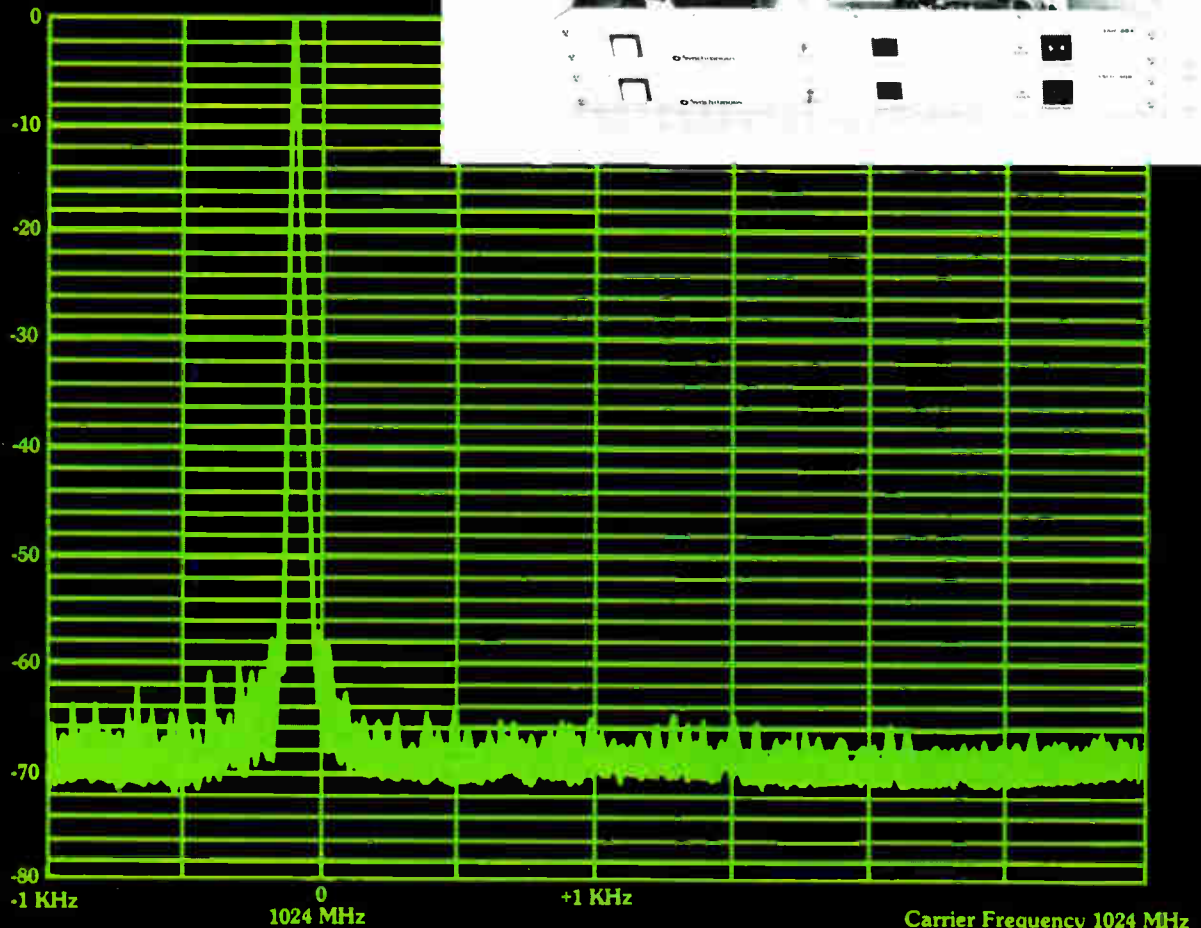
CED
The Right Stuff

OUR NEW XL-SERIES FREQUENCY AGILE HEADEND CONVERTERS OUT PERFORM ALL OTHERS!

When selecting a Headend Agile Converter System to backup RCA, Jerrold or SA, select the best you can buy.



Amplitude
in dBm



PURITY OF SIGNAL

Reader Service Number 49



Synchronous
COMMUNICATIONS, INC.

1701 FORTUNE DR • SAN JOSE CA 95131 • (408) 262-0111

800-782-2222

Herb Lacey has been appointed corporate sales representative at Mycro-Tek. Lacey's previous professional experience includes posts as manager of KWCH, Channel 12 in Wichita, Kan., president of the Advertising Club of Wichita and district board member of the American Advertising Federation.



Cable TV Supply Co., the wholly-owned subsidiary of Cable TV Industries, has appointed **Bill Robinson** sales engineer for the Southwestern U.S.; **Neil Serafin** to the post of Southwestern sales and engineering manager for the firm's Startron System products; **Roger Fallhee** to Western regional sales manager for the Startron Systems; **Sam Elliot**, operations manager for the Grand Prairie, Texas, facility; and **Jim Snow**, operations manager of the Los Angeles office.

The Jerrold Division of General Instrument has named **John Stafford** account manager for Cox Cable Communications Inc. Stafford brings to his new post electronics and computer system experience. He formerly held positions with Sperry Computer Systems, Digital Equipment Corp., AT&T and Bell South and Texas Instruments.



Ronald Fried has become president and chief operating officer at ADDA Corp., a manufacturer and marketer of digital TV equipment for the broadcast, cable and professional TV industries. Fried formerly was vice president, marketing and sales, for the company.

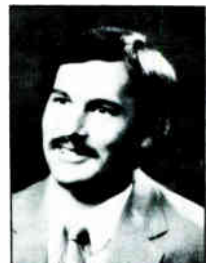
W. Matthew Hart has joined S.A.L. Cable Communications Inc. as vice president in charge of national marketing and sales. Hart has spent 13 years serving in a sales capacity for the cable industry and most recently was national sales manager for Magnavox CATV.

Sandy Weegar has been elected to the post of executive associate at Microwave Filter Co. Weegar has served as manager of materials and as manager for the company's Ham radio division.



Harris Corp. has promoted **Thomas Brimer** to vice president-general manager of the company's Interactive Products Division. Previously, Brimer was vice president-general manager of the controls and composition division. **Roland Valdes** will succeed Brimer. He formerly served as vice president of engineering for the controls and composition division.

EECO Inc. has named **Tim Thompson** product specialist, video products marketing, video products division. Thompson, who has been with EECO for the past three years, most recently was video products test/quality supervisor for the company.



**Superior
signal integrity,
no added cost.
Armex connectors.**

Center conductor gripping assembly
Body
Main nut
Integral RF shield
Patented field-focusing insulator
Long-life seals
Outer conductor gripping mechanism
Lock nut

Armex CATV FIVE pin type connectors feature a patented field focusing insulator that assures **42 dB minimum structural return loss from 0 to 500 MHz**, a 20% improvement over most other designs. Result: less signal amplification will be required for a given length of cable run.

For information on the full line of advanced Armex Cable Connectors, write: Armex Cable Corporation, 2700 E. Nine Mile Road, Warren, MI 48091, or call (313) 755-2030.

ARMEX CABLE-TV HARDWARE

Reader Service Number 50

QuickStall™

CATV Service Molding Duct

Right Angle
Corner

Inside
Corner

Outside
Corner

Quick-Stall™ Duct installs easily, quickly with staples, nails, screws, or glue. Or even quicker with built-in adhesive tape backing (optional). Hinged construction holds cables and electronic components in place during installation or service. Handles many service lines in one raceway, including mini-midget VHF, UHF, 2 and 3-way hybrid splitters and couplers. "No-kink" corner pieces have a radius for cable curve instead of being kinked at sharp angles. This cable curve provides proper signal flow and eliminates service calls. Made of rigid PVC custom profile compound listed in Underwriters Laboratories Recognized Components Index. Standard Beige Color complements most decors and can be painted.

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Subsidiary of RMS Electronics, Inc.

Reader Service Number 57

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WESTERN OPERATION:
2901 W. GARRY AVE., SANTA ANA, CA. 92704
CALL COLLECT: (714) 662-1041

Signal	Day	Start/Stop	Alert Tone	Transponder	Signal	Day	Start/Stop	Alert Tone	Transponder																																																																																																																																				
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<table border="1"> <thead> <tr> <th colspan="3">Major Communications Satellites Serving North America</th> </tr> <tr> <th>Location:</th> <th colspan="2">Satellite</th> </tr> <tr> <th>Degrees West Longitude</th> <th>Present</th> <th>Future</th> </tr> </thead> <tbody> <tr><td>41</td><td>TDRS 1***</td><td></td></tr> <tr><td>67</td><td></td><td>Satcom 6**(5/86)</td></tr> <tr><td>69</td><td></td><td>Spacenet 2*** (9/84)</td></tr> <tr><td>72</td><td>Satcom 2R**</td><td></td></tr> <tr><td>74</td><td>Galaxy 3</td><td></td></tr> <tr><td>76</td><td></td><td>Telstar**302 (8/84)</td></tr> <tr><td>76</td><td>Comstar D1/2*</td><td></td></tr> <tr><td>79</td><td>Westar 2**</td><td></td></tr> <tr><td>81</td><td></td><td>ASC1*** (9/85)</td></tr> <tr><td>83</td><td>Satcom 4**</td><td></td></tr> <tr><td>86</td><td></td><td>Telstar 303** (5/85)</td></tr> <tr><td>87</td><td>Comstar D3**</td><td></td></tr> <tr><td>89</td><td></td><td>SBS 4* (8/84)</td></tr> <tr><td>91</td><td>Westar 3**</td><td></td></tr> <tr><td>93.5</td><td></td><td>Galaxy 3** (5/84)</td></tr> <tr><td>95</td><td>SBS 3*</td><td></td></tr> <tr><td>96</td><td>Telstar 301**</td><td></td></tr> <tr><td>97</td><td>SBS2*</td><td></td></tr> <tr><td>99</td><td>Westar 4**</td><td></td></tr> <tr><td>100</td><td>SBS 1*</td><td></td></tr> <tr><td>103</td><td></td><td>Gstar 1* (3rd Q/84)</td></tr> <tr><td>104.5</td><td>Anik D1</td><td></td></tr> <tr><td>105</td><td>Anik C2*</td><td></td></tr> <tr><td>105</td><td></td><td>Gstar 2* (4th Q/84)</td></tr> <tr><td>108.5</td><td></td><td>Anik C1* (6/84)</td></tr> <tr><td>109</td><td>AnikB1***</td><td></td></tr> <tr><td>109</td><td>Anik D2** (11/84)</td><td></td></tr> <tr><td>114</td><td>Anik A3**</td><td></td></tr> <tr><td>117.5</td><td>Anik C3*</td><td></td></tr> <tr><td>119</td><td>Satcom 2**</td><td></td></tr> <tr><td>122</td><td></td><td>Spacenet 1*** (4/84)</td></tr> <tr><td>123</td><td>Westar 5**</td><td></td></tr> <tr><td>127</td><td>ComstarD4**</td><td></td></tr> <tr><td>128</td><td></td><td>ASC2*** (9/86)</td></tr> <tr><td>131</td><td>Satcom 3R**</td><td></td></tr> <tr><td>134</td><td>Galaxy 1**</td><td></td></tr> <tr><td>136</td><td>Satcom 1**</td><td></td></tr> <tr><td>139</td><td>Satcom1R**</td><td></td></tr> <tr><td>143</td><td>Satcom 5**</td><td></td></tr> <tr><td>171</td><td></td><td>TDRS2*** (late/84)</td></tr> <tr><td>TBD</td><td></td><td>Spacenet 3*** (early/85)</td></tr> </tbody> </table>					Major Communications Satellites Serving North America			Location:	Satellite		Degrees West Longitude	Present	Future	41	TDRS 1***		67		Satcom 6**(5/86)	69		Spacenet 2*** (9/84)	72	Satcom 2R**		74	Galaxy 3		76		Telstar**302 (8/84)	76	Comstar D1/2*		79	Westar 2**		81		ASC1*** (9/85)	83	Satcom 4**		86		Telstar 303** (5/85)	87	Comstar D3**		89		SBS 4* (8/84)	91	Westar 3**		93.5		Galaxy 3** (5/84)	95	SBS 3*		96	Telstar 301**		97	SBS2*		99	Westar 4**		100	SBS 1*		103		Gstar 1* (3rd Q/84)	104.5	Anik D1		105	Anik C2*		105		Gstar 2* (4th Q/84)	108.5		Anik C1* (6/84)	109	AnikB1***		109	Anik D2** (11/84)		114	Anik A3**		117.5	Anik C3*		119	Satcom 2**		122		Spacenet 1*** (4/84)	123	Westar 5**		127	ComstarD4**		128		ASC2*** (9/86)	131	Satcom 3R**		134	Galaxy 1**		136	Satcom 1**		139	Satcom1R**		143	Satcom 5**		171		TDRS2*** (late/84)	TBD		Spacenet 3*** (early/85)	Moody Bible		24 hrs.	None	3
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					The Disney Channel	Daily	(E) 7 a.m./11 p.m.	None	(W) 5X (E) 6X																																																																																																																																				

* Ku-Band
 ** C-Band
 *** Dual C/Ku-Band

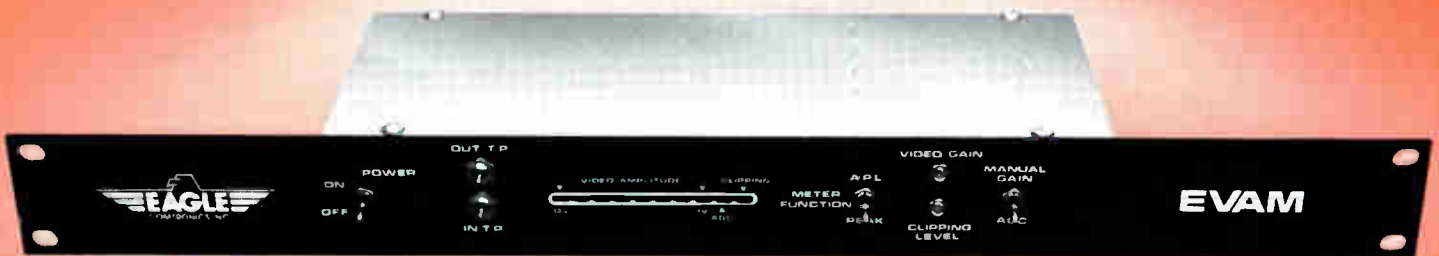
Orbital slots and launch dates often change without notice.

Contact programmer's technical department for more information on transponder use and alert tone.

Services using Westar V transponders not listed above will appear in next month's In Orbit.

EAGLE

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EVAM assures your video quality by . . .

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Automatic video-signal stability from EVAM—another way Eagle products secure the success of your business.

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Reader Service Number 52

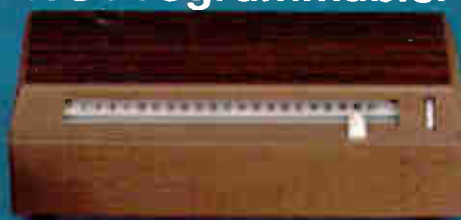


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