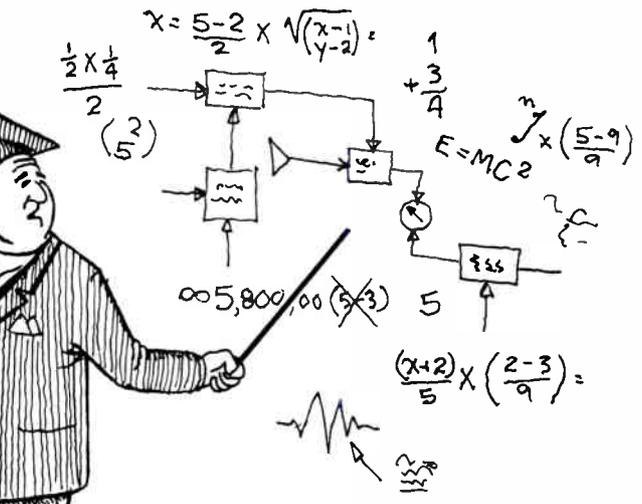
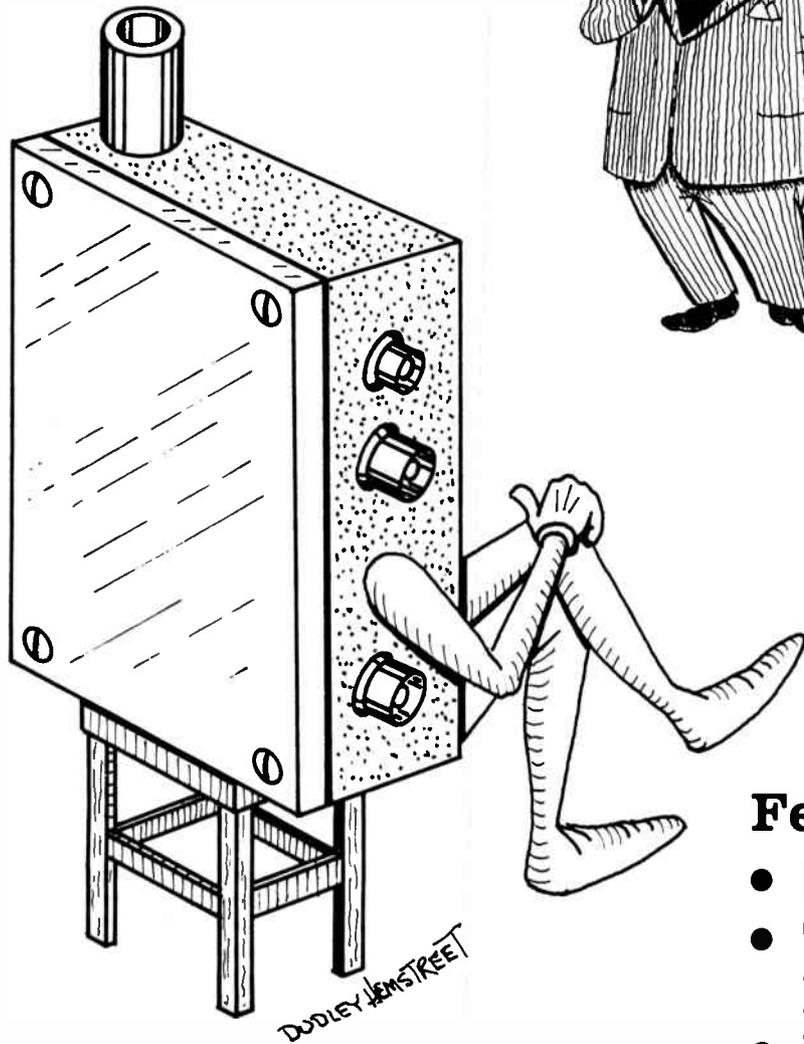


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IN MEMORIAM

On Saturday morning, December 18, 1976, the cable television industry lost one of its most well-liked and respected people, with the death of Delmer Ports. Personally, I lost a good friend, mentor and champion.

Delmer had encouraged my goals and provided me with support. He taught me the "politics" of engineering and guided me through some rough spots. When I felt that things weren't moving fast enough, he counseled patience. Usually, I listened.

I also pushed Delmer once in a while. He knew it, and he didn't mind it. He realized that there might be a need for a sales job to be done for the engineering community, and he let me do it. I tried, through my resources, to lighten a load that was increasingly heavy for any one person to carry; to single-handedly represent the growing cable television industry on national engineering and technical policy.

Ports represented this industry on nearly 30 different national committees. His career was marked with many awards of distinction. He coordinated the nearly 100 people directly involved in National Cable Television Association engineering committees. He looked to the future and saw the potential of satellite reception for cable operators years ago. He lobbied effectively, virtually by himself and kept the lines of communication open. He always listened.

He spoke softly. He was not outwardly dynamic. He was highly effective. He was a classic engineer. He protected us from the machinations of the broadcasting industry; and often, he tried to save us from ourselves. He wanted to do more; he was not quick to ask for help and felt that it was his responsibility to take work home, travel extensively, not slow down, even when doctors, friends and family wished that he would relieve himself of part of his work load. He knew that the load was getting too heavy for him to handle.

He rightfully protected NCTA's place within the industry and felt that national policy on telecommunications required an input from the organization. He did not publish much in the way of "hands on" material, but he tried to augment and publicize what was available. He never let ego get in the way. He was complimentary of others' accomplishments. He found it difficult to say "no" to any idea that assisted the industry-at-large. His instinct was one of thoughtfulness and not emotionality. He was politic and he was proud.

It was not right for one person to carry the responsibility Delmer Ports did—and I hope the NCTA board of directors and other people in the industry realize it. I hope the person who assumes the position of vice-president of engineering for NCTA receives the attention of management when he speaks. Ports tried hard to get just such attention. I hope the engineering community continues to become more active and involved in all industry matters and policy and keep what he started moving in a positive direction. —Judith Baer



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Technical News at a Glance

... The FCC "informally" showed unanimous approval of small aperture TVRO's but included stringent performance specifications in document released. Specs should prove helpful in protecting operators from "making wrong decisions" and spinning wheels with less than "proven" equipment. CATA originally introduced action to the Commission.

... Southern Satellite received approval 12-15, and champagne flows in Atlanta; turn-on was 12/17. FCC 214's will require 5-year renewals (they were perpetual!) "since concept is new." Systems using service must be certified and tariff includes technical performance specs.

... CATV industry was caught with surprise on Dkt. 21006 (Frequency Channeling Requirements and Restrictions and Monitoring of Signal Leakage) adopted 11-24 by FCC. Item was pending since late spring! Document was reported in press 12-3, released from Commission 12-8-76. NCTA committees (CATA also?) will counter FAA claims of "disaster" and present rational approach. Emotional plea for forfeiture is included in text; new frequency channeling plan is suggested. Systems giving up mid-band (subscription) channels is alternative; spending money on cleaning up systems, buying hardware and test equipment seems imminent in any case.

... American Association of Cable Television Owners is name of minority owners' trade association formed 12-10 in Washington, D.C. They'll ask funding from NCTA and industry "leaders" to get group going. It's formed under "auspices of NCTA."

... Quotes from Western Show: "The interest to buy was greater than any other show that I can remember," says Dick Covell, industry veteran from GTE Sylvania; "The most progressive and optimistic regional show I've been to in years," reports Stony Kahn of Jackson Communication. Rod Hansen of CableData says it all when he said "Terrific!" Upbeat feeling is obvious from operators and suppliers.

... FCC Commissioner Dick Wiley verbally accepted invitation to speak at 2nd Annual SCTE/IEEE Reliability Conference in Atlanta Feb. 23-24. 1976 success is expected to be exceeded! Program includes practical papers on everyday problems of system operation. Quality Inn in Presidential Park is site. Registration forms are included in this issue of C/Ed.

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scte comments

Frank Bias, Tele-Vue

Smart Taps Are You Ready?

In my opinion both long and short range forecasting is easier than middle range. Next year can usually be extrapolated from the present, while in fifteen years economic efficiency prevails. In the mid-range of three to fifteen years, powerful political and economic status quo forces make prediction of the introduction of innovations difficult. Forecasting when and in what form the "smart tap" will be utilized throughout the industry is a powerful example of this problem.

Over the last year several manufacturers have introduced products in this area. After viewing this equipment, it is easy to predict that there will not be a mandate in 1977-78 to replace every tap on every pole. Just as easy to predict is that the CATV operator who in 1990 puts any more than the cable and a simple control on the subscribers' premises will be under a prohibitive economic handicap.

To accomplish this 1990 evolution, the functions of channel selection, channel conversion (if required), control of service, and control of security must be performed in the "smart tap." The first function must be controlled by the subscriber; the latter two will be controlled by the operator from a central location.

In the next three to ten years the "smart tap" will follow a course of evaluation. Some of the factors influencing the evolution will be:

1. The greater problems of equipment retrieval (e.g. converters and descramblers) and prevention of unauthorized use in multiple dwelling units in metropolitan areas will hasten the development of "smart taps" systems of limited scope for this application.

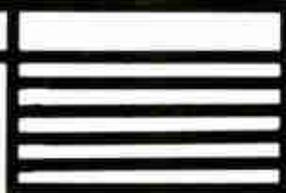
2. Until functions other than the simple connect/disconnect action are feasible, application of the "smart taps" in single family residential areas will not become economical, because of the necessity to visit/modify/replace each existing tap.

3. Continuous increases in the cost of labor as compared to machinery will eventually force the use of the "smart taps" as a substitute for "pole climbers."

The result of the third factor will be that the engineers and technicians which stay with the industry will have to be of higher technical caliber. Are you getting ready?

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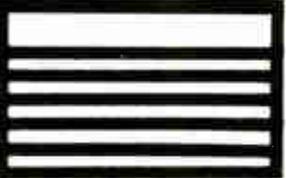
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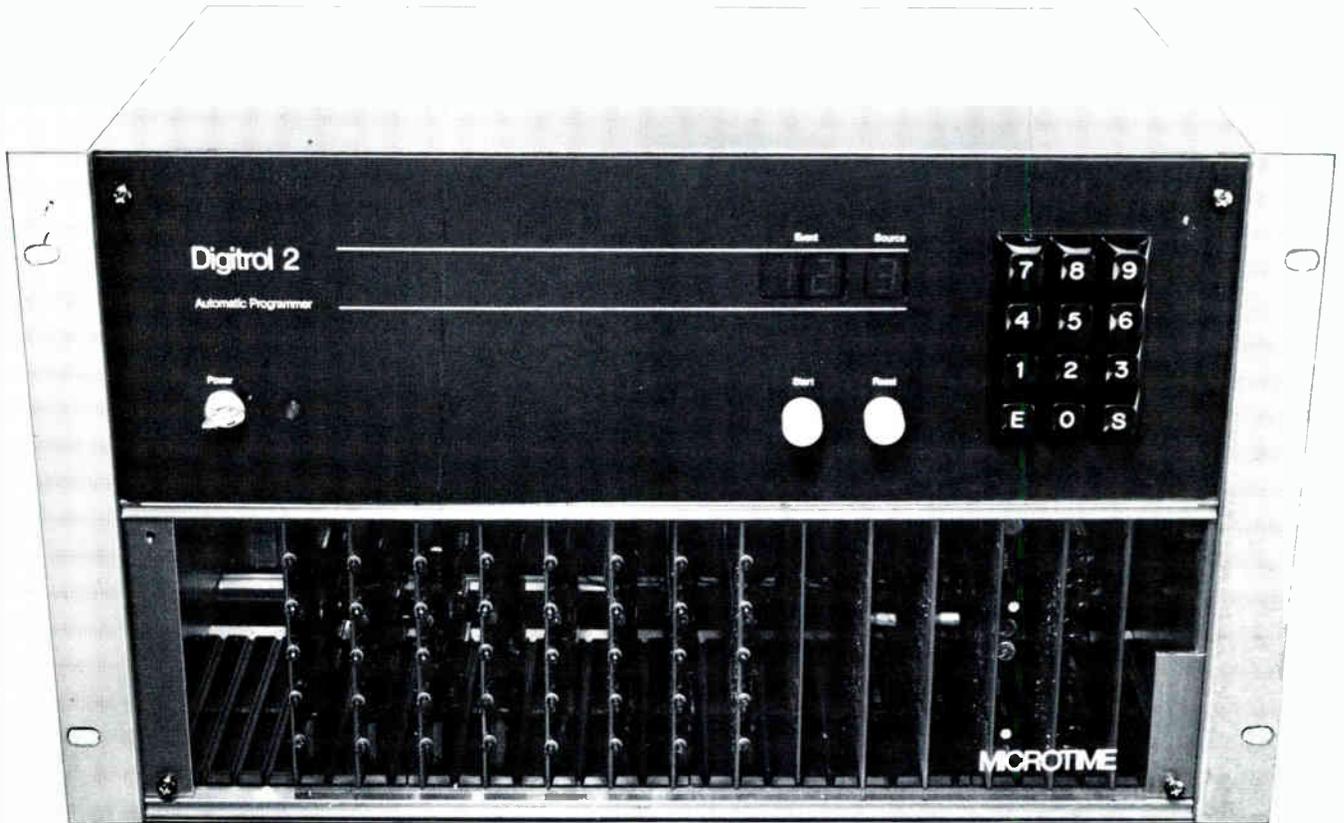
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Smart Taps

Editor's note:

Despite the arrival of Smart Taps last year, there are only three major manufacturers building Smart Taps. The performance expectations of intelligent taps are, however, well defined at this time. Each of the three manufacturer's units, with minor variations, are capable of performing the same functions.

All at present are housed in line extender size, four port housings, and some manufacturers are considering larger apartment house units. Each unit can be programmed with simple keyboards or computer interfaces.

The ability to control subscriber connections and premium TV from the headend or office offer tremendous advantages to a cable company, both in manpower savings and flexibility. In a series of typical scenarios, DBC shows off such advantages as: instant disconnects for non-payment, telephone marketing of pay-TV, customer move-out, system cycling, etc.

For various reasons, each of the three manufacturers feels it offers the best compromise of product capability and cost. These advantages are described below.

Ameco

The Ameco "Nova Addressable Tap" offers a unique switching system using magnetic reed relays. These offer memory without external power in the event of power failures. The unit uses a TRF rather than a super-hetrodyne receiver to eliminate oscillator beats, and the 24 bit FSK carrier is only "on" during cycling, so as to not add an additional continuous carrier to the cable.

Receiver programming is accomplished with a plug-in card containing a diode matrix, programmed by soldering diodes in the appropriate slots. A proprietary C-MOS chip performs the decoding functions within the unit. Premium TV for up to 2 channels can be ordered. Control of pay channels is accomplished by switching in conventional band stop traps. It is felt that this is a satisfactory solution since the traps are contained within the tap body.

DBC

Delta-Benco-Cascade offers a unique controlling scheme in its IT-4, 4 port addressable tap. Controlling is accomplished on the pilot carrier with 27 bits to power supply locations. The power supply voltage is modulated with 18 bits to control the tap. The advantage is that no receiver is required at the tap. Using this scheme, 900 sectors (power supplies) can be addressed using the first 9 code bits, and 990 subscribers can be addressed in each sector.

Decoding is via a proprietary C-MOS chip manufactured for DBC by LSI. Address codes are determined by programming a 14 lead fusible diode block that looks like a 14 lead DIP package I.C.

Premium TV for up to 2 channels can be added at any time with plug-in cards. A jamming oscillator is switched onto each subscriber's line that should not be receiving pay-TV. RF switching in the DBC unit is accomplished with PIN diode switchers. Short power failures will not cause the tap to change due to a large power supply capacitor. Longer failure will cause the tap to open (i.e., all services on) until the daily refresh cycle resets the taps.

Magnavox

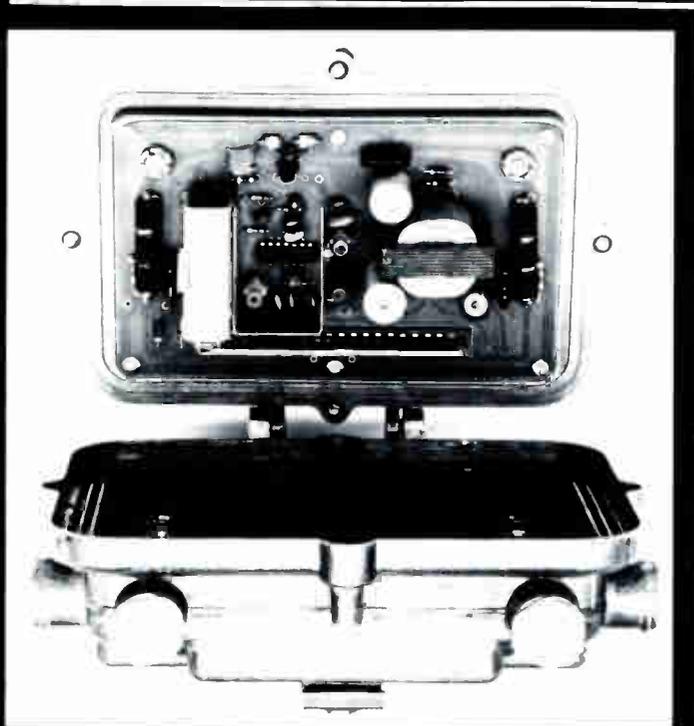
The Magnavox MX4000-SVS addressable tap uses a FSK signal in the 50-55 MHz range with a 32 bit word control signal. The address is broken into a 4 bit Multiplex Code, 16 bit location, and 12 bit program command. The bit rate is very fast, permitting a cycle time of 0.25 sec. per 1000 subscribers.

Decoding is accomplished using conventional C-MOS packages and circuitry. Address selection is accomplished using 4 small plug-in code boards. The technician can select and program the code in the field.

Premium TV is controlled using 60 Hz modulated jamming signal. One channel premium TV is available built into the tap. Additional channels and functions can be accommodated in an external housing. Memory is accomplished with a small battery in case of power failure.

Magnavox also offers a 40 channel apartment control tap and it feels this area will mature faster, since apartments represent high subscriber turnover areas.

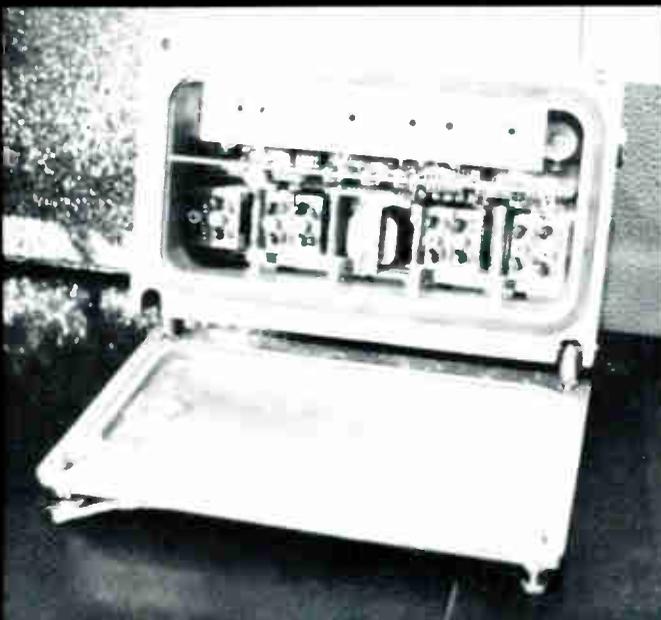
Using the same jamming technique as in the addressable tap, Magnavox has recently announced a non-addressable field programmable 4 port jamming trap used in providing premium TV in low churn areas.



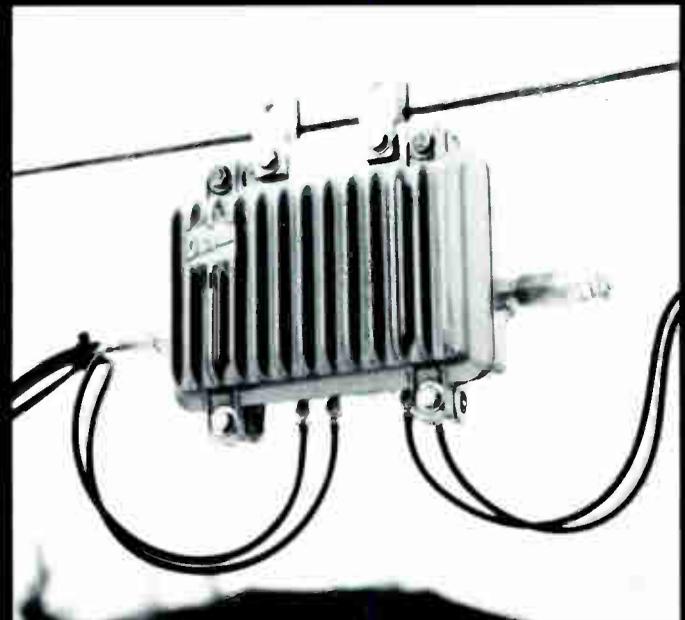
Magnavox MX-4000

Addressable Taps Summary

Model	Ameco NAT-4	DBC IT-4	Magnavox MX-4000
Basic Service			
Bandwidth (MHz)	(5-300)	(5-300)	(5-300)
Insertion Loss (18 dB Tap)	1.5	1.1	0.8
Return Loss (dB)	20	20	20
Port to Port Isolation (dB)	26	26	25
Pay Service			
No. of Channels	1-2	1-2	1 Supplied, 2nd External
Frequencies Available	2-Mid	Any	2-Mid
Adj. Channel Useable Method	Yes Trap	Yes Jamming	Yes Jamming
Communication			
Frequency (MHz)	50-250	45-300 Plus Power Feed	50-55
Modulation	FSK	FSK	FSK
Word Length	24 Bit	27 Bit	32 Bit
Switching Time (1,000 Subs)	6 Sec.	1 Min.	25 Sec.
General			
Plug-in Address Switch Method	Yes Magnetic Relay	Yes Pin Diode	Yes Pin Diode
Plug-in Pay Power Fail	No Magnetic Hold	Yes No	2nd External Battery Memory
Surge Protection	Yes	Yes	Yes
Housing Apartment System	Alum. Line Extender Size Possible	Same Possible	Same Yes



Ameco NAT-4



DBC IT-4

Agreement on Small TVRO's

WASHINGTON, D.C.—The FCC "agreed in principle" on December 14 to permit use of small aperture TVRO's. Final release and approval of the Commission's plans were expected by year-end.

"Unanimous" approval was anticipated twice from the Commissioners but last minute differences of opinion between the Cable Television and Common Carrier Bureaus held up the process. The Office of Chief Engineer had also been included in the differences, centering on the subject of conical "horn" antennas. The Commission staff effort had emphasized the parabolic "dish" design with less attention to conical horn configurations.

Horns had been included in most comments accompanying CATA's original petition. Several manufacturers and industry suppliers, along with NCTA, had supported CATA's filing throughout the process. The two trade

associations had lobbied separately at the Commission, but had done much work behind the scenes to get the job done.

Staff at the FCC held a concern about not addressing horn requirements in detail. As a result, the Commission's text will include acceptance of the current generation of horns, and considers a 14 foot horn as an equivalent to a 4.5 meter parabolic. The text also includes an "escape hatch" to allow the matter to be revisited in the future if necessary.

Cable operators will have the option of selecting antenna configurations that best suit their needs, so long as hardware meets FCC standards on signal-to-noise, carrier-to-interference and carrier-to-thermal noise. The standards are not considered absolute thresholds but guidelines in evaluating performance.

The Commission has not included a diameter limit within the text, according

to Robert Luff, engineering assistant to FCC Chairman Richard Wiley. Luff says there is "no absolute prohibition," but that 4.5 meter parabolics and 14 foot horns will be used as policy in processing applications for TVRO's. "That way," says Luff, "the staff does not have to take a case-by-case approach to processing applications."

FCC Talks of Forfeitures, Restrictions and Signal Leakage Monitoring

WASHINGTON, D.C.—The FCC released a Notice of Proposed Rulemaking (Dkt. 21006) on December 8 to amend Part 76 of the Rules to add frequency channeling requirements and restrictions and to require monitoring of signal leakage from cable systems.

The NPRM is the direct result of pressures from the FAA, OTP at the White House and the Interdepartmental Radio Advisory Committee. The pressures are the result of voice interference from the system in Harrisburg, PA, during the early spring of 1976. (See C/Ed December 1976.)

Included in the NPRM is a paragraph with a plea from the Commission for forfeitures. The text states, "Prevention,

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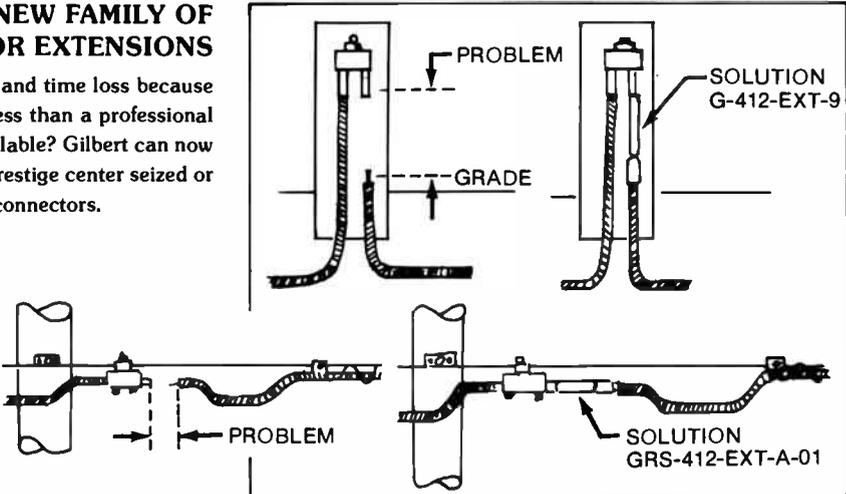
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as compared to after-the-fact correction, is clearly to be preferred in the case of safety and emergency over-the-air services." It continues, "We will go as far as we can toward permitting cable operation without frequency restrictions. But, it is possible that we might not be able to permit as free a choice of frequencies as we would prefer, due to our lack of authority to impose forfeitures on cable operators who do not meet our standards in the most critical frequency bands."

Also included in the test is the proposal for adoption of a new frequency channeling plan suggested through the Cable Television Technical Advisory Committee to the Commission in late March 1975. (See *C/Ed* February 1976.)

This plan includes standard TV broadcast channels, and may include the "so-called midband and superbroadcast channels," or, according to the NPRM, "the plan may prohibit operation in whole or in part on frequency bands used for navigation and safety."

The FCC proposes to adopt standard designation for those channels not used in over-the-air service; to modify requirements for monitoring systems for

signal leakage; to adopt rules to specify conditions under which a system is causing harmful interference, and might be required to cease operation; and, to adopt restrictions on cable carriage of signals within certain air traffic control and safety services bands.

NCTA has formed an "Interference Committee," as part of the Engineering Advisory Committee. The Interference Committee, headed by Frank Bias of Tele-Vue Systems, will present a position to FCC. Dates for comments due on the NPRM are January 17 and reply comments by February 15, 1977.

Southern Satellite Approved

WASHINGTON, D.C.—In what became a "hodge-podge" of opinions, the FCC approved Ed Taylor's common carrier application for Southern Satellite Systems and ultimate delivery of Channel 17 from Atlanta to cable television systems.

Walter Hinchman, chief of the Common Carrier Bureau, had been encouraged by the commissioners to sign off on the application within the Bureau in late November. However, Hinchman felt that the transaction

deserved the attention and approval of the full Commission and "bumped the application upstairs." One industry observer said, "He lost his place in cable television industry history by not doing it himself."

Since the entire concept was "new to the Commission," several conditions were included in the final test. Although Southern Satellite is certificated as a common carrier, the FCC 214 certificate, which has heretofore been perpetual, is subject to renewal within 5 years. There are conditions for notification and authorization of receive points; cable systems using the service must have a Certificate of Compliance; and this grant is for carriage of Channel 17 only. A new application must be filed for delivery of any proposed pay service in the future.

Some MDS-like restrictions are included on involvement in programming, and there are 50-50 limitations on affiliates.

Finally, the tariffs filed must fully prescribe technical performance parameters of the service to be delivered so that the Commission can determine where, within the entire distribution process, responsibility for



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picture quality rests. Final action came on December 15, and service started within two days from Atlanta.

SCTE Schedules Reliability Conference

ATLANTA, GA.—The Second Annual SCTE/IEEE Conference on CATV Reliability is scheduled for February 23-24, 1977, at the Quality Inn, Presidential Park, in Atlanta, Georgia. James Farmer of Scientific Atlanta is coordinating the event, with the assistance of Judy Williams of Cox Cable.

Fourteen speakers will present papers on cable television reliability, and the program will be designed in the format used for the successful 1976 meeting in Philadelphia. All papers presented will be new, and will not repeat 1976 information presented.

Luncheons, a no-host cocktail hour the evening of February 23, and a copy of the official transcripts and pre-releases of the conference abstracts will be included in the advance registration fee of \$55 to members of SCTE or IEEE. Non-members may register for \$65.

A registration card is included in this issue of *C/Ed*.

Mini CCOS in Oregon

EUGENE, OREGON—A two-day Mini CCOS was held recently in Oregon to prepare the smaller cable operators for



Steve Effros, CATA



Larry Dolan, Mid State

the March '77 paperwork and testing deadlines. As a part of a series of similar presentations around the country, the session was presented by Steve Effros, CATA counsel, and Larry Dolan of Mid State Communications.

The first day was spent on new rules, filing certificates and franchises. The

second day included demonstrations of testing techniques. Guests of honor included Kyle Moore and Chuck Kee of CATA.

Future sessions will be held in Des Moines Iowa, January 10, Indianapolis, Indiana, January 14, Winston Salem, North Carolina, January 24 and Macon, Georgia, January 27. This is an excellent opportunity for anyone not yet prepared for March 1977.

CATA Test Program

OKLAHOMA CITY, OKLAHOMA—CATA informs us that it still has room for more systems to take advantage of their '77 Test Compliance Program. For a reasonable fee, one can rent the necessary test package complete with forms and directions for testing. For more information, contact CATA, Suite 106, 4209 NW 23rd, Oklahoma City, Oklahoma 73107.

Call for Video Tapes

WASHINGTON, D.C.—SCTE and NCTA are collecting information pertaining to video tapes for training in the CATV industry. If you have any training tapes, please submit a short description and availability information to *C/Ed Magazine*, P.O. Box 4305, Denver, Colorado 80204. □

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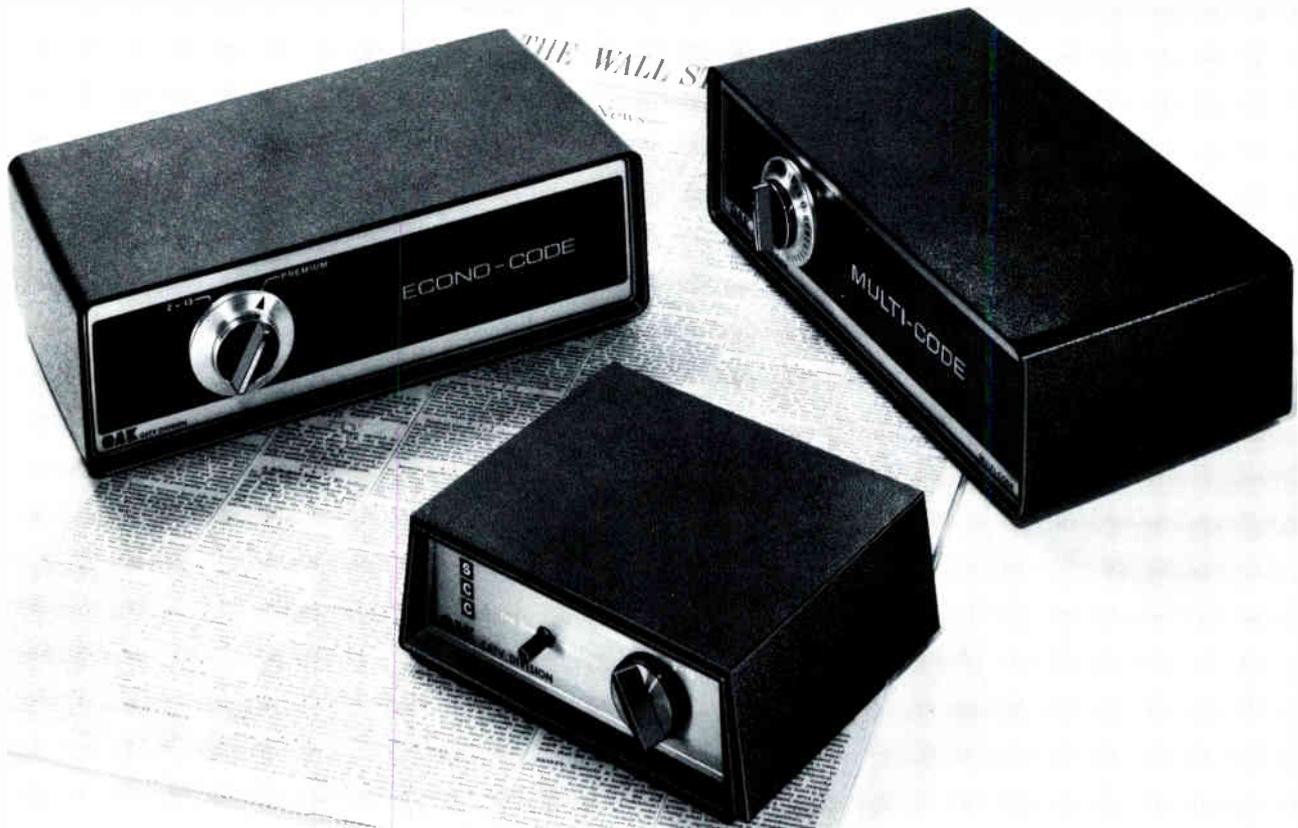
Oak designs with your bottom line in mind! These Oak Pay TV products help you increase subscriber revenue, without excessive equipment cost or rebuild, without sacrificing channel capacity or requiring dedicated channels, and with minimum head-end equipment investment.

You can choose the Econo-Code single channel converter-decoder, the SCC single channel converter, or the Multi-Code multi-channel

converter-decoder. With the Econo-Code or Multi-Code, you're sure of secure scrambling, unscrambling with perfect picture quality, and headend control of the scrambled signal. A single detented rotary selector on each unit controls both standard and premium channel selection, with automatic unscrambling of premium channels. The SCC converts one mid-band channel to Pay TV and allows for fine tuning of "premium" viewing.

All Oak units are housed in attractive, compact cabinets with leatherette-type finish, and are manufactured in Oak-owned facilities.

Our knowledgeable field engineers will help you decide which approach, and which terminal type, is most appropriate to the needs and profitability of your system. For literature or technical advice, call the Oak CATV Division today, or your nearest Oak sales office.



ECONO-CODE

Single Channel Converter-Decoder

Increases revenue in 12-channel or other non-converter systems. Oak provides scrambler and modulator for headend control of video scrambling. Two-position switch allows selection of standard or premium channel.

SCC

Single Channel Converter

Adds a channel for subscription Pay TV by converting one mid-band channel to Channel 3 or 4 utilizing a mid-band modulator. Simple to connect, simple to use; two-position switch selects standard or premium channel.

MULTI-CODE

Multi-Channel Converter-Decoder

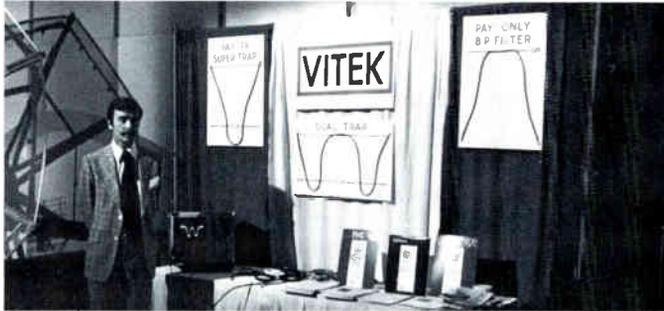
Decodes channels specified by the system operator for secure scrambling. Incorporates an Oak Jewel Case AFC remote or Trimline AFC varactor converter to provide basic converter functions. Economical scrambler and modulator are provided for headend control of video scrambling.

DAK Industries Inc.

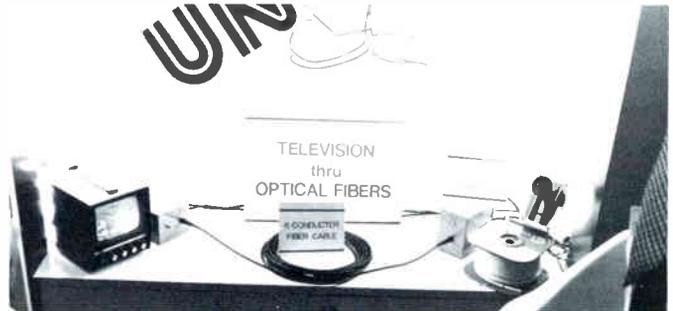
CATV DIVISION/CRYSTAL LAKE, ILLINOIS 60014

Telephone: 815-459-5000 ■ TWX: 910-634-3353

Western Cable



1. Paul Ellman, Sales Manager for Vitek, talks about its CB interference protection filters. Also new are dual trap filters. All Vitek filters are built into "drop cord-like" cables.



2. There were four manufacturers showing experimental optical fiber systems at the show. This one was demonstrated by Belden.



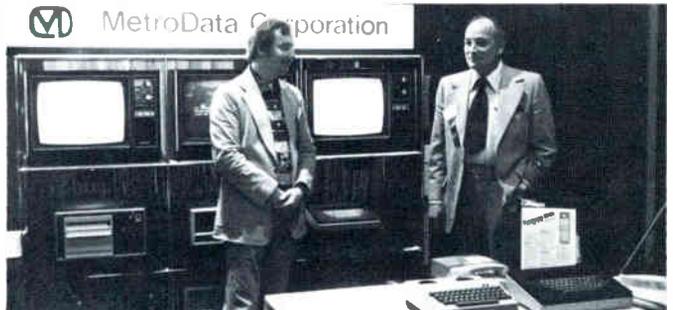
3. Blonder Tongue has an Aural carrier AGC unit and a smaller 1 3/4 inch rack height encoder for its Pay TV scrambling system.



4. Holy Smokes!!! Nobody was looking at Microdynes new digital tune TVRO when the Folies Bergere were coming off the satellite.



5. Something for FREE!!!! Dial-A-Program is doing a field test to see about giving away a free TV Guide channel complete with equipment and weekly programming service. One must, of course, have some minimum number of subscribers. Bob Weiblen (center) says that its revenue comes from the advertising it sells on the channel.



6. Richard Jenkins and Jim MacKenzie of Metro Data talk about more new services to fill channels. Latest is a horse racing readout that looks just like the scoreboard at the track. The technique can also be applied to other sports like tennis and soccer. Software programming flexibility makes all this possible with the standard Metro Data system.



7. While not obvious from the picture, Satori is using a Rank Cintel flying spot scanner for its film to tape dubs. Gary Conner says the results are impressive. [And I have to admit I have never seen finer performance from 3/4 inch Videomatic tapes.]

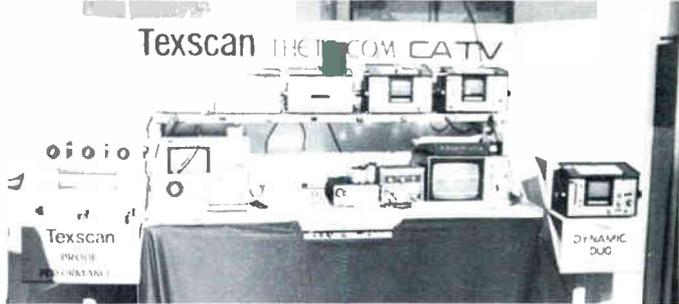


8. ComSonics has improved the Sniffer by adding a meter, a noise source, and ignition noise suppression. The Sniffer is used to hunt sources of cable leakage in a system, and the new meter is calibrated in microvolts per meter. Carl Hensley of ComSonics is holding the Sniffer.

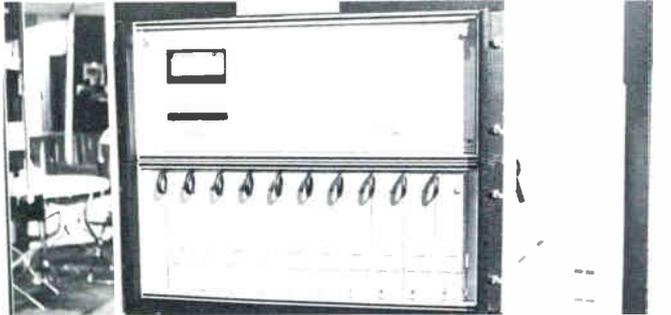
Show Highlights



9. Wavetek and MidState were side-by-side for the show. MidState stole the show with its radiation tester spurred on by the FAA controversy. Bob Welch of Wavetek said this was the best show they ever attended.



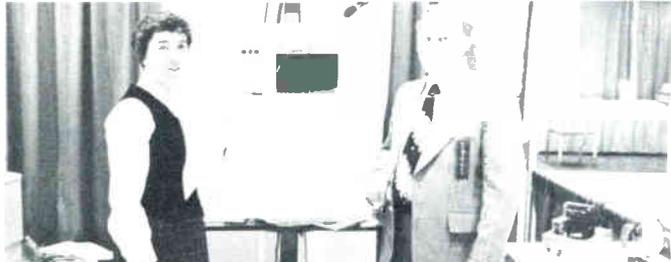
10. Texscan featured a complete test bench so the technical types could get their hands on the equipment and try it out. Offered were sweepers, spectrum analyzers, test sets, and a line of accessories.



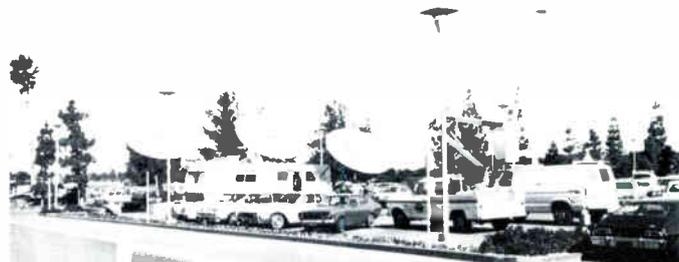
11. Another contender in the multichannel microwave distribution (MDS) business, Microwave Associates, showed a small FM receiver that could be racked up 9 across with price and performance competitive with other manufacturers' units.



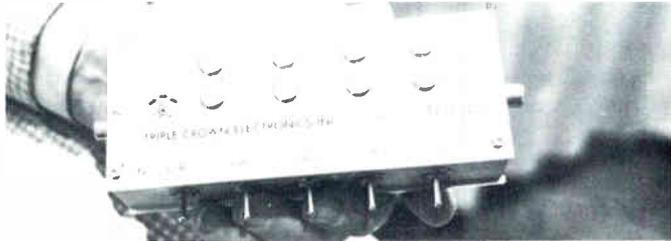
12. TRW, with an impressive display, shows off its line of amplifier components and block amplifiers. TRW, in a continual effort to increase reliability, is using gold wire to gold pad bonds on its hybrid amplifier modules.



13. Ernie Larson with his wife had new little Santa Clause appliques plastered all over everyone at the show, Larson Electric makes standby power supplies.



14. The parking lot contained 3 working 4.5 meter Andrews dishes supplying fees to the show floor. HBO pay programming as well as tests of the new Channel 17 satellite network were picked up on the dishes with no problems, even though the show was in the noisy L.A. basin.



15. Great things sometimes come in small and inexpensive packages. Triple Crown has an accessory that makes cross-mod and triple beat tests simple. Put its little \$95 box between the amplifier output and a spectrum analyzer or field strength meter, switch in a pad to reduce the high output level, then switch in a series of bandpass filters for the Low, Mid, High, and Super band to check without overloading the mixer in the test device. Contact Charles Evans at Triple Crown for more details.



16. Starting them young . . . The youngest person attending the show was Robby Purvis, escorted by his parent around the show. Notice his enthusiasm for all the new products.

WCTA Technical Sessions



The technical program for the Western Cable Television and Convention Show was presented on the last day, Friday, December 3, giving all the tired feet a chance to rest. There were eight actual sessions throughout the day.

Security: "An End in Sight for the Bottleneck" was moderated by Bill Schiller of Storer Cable, and included a presentation by M. Christopher Derick of Viacom. John Margraf, with the aid of his wife, gave an interesting talk on system auditing. His figures for number of illegals in an average system varied from 15 to 40 percent. He stressed the need for audits, offering may tips on how to protect against illegals.

"Smart Taps" was moderated by Frank Bias of Tele-Vue, and included presentations by Ivan Bigelow of Ameco and David Fear of D-B-C. Operation and criteria for Smart Taps were discussed, including reliability, power consumption, non-introduction of an extra carrier,

simplicity, price, and method for introducing premium service. Frank Bias pointed out that Smart Taps might not be a good name since they have to be told everything, but who are we to question . . . Joe Stern presented some closing comments on Smart Taps.

The "Optical Cable" presentation by SCTE drew a standing room-only crowd once everyone found the meeting room. Five viewpoints were presented: The Current User, Ron Simon of Teleprompter; The Future User, Bob Bilodeau of Suburban Cablevision; Fibers, Frank Dabby of Fiber Communications (now owned by Times Wire Co.); Cable, Herb Lubars of General Cable; and Electronics, James O'Brien of RCA. The general consensus was, although general use is still a couple years off in the future, one ought to start thinking about how to handle Optical Cable today.

Following lunch, Teleprompter's Bill Bresnan presented an excellent paper, "Fibers in Your Future." Pointing to the promise of fiber optics, he cautioned everyone about the power of AT&T and the threat that could exist if cable does not expand its technology. Bell has tried before to monopolize communications, and is now branching into fiber optics, thereby overtaking cable. The promise of fiber optics means broadband communications potential for anyone involved. Bresnan's talk, as he cautioned, was not meant to upset anyone, but every

cable operator should understand the implications of the Bell efforts.

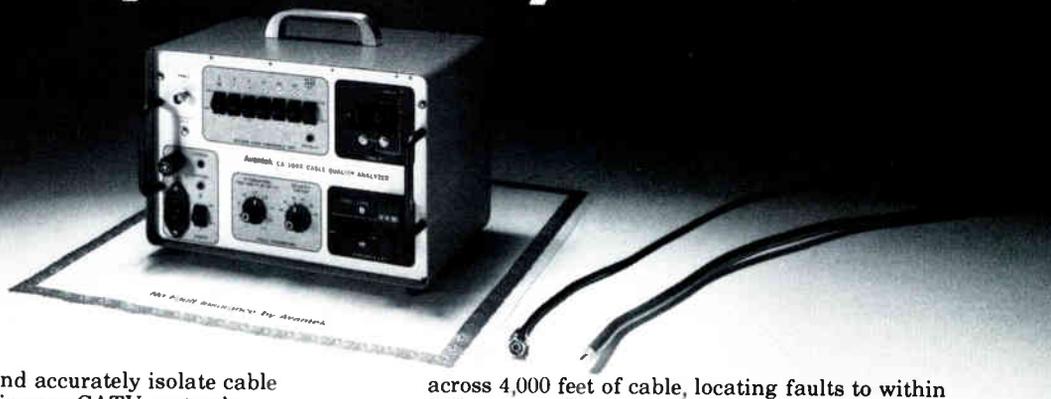
A panel on "Rebuild" was moderated by C.M. Kirkeeng, Western Communications. Considerations on cost, future expansion, and general planning hints were given by panelists Gary Hokenson of Mission Cable, R. Kruger of ATC, and Ken Wall, Western Communications.

A lecture on "Translators" was presented by Aaron Fleischman of Fleischman and Walsh. The newer translator rulemaking before the FCC could have serious effects on the cable industry if distant signal importation, microwave feed, local origination, and non-duplication requirements are all permitted. On the other hand, the cable industry will have to tread lightly in an area where the public interest might be served.

The Paycable Operations Checklist was a nuts and bolts session on how to prepare for the introduction of pay cable and the problems that might be expected. For instance, how are telephones affected, how are security of traps and converters controlled, and how is quality control handled? The session was headed by M. Christopher Derick of Viacom. Speakers included John Calvetti of Entertainment Inc., Gill Cable's Pete Mobley, and Dee Miller of Theta-Com.

The last session was on "MDS: A Status Report", and was presented by Mark Foster of Microband National Systems. □

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across 4,000 feet of cable, locating faults to within $\pm 1\%$ accuracy!

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All other areas: contact Avantek, 408/249-0700.

Avantek

wrap up

NCTA's Engineering Advisory Committee, **Subcommittee on Interference** is chaired by **Frank Blas** of **Tele-Vue Systems**. A committee to negotiate current CATV interference and signal leakage problems includes **Richard Hickman** of **Cox Cable**, **Kevin Gossman** of **Teleprompter**, representatives of NCTA's Government Relations and Engineering Departments. Blas presented lengthy presentation to NCTA's Executive Committee at WCTC in early December. **James Lahey** of **Muskegon Cable TV** is interface with NCTA Board of Directors and EAC.

Abstracts for papers to be published in **IEEE Transactions on Cable Television** should be forwarded to **James Herman**, Motorola Semi-Conductor Products, P.O. Box 2953, Mail Station Z-201, Phoenix, AZ 85008. Herman is editor of **Transactions**, which is published quarterly. **Technical sessions** for **26th Annual NCTA Convention** in Chicago are highlighting **Small System Engineering**, chaired by **Ken Walker** of **Magic Valley Cable TV** (with an afternoon "Hands-on" program); **Pay/Subscription TV Delivery Systems**, chaired by **Richard Hickman** of **Cox**; **Protection of Service**, organized by **Ron Silmon** of **Teleprompter**; **Testing and Maintenance, O.D. Page**, Consulting Engineer; **Advanced Techniques** (two sessions) chaired by **Joseph Stern**, **Stern Telecommunications** and **R.V.C. Dickinson**, **E-Com. Small Earth Stations, Synthetic Services, Eye-Opener Kickoff Joint Session** and franchising skit will be hosted by **SCTE**, with two special tours. Dickinson, chairman of Technical Program Committee says, "The technical programming this year is outstanding!"

PEOPLE IN THE NEWS include **Lucille Larkin**, NCTA's new **VP, Public Affairs**. Larkin's background brings much professionalism to trade association's image. **Sharadon R. Webb** is named **Director, Quality Assurance**; **Thomas R. Pitts**, **Sales Engineer** for Midwest Region; **Edward Ebenbach**, **Director of Engineering-Subscriber Terminals**; and **Charles E. Barry**, **Manager, Customer Service Department**, all at **Jerrold**. **Dan Zinn** is new **General Manager-Electronics** at **Anaconda Telecommunications**. **Magnavox** has named **Claude W. Simons** as **CATV Manager of Field Engineering** and appointed **William Blowers** to the company's **CATV Internal Sales**. **Donald L. Stone** joins **Channel 100** as **Vice President of Affiliate Development** in Burlingame, California. **Carl J. Bradshaw**, group vice president, communications, has been named **senior vice president** of **Oak Industries**. **Werner R. Koester** replaces Bradshaw as **group vice president**. **Stanley Gulf** named **technical director of Oak's Development Laboratories** in Madison, Wisconsin, replacing **Richard C. Gall**, moved to Oak Industries' **headquarters** as **staff engineer**. **Ken Grabowski** appointed **Manager** of Hughes' new **microwave communications** product line, relocating to Los Angeles area from Phoenix. **Abe Sonnenschein** appointed as **Manager** for **AML**. **Paul Miller**, active in the development of **Belden's SEED**, named to new post of **sales application specialist** for company's Richmond-based Electronics Division. **Frank Short** named **corporate director** for engineering and **Ramesh D. Sheth** appointed **product development manager** for Belden's electronics products. **Northern CATV Distributors, Inc.** is new rep firm formed by **Andy Tresness** and **Jim Emerson**. CCTA Director **Jack Simpson**, MSO in Ontario, Canada, heads Technical Committee of Canadian Cable Television Association.

BUSINESS NOTES about companies in the news: **General**

Cable Corp. received tenders to purchase 93% outstanding common stock of **Sprague Electric Co.**, **Insilco Corp.** and **Fiber Communications Inc.** agreed in principle to form **Times Fiber Communications**. Times Wire & Cable and FCI become operating divisions of new company. **Teleprompter** is using **satellite signal** (52,000 miles in three-tenths of a second) to cover **50 mile distance** from Danbury, CT to NYC. Signal moves 186,000 miles/second from RCA SATCOM I. TPT says it's cheaper than microwaving into system. Canadian companies **Rogers Telecommunications** of Toronto and **Premier Cablevision** of Vancouver released each other from plan where Rogers would take over control of Premier. **AELCC** signed turnkey contract with **Jeff Davis Cable TV Inc.** for 50 mile system in Jannings, LA. Also AEL won \$2.6 million contract from TCOM Corp. to provide UHF, VHF transmitters and equipment for Nigerian TV broadcast system. **Oak Industries** reported **record** third quarter **sales**. Company says backlog at 9-30 was \$38 million. **Jerrold** will construct **turnkey** for **Cable Communications of Iowa** for 21 miles of system in Pocahontas and Laurens, Iowa. Company consolidated all customer service functions in Horsham headquarters. **Phillips/Magnavox** joint marketing, engineering and manufacturing venture has produced **125% more sales** of standard mainstation equipment than initially predicted.

Scientific-Atlanta organized instrument group sales force and announced orders from WBEN, Buffalo NY for transmit-receive video satellite earth station; from **RCA Alaska** for \$1.2 million in ground station equipment; five TVRO's for **Cox Cable Communications**; and distribution equipment for **Cox's** Norfolk, Portsmouth and Virginia Beach VA systems. **Cerro-Com** delivered **24 million feet** of **drop cable** to **Teleprompter** within 14 working days at year end and still kept other customer orders on time. □

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Technical Editor's Note: As we learn more and more about the precarious balance of nature on our planet, what we often take for granted, such as radio and TV, might not be all that good for us. In addition to potential programming effects, alleged eye damage and x-ray potential from picture tubes and other high voltage circuits, there are environmental and human health considerations.

During the 1973-74 energy crunch, questions were raised about the need for high power TV transmitters. The public takes the

power for granted, often using a set of rabbit ears or built-into-the-set antennas. The same results can be obtained with roof top antennas at 1/10th or even 1/100th the power, and this has been proven in many small communities that use a 1 or 10 watt translator. The electric energy required to power today's monstrosities must be considered.

Now look at cable TV for a minute. Signals are contained within a cable. The power levels are very low; electricity used is minimal. And, the cable can provide many other energy

saving services, such as meter reading, banking, shopping, schooling, etc. . . all have the potential of saving energy and fuel.

Now we are going to have to start worrying about effects on the human body due to radio energy. Consider how much over-the-air radio could be eliminated if only mobile services used airwaves. Cable is the answer. Optical fibers will increase cable range and quality. And, the "wired nation" as a reality may be forced upon us if the "electromagnetic plague" is substantiated.

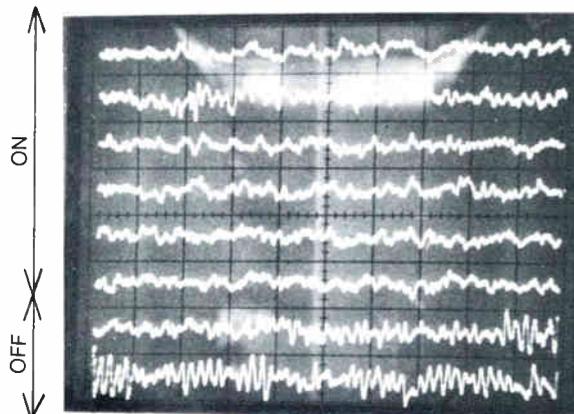
Electromagnetic Plague



Left - typical equipment setup used during the author's tests on volunteers.

Right - EEG (brain-wave) of typical subject before and after low level 345 MHz test signal was directed at subject.

1 sec. | 100 μ V



In the 12th Century, the "Black Death" killed a quarter of the population of Europe in two years. The casual connection between infected rats and man was not suspected and could never have been experimentally isolated and verified until the invention of the microscope, which was some four hundred years later. Today we may be on the threshold of another type of plague. Electromagnetic in nature, the cause may be even more difficult to pinpoint.

Fortunately, we are technologically equipped to detect this possible new plague, if we only will look carefully for biological signs with suitable instrumentation. The electromagnetic spectrum is becoming almost saturated with man-made emitters.

One consequence of the ever growing number of sources is Radio Frequency Interference (RFI). RFI is a form of environmental pollution that, like most electromagnetic radiation, is invisible to our unaided senses. The more easily observable forms of pollution are known to affect life, and it should be no surprise that electromagnetic pollution might affect life also. Whereas we have lived within a natural background of low level electromagnetic radiation, most of it originating on the sun, we have not co-existed with the present day number of coherent, high power, man-made electromagnetic sources for a sufficient length of

time to discern what the full range of their biological effects might be.

Radiowave sickness is a term Soviet and East European researchers have applied to a group of clinical syndromes observed in persons occupationally exposed to electromagnetic fields. These researchers are said to have studied the biological effects of both thermal and nonthermal RF for 25 years and have published extensively upon the subject. A majority of these researchers are convinced that low intensity (nonthermal) electromagnetic waves can also produce adverse effects upon the central and autonomic nervous systems of men and animals. Reported symptoms in man include headache, increased fatigue, increased irritability, dizziness, loss of appetite, sleepiness, sweating, difficulties in concentration or memory, depression, emotional instability, dermographism, thyroid gland enlargement and tremor of extended fingers. These symptoms have been regarded in the U.S.S.R. and Eastern Europe as typical microwave-induced functional disturbances of the central nervous system and are sometimes referred to as *asthenic syndrome*. Systolic murmur is evident and various ECG abnormalities have been seen.

Clinically, electroencephalographic (EEG) changes show decreases in the alpha wave index and increases in theta and delta wave percentages. There is

also evidence of disorders of the diencephalon . . . a portion of the brain that includes the thalamus, hypothalamus, metathalamus and epithalamus. Correlations between EEG changes and other clinical observations and subjective complaints have been noted but do not seem consistent. Clinical examinations of a large number of specialists working with generators of ultra high frequency energy (UHF) in the U.S.S.R. revealed that nervous pathology was somewhat more frequent in women (54%) than in men (48%).

Measurable thermal effects in biological tissue can be induced by RF power levels, above 10 milliwatts per square centimeter. Symptoms cited in the literature include opacity of the lens (cataracts), modifications of EEG and electrocardiograph (ECG) waves, changes in peripheral blood, functional disturbances of endocrine glands and disfunctions of the alimentary tract. The heating effect of radiofrequency radiation is in direct proportion to power density. Human and animal bodies are capable of absorbing between 20 and 100% of the energy of radiofrequency radiation at frequencies above 15 MHz and transforming it into heat.

Other documented thermal effects are gross birth abnormalities in rats whose mothers had been irradiated with microwaves. Cases are on record of

cataracts and testicular damage in man and death of animals exposed to microwave radiation experimentally. As early as 1960, it was known that certain areas and organs are less capable of dissipating heat promptly than others. Those portions that tend to retain heat include the lungs, the eyes, the testes, the gall bladder and the lumen of the intestinal tract; thus these structures are most susceptible to damage by exposure to RF.

Some researchers have observed that there is a synergistic relationship between ionizing radiation (i.e., X-Rays) and radiowaves. The combined action of soft X-rays and radiowaves has been seen to produce more severe morphological changes in experimental animals than those resulting from either X-rays or radiowaves acting individually.

Scientific confirmation or denial of electromagnetic wave effects at very low power densities is of great international importance, not only for reasons of health but also in the interest of international diplomacy. One or two points in this regard deserve mention.

There is the matter of the 1,000 times discrepancy between East and West as to what constitutes a safe power density of exposure. A permissible exposure level for the frequency bands between 10 MHz and 100 GHz was set for the United States and Western Europe at 10×10^{-3} wt/cm² (about 195 volts per meter) while the Soviet and Eastern European lower safe exposure level is 10×10^{-6} wt/cm² (about 6 volts per meter). Thus the Soviet level can be expressed as 10 microwatts compared to 10 milliwatts per square centimeter allowable in the United States.

With rare exception, most Western researchers have not considered that electromagnetic waves, with a power density below that which can produce biological tissue heating, can affect living organisms. Other mechanisms, such as resonance absorptions, which have been advanced as possible explanations for radiowave sickness have presented theoretical interpretive difficulties not yet resolved.

The Moscow Embassy Affair

A curious situation surfaced this past year in conflicting news reports about Soviet microwaves directed at the American Embassy in Moscow. Embassy personnel allegedly complained that their health was being affected, as well as the health of their families, by a level of microwave exposure of 30 microwatts per square centimeter (about 10.6 volts per meter). Secretary of State Henry

Kissinger was quoted as saying that the "Moscow Embassy affair . . . is a matter of great delicacy that has many ramifications." Before the level was reportedly lowered by the Soviets, the embassy inhabitants had been protesting about a level some 300 times below the legal safe limit in the United States. In connection with this affair, it was later reported that although no confirmed illnesses of the personnel resulted, Johns Hopkins University had been chosen to periodically monitor the health status of the United States Embassy personnel.

If you work in a very high frequency (VHF) or microwave field of 30 microwatts per square centimeter intensity and do not feel well, you cannot complain effectively to anyone because this level is well within the safe exposure limit in the United States and Western Europe. Further, if you discuss any physical or mental difficulties with your doctor, he will probably be unaware of the possible effects upon your health caused by electromagnetic fields, especially since evidence suggests that this damage is temporary and reversible in short-term low intensity exposure. (There is no certainty regarding the effects of long-term low intensity radiofrequency exposure; but one should speculate that some adaptive mutation might occur in those who survive.)

For several years, international symposia have been held wherein research on the subject of non-ionizing radiation has been reported and papers presented. The 1976 International IEEE/AP-S Symposium and USNC/URSI meeting held October 11-15 in Amherst, Massachusetts, included, for the first time, representatives from the Soviet Academy of Sciences, who unexpectedly expressed the opinion that perhaps the Soviet and Eastern European safe exposure levels may be too conservative.

The Soviets reportedly began emanating worldwide, high power, "machine gun like," interference signals from the eastern side of the Baltic Sea in July 1976, severely affecting some amateur, maritime and telephone communications. (As of this writing, they are still doing so.) The author confirmed this RFI in the 40-meter amateur band to be pulse modulated at 10 Hz, which is a biologically significant frequency because it approximates the average alpha brain wave frequency, as well as the approximate 10 Hz tremor that accompanies the normal contraction of the voluntary muscle.

It is known that electrical stimulation at certain repetitious rates can evoke

complicated and widespread responses in most people i.e. seizures in epileptics. Further, it has been shown that a sharp increase of calcium efflux from isolated chick brain tissues occurs when they are exposed to a modulated RF field of 147 MHz. This response only occurs when the carrier is repetitively modulated within the narrow band of frequencies between 6 and 25 Hz.

Another interesting fact is that both the alpha waves and voluntary muscle tremor respond in very similar ways to a given stimulus . . . slowing down in relaxation and sleep and speeding up during general alerting of the human system. Rhythmic wave 10 Hz pacemaker systems have been found in the thalamus of the brain. The main link between nervous and endocrine systems is situated in the hypothalamus. From the hypothalamus centers through the hypophysis (pituitary body) to peripheral glands, a stepwise amplification of hormonal stimuli has been observed; thus the whole endocrine system displays some characteristics of a biological amplifier with the hypothalamus as the most sensitive and crucial region. While the hypothalamus is not exclusively concerned with a temperature-regulating function, it is noted that interference with this region can drastically affect temperature regulation. Low power radiowaves can produce changes in the regulatory activities of the hypothalamus.

The question is . . . are the Soviets only jamming communications or are they attempting to induce a global behavior modification with the general population as their guinea pigs? In other words . . . have the first "shots" of a radiowave war been fired?

About the Author:

William Bise is one of a handful of Americans studying the effects of electromagnetic radiation (non-ionizing radiation) on the human and living tissues. He is self-educated, and has also spent much of his life as an engineer at radio stations around the country. He became interested in the study of radio waves effects after noting the actions of co-workers and his own reaction to the radio environment. He is a Clinical Instructor of Environmental Medicine at the University of Oregon School of Medicine, and is also the director of the Pacific Northwest Center for the Study of Non-ionizing Radiation, a non-profit research center. Further information requests and correspondence can be sent to P.N.C., P.O. Box 22053, Portland, OR 97222.

Effects of Electromagnetic Radiation on People

A unique situation has existed in the United States regarding investigation of electromagnetic radiation effects upon people. With very few exceptions, traditional research facilities have not yet begun scientific investigations similar to the author's pilot study on men. Furthermore, those institutions that should have been concerned with determining if electromagnetic radiation at low levels of power density can affect people have seemed interested only in the consideration of animal or in vitro research.

This has been an unfortunate attitude in view of the fact that one of the admitted major difficulties in this area of research has been the extrapolation of in vitro and animal results to man. Perhaps the problem has been the difference in tradition between the United States and the U.S.S.R. in biological research as was suggested by Allan H. Frey who concluded that "American investigators are oriented toward looking for effects through a microscope" while the Soviet tradition inclines the investigators to look for effects in the modification of behavior as reflecting nervous system function.

In this writer's opinion, while Western medical research has stressed chemical and microbiological changes as the basis for most disease, it is now necessary to recognize that mental and physical changes can also be produced by electromagnetic means.

From July 1975 through June 1976, the author conducted a study on 5 men and 5 women volunteers using 3 low power RF generators as radiation sources and EEG and ECG equipment (specially modified to remove RF interference) as indicators of nervous system deviations. The ranges checked were from 1 Hz to 960 MHz and X-band (8.5 to 9.6 GHz). Specific frequencies were found to produce brain wave and cardiac changes, which also correlated with observed behavior changes in the test subjects. These biological changes were seen to occur at a power density of about 1.95 volts per meter (10^{-12} wt/cm²), an intensity lower than people are normally subjected to when walking down a typical metropolitan street.

These volunteers were highly pre-selected and the effects observed could very well turn out not to be the same for the over all population. Three of the volunteers had been occupationally exposed to very high frequency (VHF) and microwave fields; the other seven had not. All subjects were in apparent good health, and only one male and two females showed no alpha waves with their eyes closed.

Volunteers were seated with eyes closed and oriented so that they could not see the experimenter, the equipment or their EEG traces during the test. They also did not know to what frequency the generator was tuned or when the generator was on or off. Artifacts such as electrode or instrument interactions were checked for and controlled out of the

tests. Except for the X-band generator which was pulse modulated, the other generators were used in the Continuous Wave (CW) mode only. Volunteers in the X-band tests were oriented so that the open wave guide output of the generator was aimed perpendicular to their sternum.

In tests covering the range of 1 Hz to 960 MHz, the generators were connected to a 1-meter open wire antenna and free space impedance coupled (end of #20 AWG wire inserted into the center conductor only of generator output) at a distance of 1 meter from and parallel to the subject's upper torso and head. Power levels, at one meter distance, were measured by means of two spectrum analyzers and were determined to vary between minus 90 dBm and minus 60 dBm (10^{-16} wt/cm² to 10^{-13} wt/cm²). Additional allowances were made on the power levels for variables such as reflections, whole body absorptions, point source concentration and the like. Thus the average power density at the bodies surface was on the order of 1 picowatt per square centimeter (10^{-12} wt/cm²). An oscilloscope camera was used for recording the traces during the tests. A unipolar 3 lead configuration was used to minimize artifact, and the electrodes were silver chloride scalp type.

In the results of tests, certain volunteers' traces showed desynchronized waves of low amplitude at one or more frequencies and desynchronized waves of high amplitude at other frequencies. In addition, mental attitudes

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noticeably changed during the tests. Short-term memory lapses took place in four of the men and were followed by lack of concentration and some irritability. Three of the women displayed mild apprehension, then anxiety and mild irritability. The brain wave changes occurred immediately upon tuning the generator to a frequency which produced a change; they then immediately reverted to their normal patterns when the generator frequency was changed or turned off.

During one test with the X-band pulse modulated generator, all three men present (volunteer, observer and the author) noticed severe frontal headache during the test and felt mentally and physically sluggish the following day to the extent that they were unable to do their work. The author checked his ECG after the test and noted that it has deviated from normal and displayed a pattern similar to Wolff-Parkinson-White syndrome. Forty-eight hours after the X-band test, the author's heart pattern reverted back to within normal limits. One other important finding was the circadian nature of the effects. Midnight and noon were the times when the EEG changes, correlated with behavior changes, were most easily observed. Mid-morning and early afternoon tests did not show changes as dramatically observable in the brain wave and behavior patterns. (It should be emphasized that to date non of the volunteers have had any lasting after effects.)

The theoretical explanation for these results presents a difficult but not impossible problem. It is almost a certainty that quantum effects and resonance absorptions are involved. At very low RF field densities, the body's defensive mechanisms most likely do not respond. It seems probable that our "fight or flight" mechanism must have a lower limit threshold which, if not perceived by the body, does not trigger the appropriate actions.

In the opinion of the author, his preliminary findings and observations substantiate many of the Eastern European and Soviet reported results sometimes described as asthenic syndrome. Further research is necessary in order to determine the full implications of these low power level frequency dependent effects. Whereas certain frequencies can be harmful, the others may be benign. The electromagnetic spectrum is a vital part of our biosphere, and it is imperative that all aspects of it be investigated so that we may understand how to use it wisely. □



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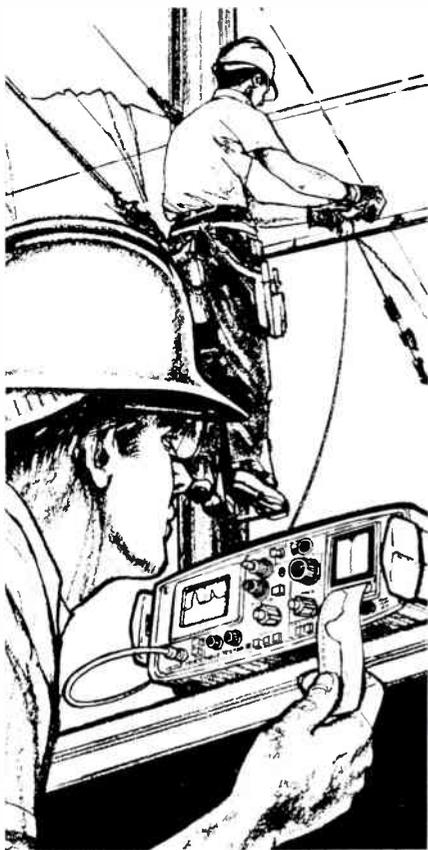
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CCTA **canadian column**

The Fall Meeting of the Western Society of Cable Television Engineers was held October 30th at the Sheraton-Villa Hotel, Burnaby, British Columbia. The technical program began after a welcoming speech by its president, Bing Mui of Vancouver Cablevision.

The first paper was presented by Ed Prins of Community Antenna TV Ltd., Calgary, Alberta, and it was entitled: "Common Grounding Versus Independent Grounds." Prins discussed the results of an investigation of the causes of cable television system outage. CATV and electric power and telephone systems had a common ground. A check showed about 70% of the neutral return current flowed through the sheath of the television cable during short circuits in the electric power system. This was due to the relatively low resistance of the aluminum. A substantial improvement was obtained when the common ground was removed and ground rods were installed at least 20 feet away from the ground rods of the power system. The current through the cable was now reduced to 30% during power system short circuits. Considerable information was given on grounding, such as the need for extending the rods below the frost line.

The next speaker was Peter Burchardt, president of Current Communications Service Centre Inc., Vancouver, B.C. His subject centered on the collapse of a cable television system antenna haul. The rods to which the antenna guy wires were attached had been anchored in concrete blocks. The rods came out of the blocks, and it was observed that the galvanized iron had corroded down to the thickness of a pin. Furthermore, a strong odor was noted. It was surmised that the corrosion was due to electrolytic action attributable to large ground currents from a D.C. power station in the vicinity. The antenna system is being rebuilt, using corrosion-resistant metal for the anchors in the concrete blocks.

The third technical paper was presented by Alan Shiel, general manager, West Coast Cablevision Ltd., Burnaby, B.C. The subject was a comparison of a 216 MHz cable television system (with 22 dB amplifier spacing) to 300 MHz systems. First, a table was presented showing the characteristics of a typical 216 MHz system. Among those were: amplifier input and output, cable attenuation and equalizer insertion loss for low band, FM, mid-band and high band. The next chart showed the characteristics of the system with 22 dB

amplifier spacing maintained at 216 MHz and a 300 MHz bandwidth. Another table showed the characteristics of a system with 22 dB amplifier spacing at 300 MHz.

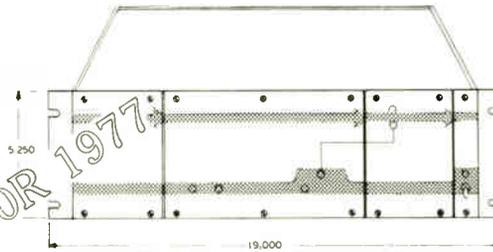
The next speaker was Bing Mui, plant manager of Vancouver Cablevision, Vancouver, B.C. His subject was the calculation of cable television system triple beats by means of a Hewlett-Packard 25 programmable calculator. A formula incorporating the characteristics of the trunk amplifiers, bridger amplifiers and line extenders was shown. It consisted of three terms having negative fractional exponents, the sum of which was divided by another term also having a negative fractional exponent. Thus, it is possible to ascertain whether or not the proposed design for a cable television system meets the requirements of the Department of Communications.

Phillip Allman of Delta-Bencoscascade Ltd., Rexdale, Ontario, discussed the use of Avantek equipment for performing summation sweeps, obtaining spectrum analyzer response displays, and measuring cross-modulation. In the demonstration, the equipment was connected to the cable television outlet of the hotel, which was serviced by Vancouver Cablevision.

The next presentation was made by Chuck Wright and Tom Sinclair, both of Western Cablevision Ltd., Surrey, B.C. The subject: "Microwave Changeover." Western Cablevision serves the communities of New Westminster, Surrey and Langley. In order to comply with BP 23 and reduce the cost of accommodating additional channels, it was decided to incorporate microwave equipment into the system and eliminate one of the two headends. Three links were installed: one STL for program origination from the office in Surrey to the headend at Cloverdale; a 20 channel AML from Cloverdale to the office for the purpose of serving the New Westminster and Surrey area; and finally, a link from Cloverdale to the Langley portion of the system. A semi-coherent headend was used with pivot channels 6, 10 and 12.

The final technical paper was given by Bing Mui on the subject of estimating the project cost of cable television system construction. Factors taken into account were: cable placement, power station permits, power supply stations, construction labor, engineering and drafting time, cable cost, cost of amplifiers, power supplies, splitters, taps, and miscellaneous hardware. Using data accumulated by the Systems Design Centre of Vancouver Cablevision, Mui showed that the money expended for labor was approximately 43% as compared to 57% for materials. Five years ago, the ratio of labor to materials was about 30:70. The labor factor is therefore increasing, and it must be considered carefully in any construction program. □

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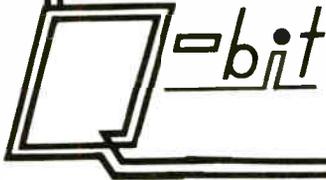


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If you're stumbling over some of the electronic jargon that's piling up in today's industry, this newly expanded "Glossary of Electronic Terms" is for you. For example, it explains what "GIGO" means - a programmer acronym for "garbage in, garbage out." "GIGO" is used to describe an incorrect output of a computer.

This pocket sized glossary has been expanded to 40 pages and lists 425 commonly used electronic terms, computer terms, and acronyms (electronic "alphabet soup") ranging from "ACC" (Automatic Chroma Control) to "Zoning" and explained in layman terminology. 4" x 9" size. In addition, a metric chart has been added.

The glossary can be imprinted for give-away use. Available for \$1.50 postage-paid in quantities of 1 to 9 copies, and \$1.20 in lots of 10 to 99 from Henry Lavin Associates, Inc., 12 Promontory Drive, Cheshire, Connecticut 06410.

Quantity pricing and imprinting is also available.

The New Yorker

"Microwaves," appearing as a two-part series in the December 13th and 20th of the New Yorker's A Reporter at Large series, is a complete and comprehensive history of radio and microwaves. Paul Brodeur, whose past articles helped to expose the controversy over fluorocarbons in the atmosphere (from aerosol sprays), now takes on the subject of radio waves and their effect on the human body. He outlines research by U.S. and Soviet scientists and notes the marked differences between the safety standards for each country. This should be required reading for anyone in radio. If the blatant profusion of radio transmitters is not curbed, we may someday have more to worry about than channel crowding. □



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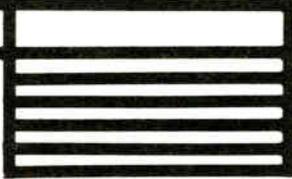
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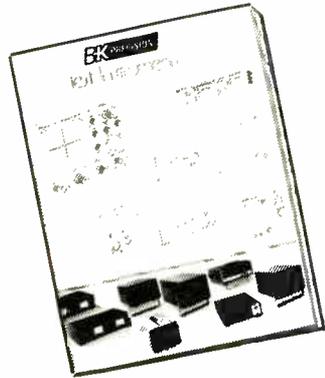
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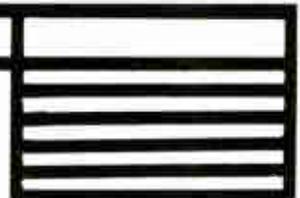
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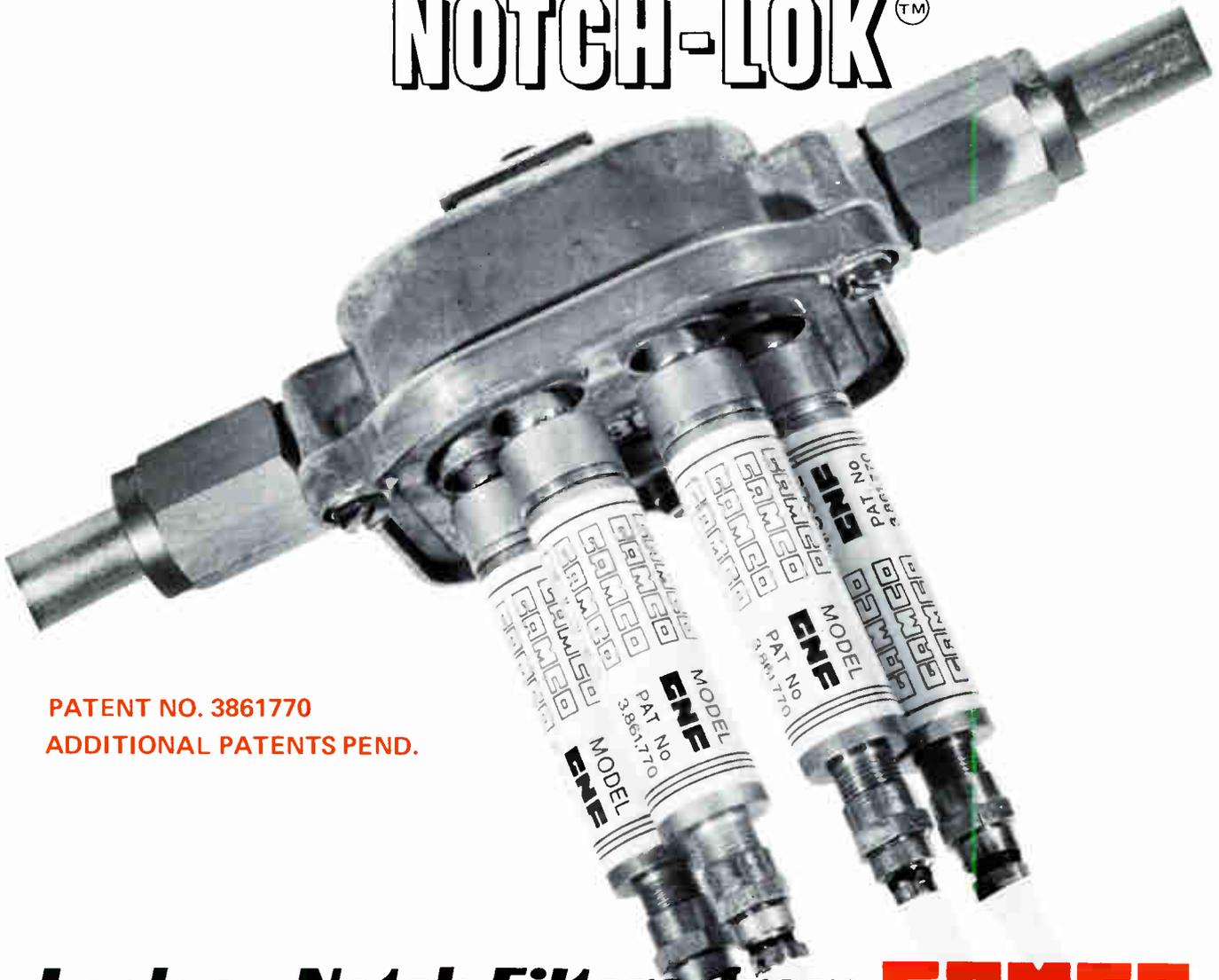
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