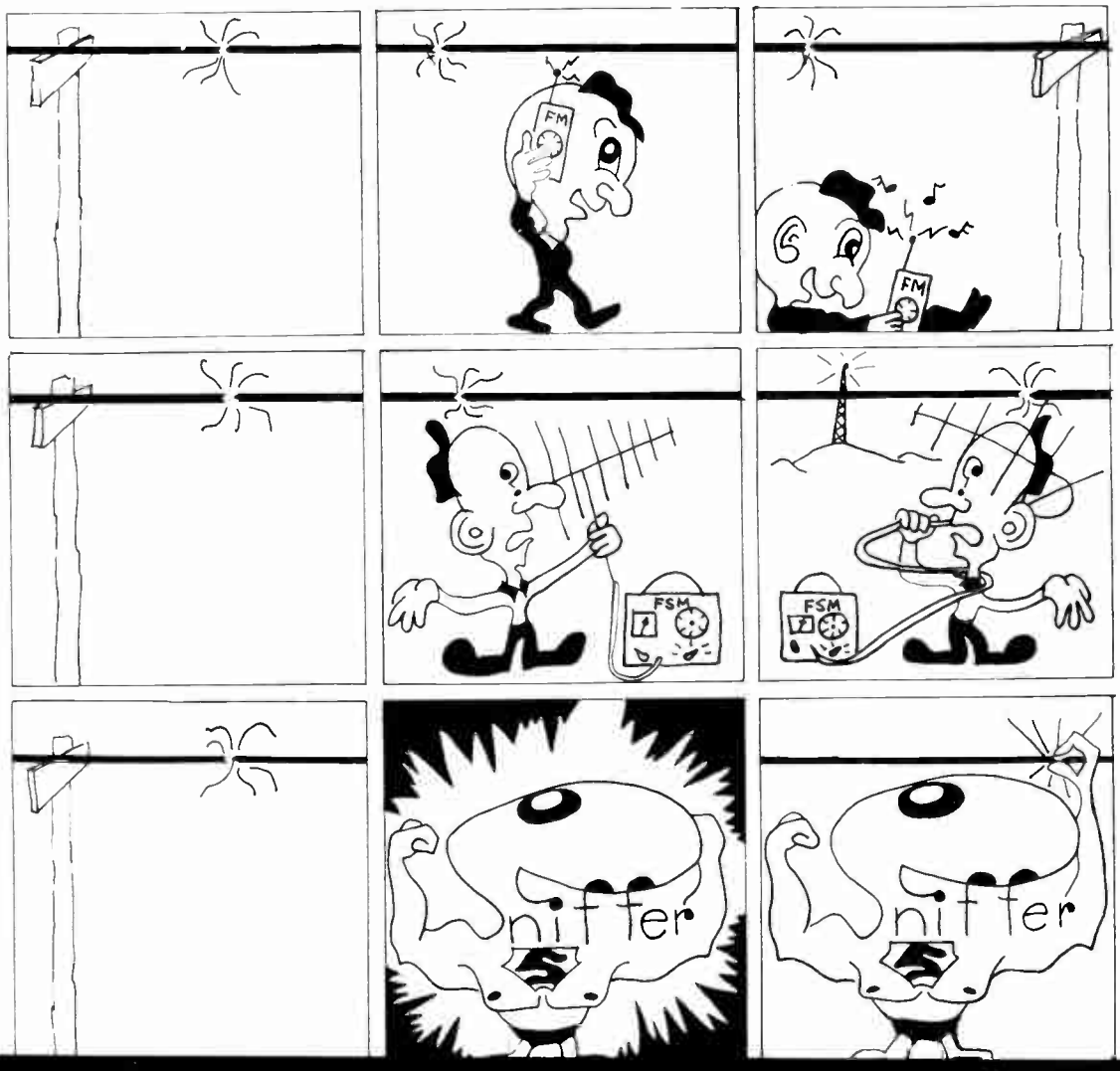
C-ED

Taps and Lasers
NCTA Engineering VP Robert Luff Interviewed

Communications-Engineering Digest
Reporting the Technologies of Broadband Communications

October 1977
Volume 3, No. 10



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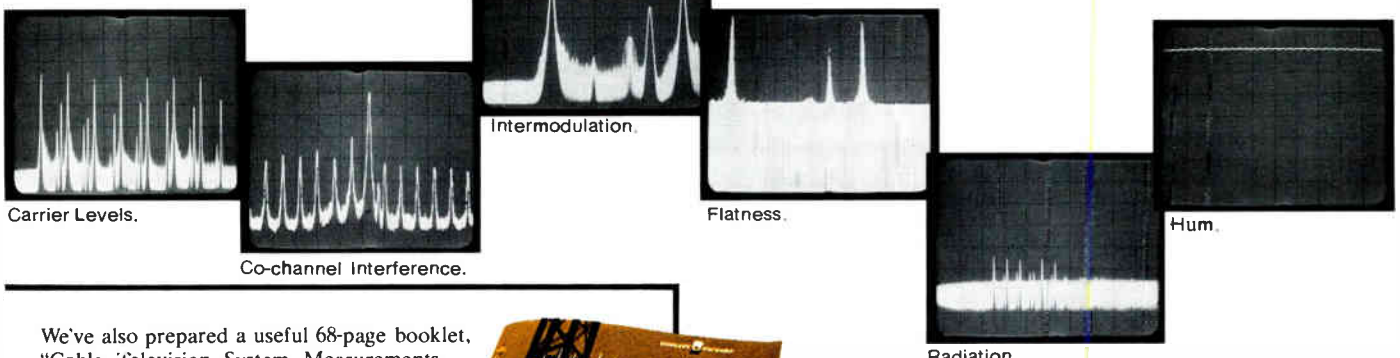

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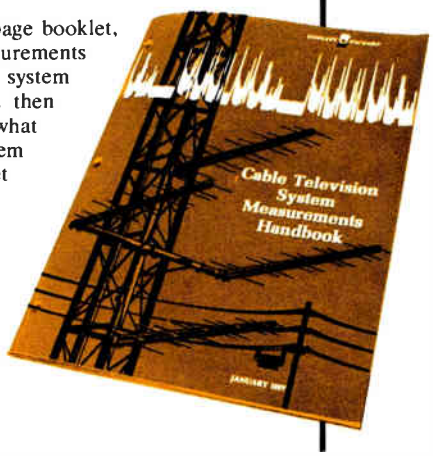

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C-ED News at a Glance

WASHINGTON, D.C.—The **House subcommittee on communications scheduled twenty-nine witnesses for** the **cable hearings** held September 29 and 30. Each witness participated in one of three panel discussions which were as "informal as possible" with no prepared testimony. Although each panel covered wide-ranging issues, the discussions were directed by specific questions.

The first session, entitled "The Role of Cable Television Service in Our Nation's Communcations Systems," **focussed on future cable services** and whether cable is "ancillary to broadcasting." The panel included: NCTA chairman Dan Aaron, vice president of Comcast Corporation; Ted Carpenter, director of the National Citizens Committee for Broadcasting; Gustave M. Hauser, Chairman of Warner Cable Corporation; Henry Geller, The Aspen Institute; Red Burns, director of Alternate Media Center; Charles F. Dolan, general partner of Cablevision System Corporation; Earl Haydt, manager of Berks-Suburban TV Cable Company; and Jack Valenti, president of MPAA.

Jack Valenti

Gus Hauser

WASHINGTON, D.C.—President **Carter** has **nominated Charles Ferris to be FCC chairman. Tyrone Brown** is expected **to fill** the remaining two year **term of former Commissioner Ben Hooks.**

Ferris, general councel to House Speaker Tip O'Neill, has been a frontrunner for the position since February.

Brown's experience in communications includes a position as general councel with Post-Newsweek Stations from 1971 to 1974. Brown was nominated for a short term, ending in June 1979. However, it is expected that after his first term expires, the White House will re-nominate him for a full seven year term.

WASHINGTON, D.C.—The **FCC** has **granted** a **waiver to Charlevoix Cable TV Company** of its nonduplication rules because "it would not be in the public interest to require a cable system to black out a superior signal in favor of one that was barely viewable or significantly inferior to the non-priority (distant) signal."

The Michigan cable system argued that the signal they were required to carry ran "anywhere from intermittent to non-existent."

SACRAMENTO, CA.—The **pole attachment bill** that passed the California legislature unanimously earlier this month has been signed by **Govenor Jerry Brown.** A spokesman for the California Community Television Association said he "was extremely pleased with the action."

The bill provides for mandatory access and a formula similar to the national bills introduced in both sides of Congress. The public utility commission of the state will become involved in disputes in the event that the utilities and cable companies can't agree on terms.

Communications-Engineering Digest is published monthly for the Society of Cable Television Engineers by Titsch Publishing, 1139 Delaware Plaza, P.O. Box 4305, Denver, CO 80204. © October 1977. Controlled circulation postage paid at Denver, Colorado.

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OPINION

COVER: This issue features an exclusive first interview with Robert Luff, NCTA vice president of engineering. Photo by Brian Lamb, Washington Bureau Chief.

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Editor's Letter

By now we hope you have received our September issue of *C-ED*, assuming, of course, the mail has treated you kindly. Many of you who have received the redesigned magazine have told us your reactions, and we're just delighted with the reception. Some of the comments were glowing; others were somewhat critical, and we truly appreciate that, too. You will notice we've made some slight graphic changes with this October issue, some of which are the result of the things we heard from you; others from our own critical eye, which will always be looking for ways to improve this magazine.

Speaking of the October *C-ED*, we are fortunate to feature three significant stories—a first-time interview with NCTA vice president of engineering Robert Luff, who fills some mighty big shoes of the late Delmer Ports; a fascinating article by Bill Redstreake on lasers; and a super piece by Terry Hulseberg and his peers at Coaxial Analysts on taps. We think you'll find all three informative, particularly Bob Luff's comments on some of the engineering issues which the industry faces over the next several months.

We'd also like to announce that Titsch Publishing, in an effort to continually improve the magazine for the Society of Cable Television Engineers, is bringing on board as our technical editor Ron Cotten, who joins us from Cablecom General where he was vice president of engineering. Ron was also, as many of you know, president of SCTE. We're delighted he's lending us a helping hand.

Paul A. FitzPatrick

Cable television systems carrying signals in the freqency band 108 to 136 and/or 225 to 400 MHz will be subject to additional Federal Communications Commission (FCC) regulations after January 1, 1978. If the cable system carrying signals in either or both of these bands is **capable of producing** peak signal levels in excess of 28 dBmV **at any point** in the cable system*, the frequency of these signals will be subject to closer tolerances than presently specified. The additional regulations would be effective if any portion of the cable television system is within 60 nautical miles (69.1 statute (ordinary) miles, 111.2 kilometers) of an aeronautical radio service.

In addition, the affected cable television systems will be prohibited from carrying signals within 100 kHz of the emergency frequency 121.5 MHz and within 50 kHz of the emergency frequencies 156.8 and 243 MHz.

Further, the cable television systems subject to these additional regulations will be required to implement a system of leakage monitoring that will cover **all** portions of the cable system at least once each year. Monitoring equipment must be **sensitive enough** and calibrated to insure the detection of leakage in excess of 20 uV per meter at ten feet from the cable plant. Each leakage source in excess of the minimum must be identified and log kept of the location, date of discovery, and date of repair. This log must be retained for two years with the other system records available to representatives of the FCC on request.

Other "housekeeping" chores that the new rules will require of the affected systems are: (a) to notify the FCC annually of all signals carried in these bands, noting the type of information carried by the signal (television, aural broadcast, pilot carrier, etc.) The timely filing of FCC Form 325, Schedule 2, will meet this requirement. (b) to notify the FCC at least 60 days before initiating use of any new frequency or frequencies in these bands. Notification shall include carrier and subcarrier frequencies, types of modulation, and maximum peak power occurring at any location in the cable distribution system. (c) to maintain at its local office a current listing of all signals carried in these bands, noting carrier and subcarrier frequencies, types of modulation, and maximum peak power which occurs at any location within the cable distribution system.

*Most cable systems carrying signals in these bands would be subject to the additional regulation since normal bridger output is 30-45 dBmV. A defective amplifier (loss of AGC) could give values 5-10 dB above normal until repaired.

These additional regulations are the outcome of an FCC rule making proceeding (Docket 21006). This rule making was initiated by an urgent request from the Office of Telecommunications Policy (OTP) and the Federal Aviation Administration (FAA). The OTP and FAA request was the result of an incident where leakage from a cable television system had an effect on aircraft communications. The Engineering Advisory Committee of the National Cable Television Association (NCTA) took the lead in preparing the industry position on this matter; however, invaluable assistance was received from the Society of Cable Television Engineers (SCTE), the Community Antenna Television Association (CATA), and individual members of the industry. Strong efforts were made to insure that the comments represented a concensus of the entire cable television industry. Because of the obvious emotional impact of the subject (which was exploited to the utmost by certain parties to the proceeding) it was difficult to keep the decision making on a rational, engineering basis; consequently a united cable television front was required. It is believed that these, admittedly severe regulations, were the least onerous that could be secured in the then existing Washington, D.C. atmosphere.

If your system is carrying signals in this band, what should you do now? As with any new rules of this large magnitude, there are some uncertainties in their implementation. Probably the greatest uncertainty is in the determination of the particular aeronautical radio facilities that the cable system must consider. A good start on the problem would be to obtain the Sectional Aeronautical Charts (usually obtainable at any airport from the operators who service private aircraft) and plot 60 nautical mile circles around the aeronautical facilities. Easily identifiable will be very high frequency omni ranges (VOR), and airport towers. However, missing will be the components of the ILS system (localizers in the 108 to 118 MHz band and glide slopes in the 328.6 to 335.4 MHz band), most aeronautical communication stations both FAA and private (approach controls, in flight service stations, unicoms, etc.) and most military facilities. Your industry representatives are working with the FCC and other government agencies to develop an easier method of aeronautical radio facility identification before the January, 1978 deadline.

Irrespective of what type of headend equipment is used it is, in practice, mandatory to measure the absolute frequency of the cable system carriers to assure minimum offset. A frequency counter having an absolute accuracy of better than 1 part in 10^6 under all reasonable operating conditions (especially if calibrated annually) can be obtained for a reasonable price.

The "housekeeping" chores would seem to present no particular problem, although the requirement for 60 days notice to the FCC before starting new operations in the stipulated bands will place some limitations on the flexibility of operations.

The new rules spell out the authority of the Engineer-In-Charge (EIC) of one of the FCC's Field Engineering Offices to require suspension of operations of any cable television system interfering with "radio communication involving the safety of life and protection of property." This would seem to be an academic provision since no responsible cable television operator would want the financial, legal, or moral burden of such interference. The operator of the system involved in the only recorded case of interference in 25 years of cable television operation has been complimented for his immediate cooperation.

It is hoped, after the hysteria dies down, and the good record of cable television operators continues, some of the requirements may be reviewed and put on a more rational engineering basis. The Interference Subcommittee will continue its efforts in that direction.

Frank Bias, SCTE Western vice president

SCTE To Hold Elections, Revise Bylaws

The Society of Cable Television Engineers is moving forward in its reorganization program and will propose a number of editorial changes to its bylaws by the end of 1977, according to Judith Baer, executive director.

Included in the proposed changes to the bylaws is the task of enlarging SCTE's board of directors to include new positions, possibly of members-at-large, as well as regional directors. "We've got the momentum and membership participation," says Baer. "Now is the time to take this rather large step," Baer continued, "and include more people in the decision-making processes facing SCTE. Any changes," Baer interjected, "will be subject to approval of the membership."

Election of officers to replace SCTE's current president, western and eastern vice presidents and secretary-treasurer will be called during December and January with results to be announced in February at SCTE's Annual Membership meeting.

The Society will move its annual meeting to coincide with its Third Annual CATV Reliability Conference in February rather than holding it during the National Cable Television Association's annual conventions.

SCTE president Robert Bilodeau of Suburban Cablevision will appoint a Nominating Committee to be announced during the Western Cable Convention, November 9-11 in San Diego, California.

SCTE Scores Record Crowds at Technical Meetings

Robert Bilodeau, president of the Society of Cable Television Engineers, has announced that since June SCTE has hosted more than 400 CATV industry technicians and engineers at meetings sponsored or co-sponsored by the Society. "At the last five SCTE events," stated Bilodeau, "we've averaged 90 people at each meeting. Some of our ongoing relationships with state CATV associations average about forty technicians each month turning out for SCTE technical meetings," Bilodeau emphasized, "such as in the Pennsylvania—Maryland—Delaware area where Jim Grabenstein and Joe Gans have provided outstanding leadership."

SCTE is actively participating in programming staged in cooperation with the Community Antenna Television Association (CATA); the Wisconsin, Minnesota, Texas, Georgia and Mississippi state cable associations; and the Mid-America CATV Association representing the states of Nebraska, Oklahoma, Missouri and Kansas.

A technical session staged in cooperation with each of the groups mentioned will be held as scheduled during October, November, December and January of 1978. Plans are being readied for the Third Annual SCTE/IEEE Conference on CATV Reliability in February, 1978 and SCTE will continue to actively participate in technical programming for the NCTA Convention in New Orleans in 1978.

SCTE and CATA to Stage Joint Tech Meeting in Florida

Ralph Haimowitz of Indian River Cablevision has announced a two-day technical session, co-sponsored by the Society of Cable Television Engineers and the Community Antenna Television Association, to be conducted in St. Cloud, Florida, January 5-6, 1978. This joint meeting is the first meeting co-sponsored by the two CATV membership groups.

Haimowitz has programmed a full schedule including test equipment procedures, earth station operation and trouble-shooting, receivers, low noise amplifiers, coordination and siting for TVRO's.

Companies participating in the program include Mid-State Communications, Wavetek, RF Systems, Microdyne, Southern Communications Associates, Compucon and Home Box Office.

Registration will be free-of-charge to SCTE members and CATA member system personnel. There will be a $10 registration charge for non-members of either group. For registration and lodging information, contact Ralph Haimowitz.

Pennsylvania and Ohio SCTE Members Hosted by C-COR

Members of the Society of Cable Television Engineers in Ohio and Pennsylvania have been invited to attend a two-day meeting at C-COR Electronics in State College, Pennsylvania on October 27-28, 1977.

James Palmer, president of C-COR and a long-time supporter of SCTE, will provide two full days of technical training on subjective picture quality and identification of system outage problems. The programs will begin promptly at 8:30 a.m. each morning, and a reception will be hosted by C-COR the evening of October 26 for early arrivals.

Subjects to be discussed on the first day include system level control philosophy, test chamber configurations, methods and calculation of system performance, plant tours, demonstrations of system tests in C-COR's environmental chamber and general discussions. On the second day, demonstrations will be conducted on heat transfer, stand-by power and surge protection.

Registration is free to SCTE members. For additional information, contact John Yack at C-COR Electronics, 60 Decibel Road, State College, Pennsylvania 16801 (814) 238-2461.

Wisconsin Association and SCTE To Stage Two-Day Seminars

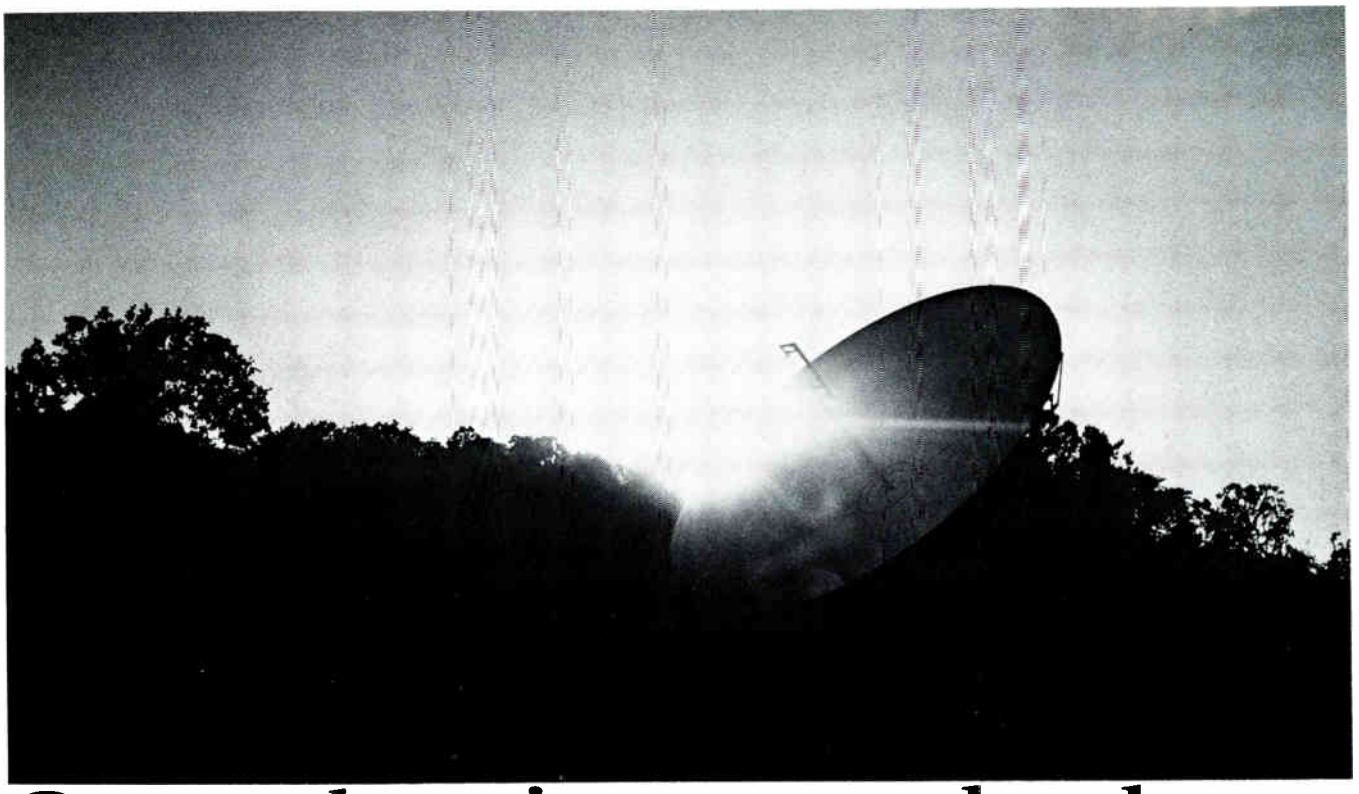
The Great Lakes North and Great Lakes South chapters of the SCTE and the Wisconsin Cable Communications Association will host a two-day management-technical seminar, October 19-20, 1977 in LaCrosse, Wisconsin at the Ramada Inn. Glenn Chambers of Fox Cities Communications and eastern vice president of SCTE and Bruce Armstrong, Teltron Cable TV and president of the WCCA are coordinating the meeting.

Program events include discussion of FCC Rules and Regulations with representatives of the Federal Communications Commission's CATV Bureau; OSHA rulings and compliance with officials of the U.S. Department of Labor; small aperature earth station technology; test equipment use and system planning and design.

CATV companies participating in the meeting include Scientific-Atlanta, Home Box Office, Magnavox Corporation and Texscan Corporation—all Sustaining Members of SCTE.

A nominal charge will be required of SCTE or WCCA members with higher charges for non-members. SCTE members across the country are invited to attend, regardless of chapter affiliation.

For registration information, contact Bruce Armstrong at (715) 845-4222 or Glenn Chambers at (414) 731-3272. Low cost housing arrangements are available.



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THE LASER:

OR
WHAT CAN WE DO WITH 80-MILLION CHANNELS?

By Wm. N. Redstreake
Gwynedd View, RD #1
N. Wales, PA 19454

About the Author

Bill Redstreake is no stranger to the CATV industry. Many people are familar with his in-depth market guides to CATV amplifiers and Pay-TV hardware. As a young man in the early sixties, he was automation editor for The Iron Age; where he wrote reports on all kinds of significant innovations from lasers to tape-controlled machine tools. An ex-Jerrold man, Bill describes himself as a literate engineer. For relaxation, he writes fiction and historical fiction, both short stories for general-interest magazines and full-length novels.

Television, telecommunications, fiber optics, masers for extremely stable, narrow-band microwave frequencies, and "the ultimate communications tool"—the optical maser or laser.

All are miracles we accept without the slightest sense of mystification.

The laser, which has been hailed as the ultimate communications medium, was a fundamental discovery in physics, comparable to the invention of the vacuum tube. (The vacuum tube led to the development of radio, radar, television and broadband communications.)

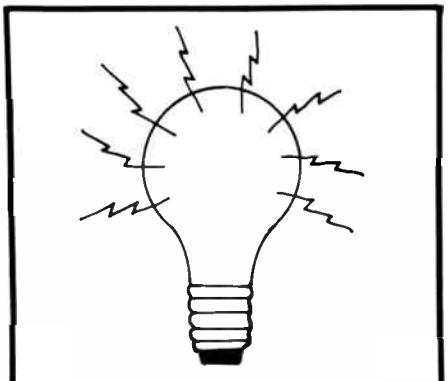

Fig. 1: Random Light Waves

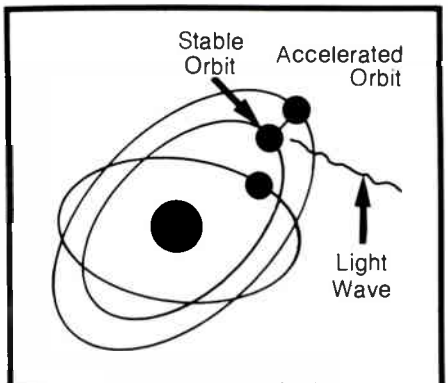

Fig. 2: Electron Orbits

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation.

Since a laser can operate at one-half million times the frequency of television waves to produce kilowatts of "coherent light" in a narrow beam, it may be a natural candidate for use in amplifier circuits for ultralong fiber-optic transmission systems.

The laser is also a powerful communications medium in itself, capable of carrying messages over gigantic distances. One of the earliest applications was the projection of a narrow beam of light to the surface of the moon.

Channel Capacity: A laser's visible-light band of frequencies can theoretically accommodate 80-million television channels of the present bandwidth!

The ingenious principle of the versatile laser was worked out in 1958 by Charles H. Townes, then a physicist at Columbia University, and his brother-in-law, Arthur L. Schawlow, of Bell Laboratories. Their reasoning was based upon fundamentals of atomic physics, known for years.

Before Dr. Townes developed the theory that made the laser a reality, he had devoted his efforts to the amplification of radio waves: and he had invented a device very similar to the laser—the maser (Microwave Amplification by Stimulated Emission of Radiation).

The maser is used in today's low-noise, supersensitive microwave receivers.

The theories of Drs. Townes and Schawlow, which will be explored in this article, were proved correct in 1960 when Theodore H. Maiman of Hughes Aircraft built the first working laser. That laser was made from a pencil-thin rod of synthetic ruby, composed of aluminum oxide and a tiny amount of chromium.

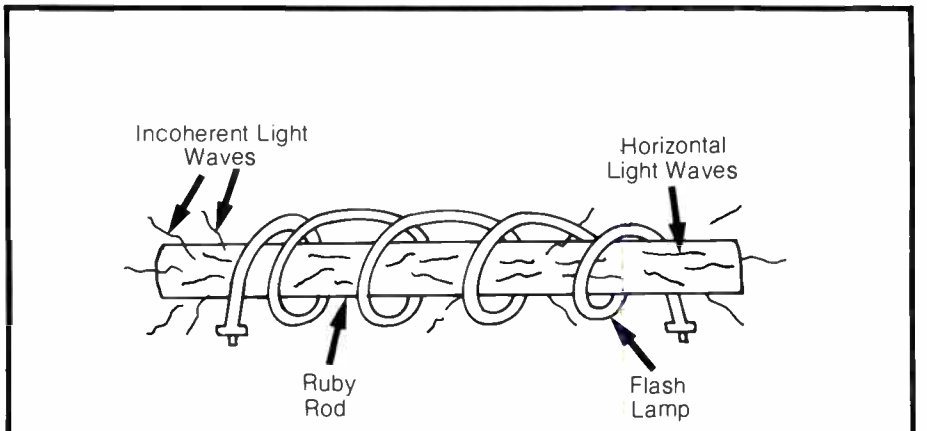

Fig. 3: Stimulating Natural Random Fluorescence

Coherent Light: Before we examine Dr. Maiman's ruby laser, let's start with an understanding of coherent light as opposed to random or ordinary light.

Ordinary light from the sun, an electric bulb or from an open fire is radiated in a disordered pattern of colors. It has many different intensities and directions.

Because of this disorder, ordinary light is termed incoherent.

Until 20 years ago, everyone accepted the fact that light was incoherent. Nothing could be done about it. Then, in 1958, Drs. Townes and Schawlow developed the theory that *light could be made to behave*. They theorized: Every wave of light from a particular source could be made identical to every other wave of light produced from the same source.

As identical light waves, all would be the same size (wavelength), direction and intensity. Hence, the controlled light waves would be coherent; and they could be employed for many useful applications.

Early Predictions: In 1962 the author interviewed Dr. Townes for a report in a national weekly magazine. I asked him about potential uses of the laser, the death ray of the future. At that time, he predicted lasers would find many uses—from cutting tiny holes in industrial diamonds to welding "unweldable" materials; from controlled beams surgeons would use with greater accuracy than a scalpel to missile tracking; and from a laser typewriter eraser to communications in outer space.

With the exception of the laser beam for erasing type (which this writer could use), all of Dr. Townes' predictions have been realized. In 1964, he was awarded the Noble Prize for physics.

Now, let's study Dr. Maiman's ruby laser illustrated in Figure 3. The ruby rod was positioned at the center of a spiral glass tube filled with xeon gas. When a current was passed through the gas, it glowed brightly to illuminate the ruby rod.

This light provided the energy required to excite the atoms of the ruby.

To impart direction to those energized atoms, a special reflecting mirror was formed on one end of the laser rod. A semitransparent reflecting mirror was formed on the other end.

Hotter Than the Sun: When the ruby rod was energized by the externally applied light—a photographer's flash tube wound around the rod like a corkscrew—a bright red beam shot through the semi-transparent mirror. That light was parallel, coherent, and millions of times hotter than the sun!

Synthetic ruby consists of a crystal of aluminum oxide in which a few of the aluminum atoms have been replaced by chromium atoms. The chromium atoms absorb green light, thus leaving a red color. This is why rubies are naturally red.

When the photoflash light surrounding Dr. Maiman's ruby rod was turned on, the green light of the flash excited some of the electrons in the chromium atoms—pushing those atoms up to higher orbits (Figure 2). Then as the excited atoms fell back to their normal levels, the absorbed green light was re-emitted as red light, giving rise to the well-known fluorescence of the natural ruby.

The trouble with natural fluorescence is that it is incoherent, like other random light. Hence, we have so far only seen a ruby *stimulated* into natural red fluorescence.

Taming the Electrons: To tame millions of unruly electrons in the ruby and to make the laser "lase," Drs. Townes and Schawlow had devised a complicated system. The excited electrons, which jump to higher orbits, are extremely unstable and ready to release their excess energy.

By exposing the excited electrons to light waves of the same wavelength to those they are about to emit, the excited electrons can be "triggered" to emit their excess energy sooner than they would ordinarily and exactly in phase with the triggering waves to reinforce those waves of electrons.

Unfortunately, the amplified waves were lost in the general disorder of the extraneous incoherent light.

To solve that problem, the initially emitted light waves were passed right back into the pool of excited electrons.

As excited electrons passed back and forth between the two mirrors millions of times, a powerful chain reaction was initiated and amplified billions of times—until the coherent beam of light burst forth through the partially transparent mirror.

The analogy is apparent to anyone familiar with a particle accelerator.

For the sake of simplicity, this story has been restricted to the ruby laser (Figure 4). It produces only single bursts or pulses of light at a time.

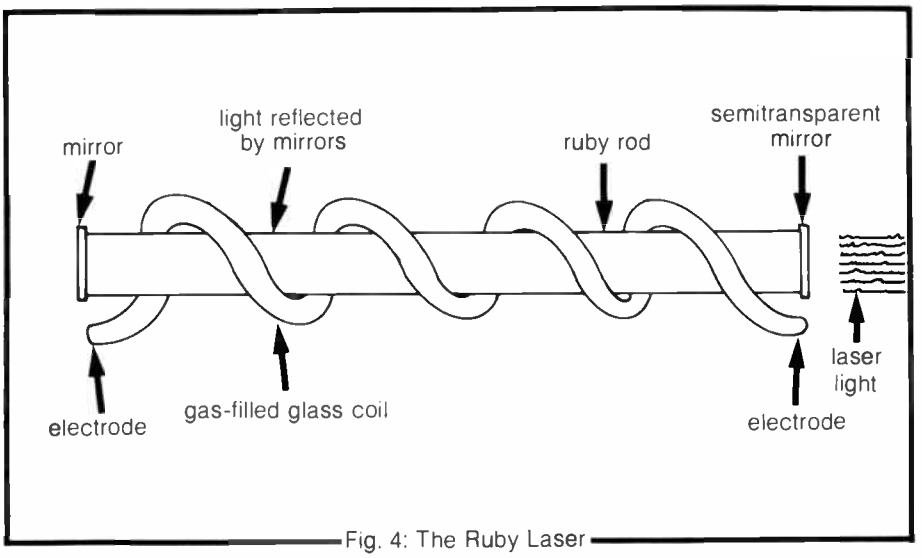

Fig. 4: The Ruby Laser

Semiconductors: Laser action has been observed in a variety of substances such as neodymium glass and calcium-fluoride, doped with gallium arsenide.

Continuous helium-argon (gas) lasers, which look like ordinary neon tubes, provide much lower power and drastically reduced temperatures than the pulsed lasers. And semiconductor materials like gallium arsenide have been used to produce both continuous visible and near-visible light.

The continuous laser and its successor, the solid-state injection laser, are more useful tools for surgery, metal-working and broadband telecommunications.

A continuous laser will insure ultra-high-frequency stability and purity with minimal degradation of the light beam. With solid-state injection, laser action may be turned on and off, at will, to obtain synchronized pulses.

Audio, Video and Data: Since the intense beam of coherent light emitted by the laser can theoretically accommodate 80-million television channels of the present 6 MHz bandwidth . . . and since more than a million characters per second of noise-free data can be transmitted within each 6 MHz channel . . . the question, with apologies to Newton Minnow, is: Will that million-times more vast wasteland ever be utilized adequately? **C-ED**

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In attenuation for instance 'Lumifoam III has the lowest numbers in the industry. Besides helping to bring your subscribers better picture quality, it can also save you the cost and maintenance of an amplifier or two.

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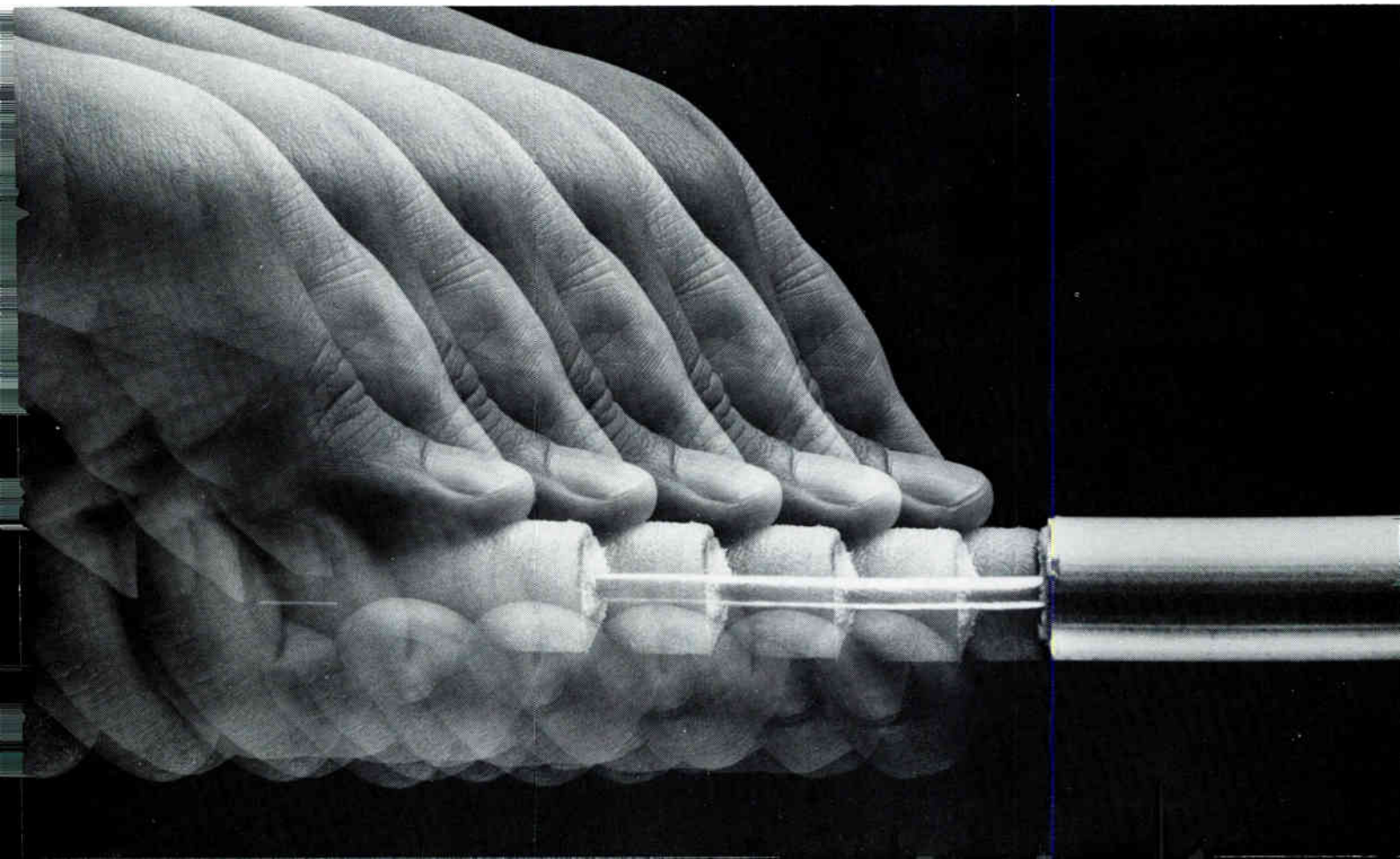

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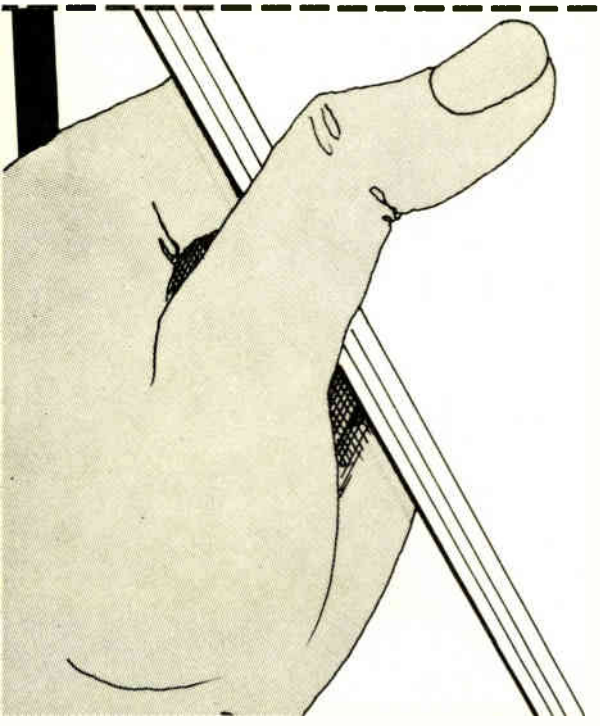

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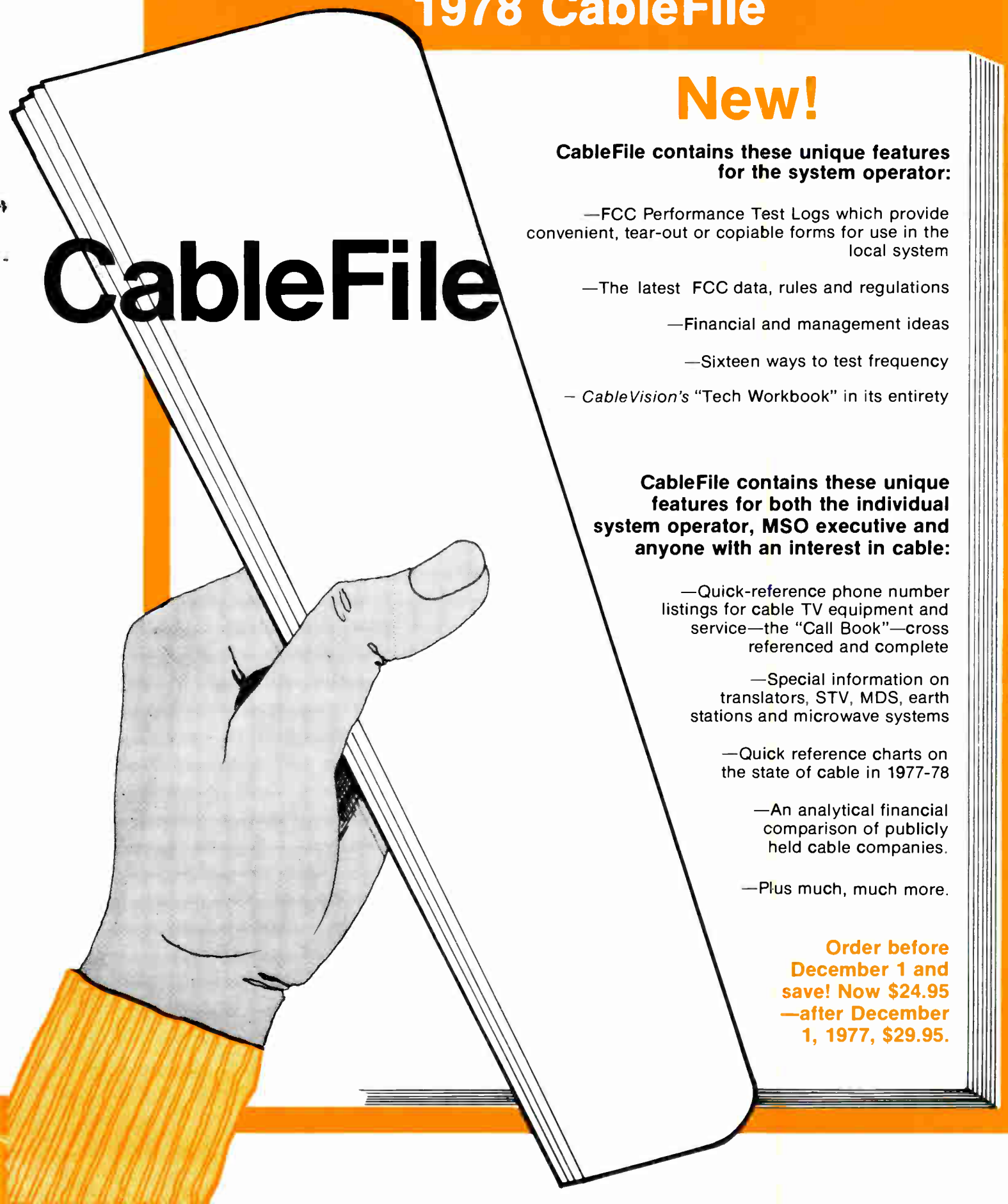

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Continental Cablevision Tops Off Dayton TV Tower

BUTLER TOWNSHIP, OHIO—Continental Cablevision of Miami Valley, Inc. topped off its North of Dayton cablevision system tower with the assistance of city and Continental Cablevision officials. The tower, located in Butler Township, will serve as the reception point for the Englewood, Union, Trotwood and Vandalia CATV system, now nearing completion.

The two hundred foot tower is the "heart" of the system. The tower will receive off-air signals from channels 2, 7, 16 and 22. It will also receive, via microwave from Continental's Huber Heights tower, channel 4 from Indianapolis, channel 43 from Cleveland, channel 34 from Columbus and channels 9, 12 and 19 from Cincinatti.

Pulling the last section into place are (left-to-right): Jim Novak, chief technician, Continental Cablevision; Tom Hanna, manager Dayton Systems North, Continental Cablevision; Bob McNay, Trotwood City manager; Eric Wharton, Trotwood City assistant manager; Bill Cooper, Mayor of Union, and Don McMahon, tower site owner.

United Video Files With FCC To Carry Station WGN To Earth Station Dishes

TULSA, OK—United Video, Inc., has filed for permission with the Federal Communications Commission to carry the company's first satellite programming by offering Chicago-based independent station WGN to cable systems with earth station dishes.

United Video ranks among the top five as a miscellaneous terrestrial microwave common carrier. It has 3,500 route miles and serves 108 cable television systems. The cable TV systems served by United Video have over a half-million viewing subscribers and pass more than a million homes.

Present Spurious Emission Requirement Should Be Maintained, NAB Says

WASHINGTON, D.C.—The National Association of Broadcasters disagrees with a proposal to limit to -90 dB spurious emissions from high-power broadcast transmitters and urges that the present tolerance be maintained.

Spurious emissions are those outside authorized channels and the FCC has proposed the new tolerance for submission to the 1979 World Administrative Radio Conference.

In a filing with the Commission, NAB said there is no evidence that nations meeting the present international standard are causing widespread interference across their borders. Furthermore, in many instances, compliance with the -90 dB requirement would impose technical and/or economic hardships upon licensees without justification.

The Association stated that the suggested suppression levels may be beyond practicality because the measurement could be made under ideal conditions such as during the manufacturing process, but would be difficult, if not impossible, under actual field conditions.

TCA Selects C-COR For New Iberia Rebuild

STATE COLLEGE, PA—Texas Community Antennas group has announced the selection of C-COR Electronics for amplifiers and mainline passives in rebuilding its New Iberia, Louisiana systems recently purchased from Vision Cable Communications, Inc.

The 80-mile rebuild will involve a new tower and tower site, and all new electronics. The rebuilt system will have a 21-channel capability and will utilize C-COR's 32 dB spaced, modulated pilot controlled trunk amplifiers. The project is expected to take one and one-half years.

Wideband Communcations To Impact Travel

NEW CANAAN, CT—Communications satellites and fiber optic technologies will be combined to provide universally-available, inexpensive, wideband communications within the next few years, according to a new 223-page report published by International Resource Development, Inc., a market research firm.

In the report, entitled the "Impact of Wideband Communications," the IRD predicts that the launching of the IBM-backed Satellite Business Systems service will be just the first step towards the proliferation of wideband telecommunications, which up to the present has been too expensive for all but a handful of major communications users. The new communications channels will have a major affect on the economics of teleconferencing, electronic mail and data communications.

Included in the IRD report is an analysis of the expected effects of wideband telecommunications on the television, CATV and movie industries. The IRD research team concluded, after analyzing the probable development of satellite systems and fiber optic communications over the next ten years, that the newly-available wideband channels would permit two-way CATV and television services to be available to most of the U.S. population by 1987. This, according to IRD, would cut deeply into the present domination of TV entertainment by the major TV networks, and would hasten the development of a variety of "Pay-TV" services, not only for entertainment but also for delivering medical, educational and commercial services of several kinds. These applications will be limitless.

Alron Offers Unique Expertise In Fast-Growing CATV Industry

MELVILLE, NY—Alron Communications, Inc. has announced its expanded capability as management, technical and financial consultants to the cable television and related industries.

The company provides complete, expert counseling and opportunities in investing, making acquisitions, marketing of products and services and supplying research and in-depth analysis of any area within these industries.

RCA Americom Links Hawaii And Maryland For Nasa

PISCATAWAY, N.J.—The National Aeronautics and Space Administration's tracking station in Hawaii is now linked to the Goddard Space Flight Center in Maryland by RCA American Communications' satellite system.

The Kokee Park Space Tracking and Data Acquisition Network (STDN) station gathers data from experimental satellites in earth orbit.

Completing the space communications link is RCA Americom's new earth station at Barking Sands Naval Air Station, Hawaii. That station, which is dedicated to government use, is connected by microwave to the Kokee Park STDN station on the island of Kauai. The RCA Americom satellite system and earth station provide a high speed, 56 kilobits-per-second digital circuit carrying data in both directions between NASA's Kokee Park facility and the Goddard Space Center in Greenbelt, Maryland.

The new facility at Barking Sands uses a 10-meter diameter parabolic antenna. At Goddard, a similar earth station, also owned and operated by RCA Americom, is dedicated to government services.

NASA's stringent requirements for high reliability television and data transmission are being met by RCA Americom in support of several continuing programs, such as the Viking I and II photographs of Mars and the Space Shuttle.

RCA Americom's domestic satellite system provides private line telephone, television and data communications services for the media, business and government.

AEL To Rebuild Kilgore, Texas CATV Plant

MONTGOMERYVILLE, PA—Kilgore Cable TV, an affiliate of Wehco Video, Inc., has awarded the CATV Communications Division of America Electronic Laboratories, Inc. (AEL), a turnkey contract for construction of a cable TV system in Kilgore, Texas.

The system will utilize AEL's latest state-of-the-art CATV equipment, the Mark IV series of push-pull integrated circuit amplifiers and M4X series of line extenders.

Shown at the contract signing (left-to-right) are: Robert C. Bailey, vice president and general manager, CATV Communications Division of AEL; Ed Hopper, vice president, Wehco Video, Inc.; and David P. Mooney, general manager, Kilgore Cable TV.

EIA Communications Delegation On Satellite Communications Returns From China

WASHINGTON, D.C.—A delegation representing EIA member companies interested in satellite communications visited China, August 8-17. The following statement is a consensus of the delegation: "The recent eight-man delegation on satellite telecommunications sent to the People's Republic of China, sponsored by the Communications Division of the Electronic Industries Association, was warmly received by its host, the China National Machinery Import and Export Corporation."

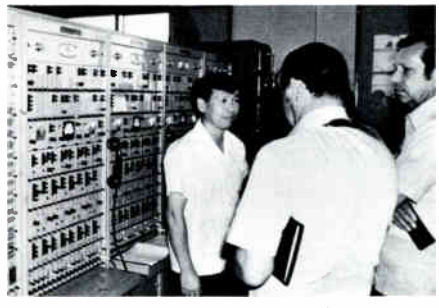
During the delegation's eight-day visit, the American visitors witnessed a two-day formal seminar, and some U.S. visitors briefed their Chinese hosts on specific areas of company interest.

During a visit to an industrial exhibit in Peking, the delegation was shown a ten-meter satellite earth station. The earth station, constructed of high quality and good design concept, is clearly intended to be part of a domestic satellite system. How many of these stations have been built by the Chinese is unclear. It also is not known what type of satellite the Chinese intend to utilize with the indigeneous earth stations.

The Chinese appeared to be interested in a variety of satellite services, and were particularly curious about optimum use of various portions of spectrum for various services.

The trip was an exploratory one and delegation members learned a great deal about the state of technology in the People's Republic of China. "No concrete business resulted from the visit as of this point," stated the concensus, "but further contacts with China National Machinery Import and Export are expected."

The delegation was chaired by Sidney Topol, president, Scientific-Atlanta and chairman of EIA's Communications Division; Carl Faflick, vice president and assistant group executive, Space and Communications Group, Hughes Aircraft Company; James Hillier, executive vice president and senior scientist, RCA Corporation; Thomas Campobasso, executive vice president, Collins Radio International, Inc.; David Leeson, president and chairman, California Microwave; Frank Barnes, senior vice president, Product Group Manager, Telecommunications Equipment and Systems, ITT Corporation; and John Sodolski, vice president, Communications Division, Electronic Industries Association.



Shown are some of the newer Chinese-made equipment in the Peking Telegraph Office. The explanation was given by Mr. Chu, the chief engineer, to Tom Campobasso of Rollins (his back to the camera) and Carl Faflick of GTE (on the right). The man behind the camera was James Hillier of RCA Corporation.

Cyclotron Corporation Receives Order From New England Nuclear Corporation

BERKELEY, CA.—The Cyclotron Corporation (OTC) today announced receipt of an order from New England Nuclear Corporation for a Model CS-30 cyclotron valued at approximately $800,000 and scheduled for installation next year.

Crowley, La., Rebuilding With C-COR

STATE COLLEGE, PA.—Rebuilding of the Crowley, Louisiana, cable television system is about 50 percent complete, according to A.L. Bruno, Manager of the Telecable Associates systems in the Lafayette, Louisiana, area. Amplifiers and mainline passives manufactured by C-COR Electronics, Inc., of State College, Pennsylvania, are being used to replace the SKL amplifiers. Approximately fifteen miles of plant will also be added in conjunction with the rebuild. For more information, contact Jim Parker.

Hughes Sets Washington Area Replay For Its Seminar On Ground Terminals

TORRANCE, CA.—Hughes Aircraft Company's microwave communications products will move its seminar on satellite earth terminal technology to the Washington, D.C., area for the first time in October.

The three-day seminar, to be held October 5, 6 and 7 at Stouffer's National Center Hotel in Arlington, Viriginia, is one of a series on ground stations used by CATV system operators to receive satellite-transmitted television programming. The meetings are designed to brief technical management personnel from CATV systems throughout the country with both the theory and practice entailed in the use of satellite receiving terminals.

Speakers will include industry figures from both Hughes and outside companies involved in providing equipment and services to the CATV industry. Briefings will cover the design, installation and operation of ground terminals, as well as discussions on site considerations and maintenance procedure.

Among the scheduled speakers and topics are: Grover Cooper, attorney-at-law, Fisher, Wayland, Southmayd and Cooper, "FCC Licensing Procedures;" Joseph P. Smith, CATV consultant, Smith Cooper Associates, "Business Planning for Earth Stations"; Byron B. Jarvis, CATV and broadcast consultant, Metz and Jarvis, "Economics of Earth Stations"; Carl D. Van Hecke, manager of product planning, Andrew Corporation, "Earth Station Antennas"; and Robert Tenten, director of engineering, Home Box Office, "Satellite Video Link."

A similar meeting is scheduled for January 16, 17 and 18, 1978 in Kansas City, Kansas.

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A New Generation At The NCTA

C-ED: What is your mission as vice president of engineering at the NCTA?

Luff: My purpose is two-fold. First, is the technical side of the industry. Because most of the systems are rather small or medium-size, it's difficult for them to address the broader overall technical issues: engineering standards, standard graphic symbols, safety standards, product awareness and information dispersion of new information, new techniques and new standards. I think our Washington office can muster resources and get that information out to those systems so we serve the technical side of the cable industry by cooperative measures.

The second phase, of course, is the broader representation of the cable industry in Washington. The Federal Communications Commission, the Federal Aviation Administration, National Academy of Science and other research and educational institutions have alot to offer as long as there's a continuous dialogue between the technical problems of the industry and those who have the resources and the finances to address the issues.

C-ED: With your background—seven years at the commission, good education and young age—what led you to the NCTA?

Luff: The job offers a lot of opportunities. It's a very exciting growing industry. Cable is relatively new compared to other forms of telecommunications. In addition, my total working career so far has been with the federal government and the FCC. While I'm reasonably conversant with all the radio industries, it's impossible to get into all their in-depth details. It's satisfying to try and know every crack and crevice of this industry's problems, and I get a feeling of accomplishment. After several years, you can look back and see how things were before you came on the scene.

Also, there was an opening and the timing—the chairman was leaving—made it necessary for me to decide whether to stay in the federal government or to leave to go into one of the telecommunications industries. I happened to choose the cable industry.

C-ED: Are you surprised to be here now?

Luff: Definitely not. After seven years of being in a regulatory agency where patterns are such that you see both sides of issues and hear all arguments. You try to take the best points and put together a reasonable decision. It may be hard philosophically for some to appreciate giving that up and going with just one industry where you're representing that particular side. I think in the technical area, the engineering area, there are so many alternatives, on top of the political and other types of decisions that have to be factored in.

C-ED: Without characterizing any individual person's attitude, when you were at the FCC, what kind of an image did the cable industry have from behind those doors on the eighth floor?

Engineering vp Bob Luff hard at work.

Luff: I had an impression of newness, of perhaps even adolescence. I don't think there was as much recognition or respect for the technical community in the cable industry as there was perhaps in broadcasting or the common carrier or satellite industries.

Cable has come a long way, even in the last year, mostly because of the small aperature earth station issue. The cable industry very properly and professionally represented itself before the commission and won a major victory over those who would have kept the satellites at a very large aperature, at high cost and high technical performance even though it was perhaps not necessary for the cable industry's own requirements. And I think that began the change in philosophy or attitude of the commission towards the cable industry. Part of the problem comes from the commission's long recognition of broadcast engineering, so much so that FCC commercial examinations are used to measure the capabilities of broadcast engineers. Of course when you invest that amount of time and resources in a program to—in effect—certify the broadcast engineers, and you don't have the similar programs of cable engineers, there is some internal bias. And the broadcast and other telecommunication industries have been around longer so the personalities are better known to the commission structure.

C-ED: When you were at the commission, what impressed you most when an industry came to present its case? What is it that makes a difference when you're headed toward a decision? You might want to talk about the small aperature earth station.

Luff: Most important for me was a feeling I wasn't being

Robert Luff is the new vice president of engineering for the National Cable Television Association. Before coming on-board NCTA, Luff devoted seven years to the FCC. He was most recently, engineering assistant to chairman Richard E. Wiley. Prior to those two years, Luff was chief engineer at the FCC for five years.

After the death of Delmer Ports, the NCTA undertook an intensive search for someone talented and qualified to fill the position of vice president of engineering for the NCTA. The quest ended when Robert Luff, age thirty, agreed to fill that position.

Communications-Engineering Digest's Washington Bureau Chief Brian Lamb was able to get Robert Luff's first interview. The exclusive interview for C-ED follows.

Hazel Dyson and Robert Luff discuss the agenda for the day.

handed a line. The cable industry has always been very straightforward and honest in its arguments. This is one of the reasons, I think, it's come as far as they have in recent years.

C-ED: Even though you're new in the job, and by your own admission you still have a lot to learn about the cable industy: If you could look in a crystal ball, what are the two or three technical things that could make problems for the industry down the road? Or if FCC regulations could be changed, what would improve the ability to build systems?

Luff: I think the cable systems have got to recognize they are but one of many telecommunications industries all jammed together sharing a natural resource. And the problem with the integrity of the system itself is leakage due to poor maintenance or improperly installed connectors or cable fittings that in turn cause energy in the cable system to leak out and interfere with other users' rights to the spectrum.

It's a serious question. The commission addressed the cable leakage issue recently in report and order 21006. But the problem isn't solved. There's a black mark against the industry—the installation practices, the lack of a good installer's manual, training in the industry at the basic installer's level—it all needs constant attention by all systems, by the whole cable industry or it's going to get worse; it's going to cause skepticism, or at least conservative action on the part of the commission.

There'll be further de-regulation, particularly in the technical area. I think that's number one; cable systems have got to pay a lot of attention to this cable leakage and the installation practices of systems, if it intends the commission to roll back some of its regulations in that area.

Another area, of course, is safety. The cable industry is rather small and growing but the number of situations—linemen climbing poles without any proper instructions, shock hazards, exposures, and what have you—are just something we've also got to look at for the sake of the industry itself.

Another long term area, of course, is just the quality of the picture. Again, this usually comes down to construction practices and installation techniques. When the amplifiers and the cables are well designed, systems still (when they go through rate increases or further negotiations on the franchise) find stacks of letters at city hall complaining of the quality of service.

C-ED: On one issue you raised—the FAA problem and leakage—where does that stand right now?

Luff: The commission has issued its final decision. Its action in that matter: That is, the NCTA offset frequency proposal as an alternative to the FAA's request for an outright band, or at least very burdensome monitoring and signal leakage requirements. It would require the cable systems to offset their pilot or carrier frequencies 50 or 100 kHz away from active FAA channels in their particular area—it happens to be 60-mile radius around the system. Alot of the details as to the actual procedures of implementing that order are still to be thrashed out by the commission and the cable industry, such as how does a cable system know what is an active FAA frequency? Cable systems, of course, add and take pilot carriers and other signals off and on occasionally, and with required filing period of 60 days ahead of time, it's a burden to the cable industry when it doesn't know what the FAA frequencies are in the area. And that causes advance planning problems because there's a lead time on equipment. You have to make orders and make some decisions in perhaps six months before the planned actual construction. And the FAA is not static either; it is occasionally changing its terrestrial circuits, so that at six months there may not be a time that system's only monitoring. So it does require coordination through Washington, through the FCC, through FAA, to determine what existing or future systems may be in a particular area.

C-ED: Do you think it's the responsibility of the FAA to let the cable system know, or the local airports to let the local system know, that they're operating on certain frequencies?

Luff: Well, it's going to be very burdensome to a party, no matter how it turns out. It looks now, from those recent discussions I've had with the commission, like the FAA and the commission are going to share the majority of the burden. The way it looks, cable systems are going to file with the commission what frequencies they're using in midband and superband channels. And the commission will then coordinate with the FAA, because even the commission does not have an updated roster as to what precisely the FAA is using throughout the country. The FAA then

will have to search that list and compare it with its active files as to which areas are in operation or plan to be in operation that would be in conflict; it then would notify the commission of those conflicts.

The commission will, in turn, be back in touch with the cable system, advising them of a potential conflict, and, of course, there is still the provision that a waiver request could be made by the cable operator even though there is a conflict between the system and the FAA, assuming it can meet the commission's requirements for a responsible signal monitoring and leakage detection practice method.

C-ED: Do you have any idea how many systems in the country, on a percentage basis, would be affected by this decision?

Luff: Well, I don't know the exact number now. It's probably down in the less than 20 percent bracket.

C-ED: Who would those 20 percent be? Would they be around airports?

Luff: Take the combination of a system that's using a large number of channels and, therefore, has moved into the midband and superband spectrum. It has to be a system that is probably

"I think the cable systems have got to recognize they are but one of many telecommunications industries all jammed together sharing a natural resource."

—Robert Luff

located near a major air traffic control center or congested air travel route in order for the statistics to show he does fall right on top of an FAA frequency. But the number is going to continue to rise as systems expand the number of channels and services they provide.

It also has an additional problem in that there may be, in some areas, several sets that would be required of a single system, and in moving off of one, you may force all of the channels into the midband. If he's using channels A, B, and C, and he happens to have a conflict on A, as he moves it up a hundred kC, he may end up having to move his channel A, B, C and D, or anything else he has up the same amount, so that the 6 MHz separation between channels is maintained.

C-ED: How much is it going to cost the cable operator for the offset gear?

Luff: Well, it's probably not a matter of great capital expenditure as much as it is the investment of his labor and readjusting the equipment that he has at the headend. Generally the process is that the signal is brought in via this headend and microwave or satellite receiver and he comes into an RF generator-modulator process, and at that point there is a crystal that determines the output frequency of that device. If it turns out that crystal happens to cause the signal to fall on top of an FAA protected channel, then that crystal will have to be removed and another crystal reordered and installed. Generally the frequency shift is so slight as to not require a massive retuning of the device. But it does require the labor, installation and some down time, and, of course, any time you take the back off of a piece of

(Cont'd on Page 30)

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As the official publication of The Society of Cable Television Engineers, C-ED has enjoyed a favored reputation with industry technicians. To further our commitment to the SCTE, forthcoming issues will be provided as a free service.

We, at Titsch Publishing, are proud of our record of maintaining a magazine for the engineers alone. C-ED's sister publication, CableVision, is known industry-wide for its excellent news and editorial commentaries. The managerial aspect of CableVision and the technological emphasis of C-ED are no accident.

In order to completely fulfill our commitment to the engineers in the cable industry, the new C-ED format will include an international column, a system profile section, expanded feature stories, a bibliography of recent published reports, reader comments and a technological section in each issue.

We invite you to receive this free technical journal for your system engineers. Just fill out and return the enclosed card.

Very truly yours,

Robert Titsch
Publisher

(Cont'd from Page 26)
equipment and do anything to it, you're subjecting yourself to secondary problems.

C-ED: There's not really much cost to it? It's not a heavy expenditure?

Luff: The decision is so new—I would just say the actual purchase of equipment is probably not going to be where the cost is as much as what the requirement will be. I think it's a good requirement; that when systems are using midband frequencies, the commission requires that they develop an acceptable program for monitoring, detecting and correcting the leakage. That's something the cable systems should be doing anyway. So I don't think it's fair to charge that cost to this decision, because it's just good engineering practice and something systems should be attentive to.

C-ED: You know, there are some cable systems that don't even tell anybody they exist. What happens if a guy in an airport area doesn't comply and causes an airplane accident? Is he liable? Can he be taken to court? What would happen to him, if it was discovered that the cable system didn't comply with the rules?

Luff: I don't have a precise answer to that. I think it would be extremely remote that anything so disastrous as that would occur. We've never had a situation where a cable system has caused reported harmful interference to air traffic. We have had reports of an annoyance, of breaking a squelch, of obvious jiggling of the navigational equipment and indicators. But we haven't had a situation where there is a complete outage of sufficient magnitude to cause a hundred percent break in communications. Obviously, the system would be in violation of at least the signal leakage rules and other provisions in that final report-in-order.

C-ED: When is it that effective?

Luff: Effective January 1st, 1978, and the system could at least be served with a cease and desist order from the commission if it didn't show adequate concern and develop a program to correct that situation immediately.

C-ED: What have you learned about the small earth station since you've been watching its development?

Luff: It certainly is providing the cable industry with another program distribution alternative. Some systems are located so that microwave or off-air pickup of additional signals is just not economically feasible. And the earth station concept is basically the same—its technology basically provides the same type of service around the country for about the same cost regardless of how remote the cable system headend may be. It offers a new variety of programming choices that perhaps aren't available via direct pickup or microwave.

"The Society of Cable Television Engineers is relatively new on the scene, but it's growing. I encouraged the activities. Any group is welcome that can come into the cable area and help address the issues before us."

—Robert Luff

C-ED: Do you think there's any chance the small 4.5-meter earth station will ever get smaller?

Luff: I don't know. Many people are certainly looking at that. I question whether it'll get smaller in that frequency band. There are other alternatives in the 12 GHz region of the spectrum where antennas are much smaller. In fact, shortly before I left the commission, the chief engineer's office had such a 12 GHz dish set up on the carpet inside an office facing the direction of the satellite. The people just pulled up the Venetian blinds and turned the equipment on. After 10 or 15 minutes of alignment, they received a very acceptable TV picture from the CTS satellite.

C-ED: CTS is the Canadian?

Luff: Yes, Canadian experimental satellite, and the dish was about four feet in diameter. Unfortunately, it has one drawback: at that frequency range, it's susceptible to rain altitudes during very heavy cloudbursts.

But the cost is such that with duplication of antennas located several miles apart, the probability of outage by such a heavy rain squall would be insignificant. It could be an attractive alternative to some of the systems of the future.

C-ED: What about fiber optics? This is a very touchy issue with many cable people. They were very much opposed to it a couple of years ago. Now, everybody's talking about experimenting with it. Are the attitudes changing and should they be changing?

Luff: I don't have a position on fiber optics one way or the other. It's encouraging that people feel there's sufficient promise in fiber optics to continue to experiment. It serves the cable industry—all the telecommunications industries—to keep pursuing promising technologies. If a technology doesn't seem as attractive as other alternatives for one reason or another, it's

not a reason to give up exploring and exploiting its possibilities.

We've seen too many times how quickly things can change with one major technological breakthrough. Fiber optics' manufacturing process costs, in addition to the cost of the fiber optics itself, is coming down quickly. The process of taking the optical signals and processing them in regenerative, repeater-type processes, is where some of the key technological breakthroughs are going to have to develop in order for it to be completely competitive or perhaps even take over the coaxial technology.

C-ED: What about your own goals in this job? For starters, how long do you think you can stay interested in this kind of thing?

Luff: I hope there's no limit. I think it will depend a lot on the industry, on the progress I'm able to make and just the general health of the industry itself. It looks very favorable, and I'm looking toward a long career in the cable industry.

C-ED: What do you want? Before you eventually leave this job, won't there be a couple of things ticking away in your head saying, "I want to do x, y, and z before I get out of this job." What are those things right now?

Luff: If the cable industry develops as I think it will. I have mixed emotions. I like the Washington, D.C. area. My home's here; my family's close by; and I have no great desire to leave. On one side, there's a strong force to look at what's available in my area of expertise—telecommunications—so I can maintain my home in the area. The other side of the coin, of course, is that if cable develops, the opportunities are going to be great throughout the country in many areas—perhaps chief engineer of a large MSO, or in the manufacturing side. For example, the small aperature of earth station technology may greatly develop and there may be opportunities there.

There seems to be a great requirement for all kinds of literature in educational publications addressing specifically the cable industry which I or others may be interested in developing.

"The job offers a lot of opportunities. It's a very exciting growing industry. Cable is relatively new compared to other forms of telecommunications."

—Bob Luff

C-ED: In your job, what goals do you have as vice president of the NCTA? Your predecessor, the late Delmer Ports, ran the NCTA engineering shop in a certain style. You've come in and had a chance to look at the structure. What kind of things there would you like to change?

Luff: I don't know if there's a need for change as much as it is continuing what needs to be done. On the Washington scene, it's important for this office to maintain close liaison with the government agencies that have an impact on the cable industry, such as the FCC, the FAA and others. To do that, we try to make ourselves well-known and respected in the Washington telecommunications industry. On the industry side, some of the priorities have got to include, for industry's sake, addressing the integrity of the system—the design integrity, the maintenance integrity and the performance integrity of cable systems. We need to do this by concentrating more effort on training of installers and engineers and technicians in the cable industry, developing a set of industry standards for construction practices and signal leakage programs.

C-ED: Do you feel the Society of Cable Television Engineers is doing the job it set out to do?

Luff: It's relatively new on the scene, but it's growing. I encouraged the activities. Any group is welcome that can come into the cable area and help address the issues before us; help us grow up and stand shoulder-to-shoulder with other industries many years older in front of the American public. I think just as IEEE has addressed the broader areas of electrical engineering without stepping on the toes of other trade associations, that the SCTE definitely has a place in the cable industry.

C-ED: When you break down the amount of time you'll spend, how much of that time will be at the FCC?

Luff: Probably about 10 or 15 percent. It would seem like more, but so much has to be done and there are so few of us right now. Correspondence from the membership, keeping other NCTA officers and board of directors informed, developing contacts and sources of information, communicating with the engineering advisory committee and with all kinds and sizes of cable systems, it all takes time. I travel locally as well as to state and regional cable conventions.

C-ED: Do you need more help?

Luff: Yes. It's a big job for two of us, Hazel Dyson and myself. As we begin looking at the goals and priorities of developing acceptable training programs, how we can better market the technical publications, requirements for the FCC and various cable problems, it's a pretty large drain on my own time and Hazel's. Certainly having another person with a strong technical background in the cable industry would be welcome. However, at the present time, we'll do the best job we can with what we have to work with. **C-ED**

Tap Value Research Project Completed For Titsch Publishing

By Coaxial Analysts, Inc.
Technical Services Division

Preface

The following data represents a study completed by the Technical Services Division of Coaxial Analysts, Inc. (formerly the Digital Synthesis Corporation) for Communications-Engineering Digest magazine to provide some insight into the area of tap value engineering. It is not intended to be an exhaustive or complete study of this area. Persons interested in pursuing a complete research project should contact Terry Hulseberg at Coaxial Analysts, Inc. directly.

Introduction

Throughout recent years and again just last month I was asked for an opinion with regard to what tap values would be optimum from a system designer's point of view. In my opinion this question has three sides: 1) What series of values will yield the most efficient system design possible? 2) How many values are economical to manufacture? 3) How many values are practical for the operator to inventory? Obviously the ideal tap values must meet all of these criteria before they could be considered as a truly optimum "solution set of tap values."

Assumptions

In order to begin a study of tap values we need to determine engineering values for all the possible variations of taps we desire to test. Evaluation of the specifications sheets of several major tap vendors revealed two significant features. The first is that taps typically come in 3 dB steps (11, 14, 17, etc.). Secondly, the insertion loss specifications, although similar, do vary a few tenths of a dB. Coupling this with the fact that the new values to be tested are nowhere to be found, I decided to play passive design engineer and create the required specifications.

The theoretical directional coupler values were determined by using the power split chart on page 77 of the Jerrold "Redbook."[1] I then applied a formula that increased these values to approximate the tap and insertion losses available for taps currently on the market. These resulting values are listed in Table I. Addtitionally, for reasons of simplicity and practicality, no half value taps were considered.

Table I
Tap Values & Insertions
Losses for Comparison

Tap Losses			Insertion Loss
2-Way	4-Way	8-Way	
4	7	10	Terminating
5	8	11	7.5
6	9	12	5.5
7	10	13	3.9
8	11	14	3.0
9	12	15	2.3
10	13	16	1.8
11	14	17	1.4
12	15	18	1.3
13	16	19	1.1
14	17	20	.9
15	18	21	.8
16	19	22	.8
17	20	23	.7
18	21	24	.6
19	22	25	.6
20	23	26	.6
21	24	27	.5
22	25	28	.5
23	26	29	.5
24 & Higher	27 & Higher	30 & Higher	.4

[1]"Technical Handbook for CATV Systems" by Ken Simons. Third Edition, March 1968.

Straight Line Tests

The only way to find out which tap values will yield a maximum efficiency design is to actually design several miles of system in several different towns and with several different tap value selections. Since the magnitude of this method is beyond the scope of this project, I decided to narrow the selection of ranges to three. Rather than relying exclusively on experience and intuition to select these three tap value sets, I elected to set up several straight line designs to test the efficiency of many tap value sets and then choose the three to be tested from these preliminary results.

Basic Specifications For the Test Designs

The basic specifications were selected with regard to current industry practice and are listed in Table II. The cable loss and frequency of design are probably the most debatable items, but we are in effect testing many different cables at different frequencies and pole line spacings. This has the effect of varying the system density as well as changing cables with constant density. In fact, the density can be shown to vary in effect from 54 homes per mile to 290 homes per mile (conversions of this sort can be done by analyzing the test runs using one cable

Table II
Specifications For Test Designs

	300 MHz	54 MHz
1. Amplifier Output Level	+49 dBmV	+43 dBmV
2. Minimum Tap Level	+10 dBmV	+ 7 dBmV
3. Cable A Attenuation	1.49 dB/100'	.59 dB/100'
4. Cable B Attenuation	1.27 dB/100'	.53 dB/100'
5. Line Extender Gain	25 dB	
6. Derating for Two L.E.'s	3 dB	

type at a given frequency and spacing and converting the losses to another cable type at another frequency—thus revealing a new spacing and therefore a new density).

Example:

Cable A Attenuation = 1.49 dB/100'
Cable B Attenuation = 1.06 dB/100'
Using Cable A and 140 foot spacing is equivalent to using Cable B and 197 foot spacing. With 2-way taps this is equal to 54 homes per mile.

Table III shows all of the variables that were tested in the straight line designs. When these variables are combined in all possible manners, sixty different test runs result. All sixty combinations were run through our design computers and from the results settled on the three tap value sets shown in Table IV. (The results of these tests are available upon request.)

Seven Mile Test Area

Now that we have narrowed the field of potential candidates to three, we can do some actual designs to test the superiority or non-superiority of any of our test sets.

Table III
Combinations For Straight Line Test

A. Pole Spacings
   1. 100'
   2. 140'

B. Cable Selections
   1. Parameter I
   2. Fused Disc

C. Type of Taps
   1. All Two-Ways (2-2-2-2)
   2. All Four Ways (4-4-4-4)
   2. Combination of Two's and Four's (4-4-2 and 4-4-4-2 and 4)

D. Tap Value Sets
   1. Every Value
   2. Every Other Even Value
   3. Every Other Odd Value
   4. Every Third Value (7, 10, 13, etc.)
   5. A Special Selection

A seven mile area of a system we had already designed was chosen as the basis for the test. This area is in a major metropolitan market but lies at the outskirts of the city. It is fairly well self-contained with an average number of cross-connecting strand lines and a density of 105 homes per mile. Specifications are the same as those used in Table II, with the cable type and tap value sets being the only variables, thus requiring six designs totaling forty miles.

In qualification of these tests we have a few unknowns or uncontrollable variables to contend with. The first consideration is the small size of the test. Although a seven mile area is generally considered too small to be a meaningful comparison, it is nonetheless an actual test in a real situation. Secondly, we have the human element as an everpresent variable. The results indicate this factor is negligible in this test, but I belive wide variations are possible among the industries' design engineers. The third factor affecting results is the density. Higher densities will show greater differences due to value selection and these tests do not reflect that factor. Then we have the routing consideration. The less alternate routes that are available should increase the value of a more flexible tap value set. Finally, we have overall design efficiency to consider. In an inefficient design, more tap value choices are of reduced benefit.

Seven Mile Test Results

At first glance the results are somewhat surprising. With each type of cable the tap value selection made no difference to the ultimate cost of the system!

There were a few percentage points difference in the actual amount of feeder cable used in each of the designs due to differences in the direction of feed or the amount of double cable used. But this amount was not consistent with any one value range and therefore cannot be considered as an advantage for any value set. The results shown in Table V are for all three designs of both cable types.

Table IV
Tap Value Test Sets

Tap Test #1-Special Selection
2-Way Values
4-8-9-10-11-13-15-18-21-24-27
4-Way Values
7-10-11-12-13-14-16-18-21-24-27
8-Way Values
10-13-14-15-16-17-19-21-24-27-30

Tap Test #2-Two dB Increments
2-Way Values
4-8-10-12-14-16-18-21-24-27-30
4-Way Values
7-11-13-14-17-19-21-24-27-30-33
8-Way Values
10-14-16-18-20-22-24-27-30-33-36

Tap Test #3-Three dB Increments
2-Way Values
4-7-10-14-17-20-23-26-29-32-35
4-Way Values
7-10-14-17-20-23-26-29-32-35-38
8-Way Values
10-13-17-20-23-26-29-32-35-38-41

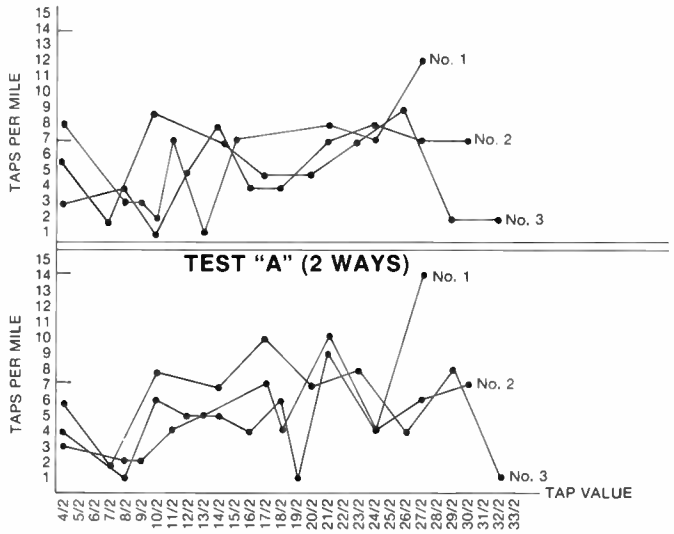
Tap Usage Charts

I have included tap usage charts to show the distribution of values used. Normally two types of curves will show up in a chart of this kind. A normal design will yield roughly a bell shaped curve peaking around a 20 dB tap. A highly efficient design will show a similar curve peaking at a somewhat lower value but will have a very high rise at the lowest value

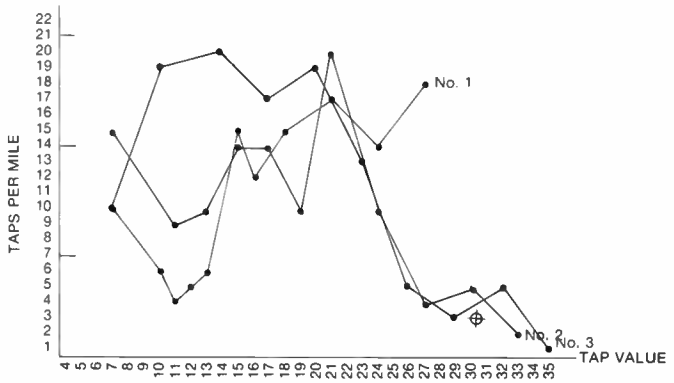
Table V
Seven Mile Test Results

Item	Cable A. Designs	Cable B Designs
Trunk Bridgers*	2.5	2.5
Feeder: Trunk Ratio	9	7
Line Extenders	9:1	9:1
Amplifiers per Mile	1.7	1.4
Actual Strand Miles	6.7	

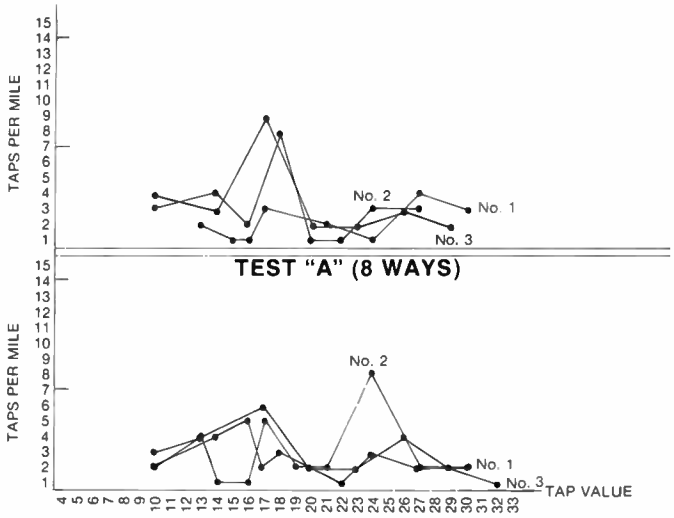
* Since an arbitrary starting point was used in the middle of a town, one-half of a station was used in these designs.



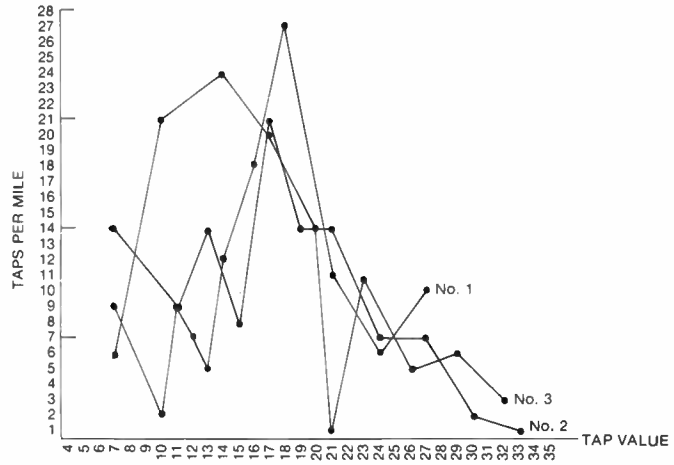
TEST "B" (2 WAYS)



TEST "A" (4 WAYS)



TEST "B" (8 WAYS)



TEST "B" (4 WAYS)

(terminating) tap. (Terminating taps were used to add to design efficiency. Any ghosting calculations with today's taps will yield a worse case reflection down 25-30 dB . . . more than adequate isolation to prevent ghosting.)

The charts show abnormal curves in many cases, particularly with the special selection of Test number 1. A large percentage of these variations are due to the small size of the test area. The large quantity of the highest value tap in all designs is due to not using any higher values for the test as they would all have identical insertion losses.

Considering the deficiencies of the test area, some interesting conclusions can still be drawn from these charts which may improve upon the tap selection we now have. Note the lack of usage of 13 two-way taps of the Cable A design Test number 1. It would seem that this value is not a useful one and should be eliminated in favor of a reduced inventory, but other new values retained.

I will leave other observations on the ideal tap value set to you. I caution you to consider all types of taps in drawing your conclusions

Conclusions and Opinions

One thing not available from any of the charts and graphs presented here is the human element of design. How did it feel designing systems with the different value sets? The special selection was noticeably easier to work with and we feel will produce a better design in the long run. How much in dollars and cents is impossible to determine without further experimentation? Would it be worth the effort to find out? We think so . . . or put another way: can we afford not to know?

Finally, more qualifications (what else?). It is somewhat ludicrous to ask our tap manufacturers to supply us with taps in one dB increments when their manufacturing specification is only ± 1 dB in the first place. However, this is not to say it cannot be done. Before an absolute selection is made, my estimated insertion loss specifications should be analyzed by the manufacturer as to produceability—can they meet my specifications in production?

In conclusion, it would seem that there is a better selection of values to be had. Are there any of you out there willing to find out? C-ED

Manhattan Cable TV Offers Information Transfer On Coaxial Cable

For several years, Manhattan Cable Television (a subsidiary of Time Incorporated) has carried off-the-air and special television programming on its system to the Manhattan community south of 86th Street in New York City. For the last three years, Manhattan Cable has also provided medium and high speed data circuits (4800 b to 230.4 kb) to commercial firms in the area.

The system operates in a tree-type structure originating from the headend in the Gulf and Western Building at Columbus Circle. Signals are relayed via "truck" cables through buried duct systems into apartment and offices. Amplifiers are strategically placed to compensate for signal loss and to insure high quality signals in all locations.

Data is transmitted to customers by an upstream path that uses the simple insertion of reverse carriage components in the amplifiers. A signal originating at a customer's location is then transmitted to the headend on a specially assigned upstream channel. A point-to-point data circuit is established by assigning a specific sub-channel to each data transmitter. The capacity of this sub-channel is directly related to the speed of data transmission desired. The upstream sub-channels are collected at the headend and converted into a downstream channel in the superband frequency range.

At the receiving points, the data is detected and delivered to customers in its original form. A full 6 MHz is alloted in both the up and downstream directions for carriage of the data signals. The capacity assignment exceeds five million bits per second.

In the past, a company's electronic data-transfer applications had to be conceived and cost justified on the basis of availability, price, error rate and reliability of telephone circuits. Now, at least in Manhattan, there is an alternative.

According to *The American Banker*, the only daily banking newspaper, "commercial banks have taken the lead among New York City corporations in utilizing cable television channels to transmit data between operations centers in Manhattan."

Because the cable medium is flexible, less expensive and more reliable than telephone services, businesses find cable more viable and economical for their needs. According to the three firms using cable TV the longest, they're so pleased that they will continue using cable TV and exploring new applications even if Manhattan Cable is forced by a state regulator to raise its prices.

As far as the New York bankers are concerned, a price increase is not of paramount concern. The time required to repair breakdowns in coaxial cable is a fraction of that needed when telephone circuits malfunction, and therefore, it would require more than an equalization in costs for the banks to discontinue use of the cable medium.

Since the Bankers Trust Company became the first corporation in the country to utilize bandwidth capacity on CATV—the identical network 87,000 residents of lower Manhattan subscribe to—New York has been the only city whose cable channels are applied to business data transmissions. Businesses subscribing to Manhattan Cable's business data transmissions are Bankers Trust Company, Chase Manhattan, American Express, Citibank, Manufacturers Hanover Trust and Morgan Guaranty.

Bankers Trust Company instituted a pilot test of the cable line between the bank's former operations center at 16 Wall Street and its BankAmericard division at 1775 Broadway. The cable transmission line paralleled the telephone company. "The pilot testing was favorable," stated Stevens Harrison, Bankers Trust vp of telecommunications. "During the four-month test period," Harrison emphasized, "there was only one breakdown of the cable, and that was repaired in 75 minutes. An equivalent telephone line breakdown (3,000 twisted pairs of copper wires) could take three to four days to fix," Harrison added.

A half-inch diameter coaxial cable utilizes a transmission capacity equal to 30,000 twisted pairs of telephone wires. Bankers Trust uses the equivalent of only 2,800 pairs.

According to Alan Maltz, systems engineer for Bankers Trust, the cable's capacity and size provides space-saving and cost-saving advantages over telephone lines. Copper phone lines can only carry video signals over a short distance. Cable, however, can interface easily with virtually any data network.

As reported in *The American Banker*, Maltz revealed the price differences between telephone service and cable. "Bankers Trust has been paying $600 for each of its two cable TV links since 1974, but the price of each telephone company link was $800 when the change-over to cable was installed in April 1974, and since has risen to $980."

Manhattan Cable is excited about the various applications of their cable system and look forward to many more innovations in an ever-expanding telecommunications industry.

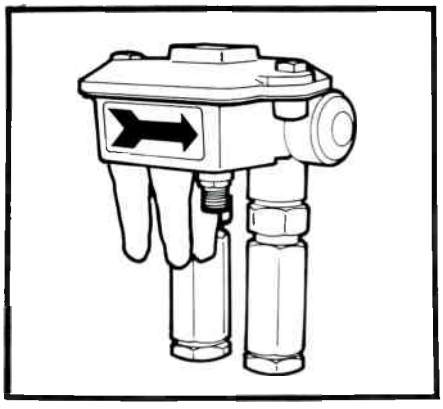
Taps

American Technology's Tech-Tap II

American Technology Company's Tech-Tap II 4000 series features advanced circuitry for high directivity, strand or pedestal mounting and a 5-300 MHz capability for two-way systems.

These units, (two and four outputs) have tap-to-tap isolation of 25 dB average. The band average equals the average of absolute values at 5, 54, 108, 216, 270 and 300 MHz.

The taps provide corrosion protection by using a baked, dri-lube phenolic coating. All aperatures are gasketed with O-rings or molded gasket seals.



RMS Electronics Multi-Directional "Unitap"

For aerial or underground installation, RMS Electronics' "Unitap" is a low-cost tap with an interchangeable tap plate. The power passing network has a single air-coil, providing the lowest hum-level available. No power passing or tap network components are exposed, preventing accidental damage.

The "Unitap" accepts VSF, "Sealamatic", "Dyna Foam", "Fused Disc" and standard feed-thru connectors with 1¼" stinger or longer. Entry ports have tapered counter bore so that connectors make 100 percent metal-to-metal contact for 100 percent RFI integrity. The seized center conductor is mounted to a strong fibre glass plate that can withstand over 100 pounds of stress caused by thermal contraction. The sealing gasket on the bottom of the housing is aluminum impregnated for excellent RFI protection. The strand clamp is center-to-center with aerial input and output parts, preventing the unit from shifting on the strand.

Jerrold's Future Features Taps

Jerrold Electronics Corporation's Future Feature Taps provide: full 7 amperes power passing; 30 dB tap-to-tap isolation to prevent subscriber-to-subscriber interference; maximum RFI integrity with a woven continous metallic gasket; chromated and coated weather-proof housings; and guaranteed specifications.

Specifications include: 5-300 MHz bandwidth; 20 dB input-and-output return loss; -70 dB minimum hum modulation at 7 amperes; -75 dB minimum hum modulation at 5 amperes; and 7 amperes maximum continuous current capacity.

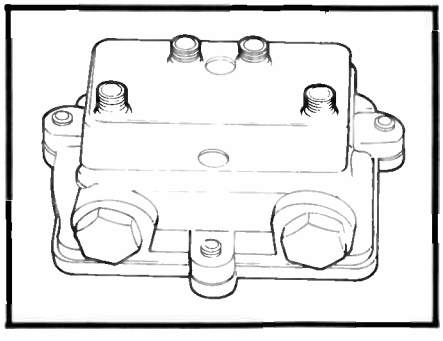
Lindsay 'Colorflex' Multi-Taps

Lindsay's 'Colorflex' series Multi-Taps, model CFTW, contain seized center single action connectors. These multi-taps (5-300 MHz) feature the exclusivity of collet-chucking of aluminum outer conductors which provide security against radiation, pullouts or cable turning. A newly designed bracket allows extra versatility and universal strand and other mountings in 25 different positions.

Cerro's Hybrid Multi-Taps

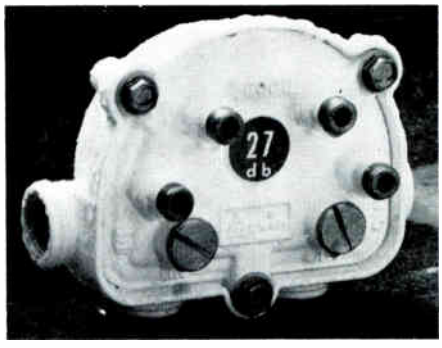
Cerro Communication Products has provided the cable industry with its model DT-4 hybrid directional multi-taps. Features of this tap include: secure grip seized center conductors; conductive gasket seal, weatherproof and radiation proof; rugged cast aluminum alloy case; strand or pedetal mounting; low loss and high isolation.

Specifications include: 5-300 MHz bandwidth for two-way capability; 20 dB return loss; ±0.5 dB response flatness; 5 amperes current capacity; 20 dB minimum tap-to-tap isolation; and 25 dB minimum output-to-tap isolation.



Arvin Systems Directional Tap

Arvin's series 3600B directional tap provides: 5-300 MHz bandwidth; 27 dB tap-to-tap isolation; 20 dB minimum return loss at input, output and tap across 5-300 MHz; 5 amperes current capacity; -65 dB hum modulation at 10 amperes; and 75 ohms impedance.



Magnavox Eight-Way Aerial/Pedestal Taps

Magnavox's model MX-3800 eight-way taps are tough yet versatile. Modular construction permits easy output and valve changes without disturbing the housing or thru connections. The absolutely secure center conductor seizure reduces chances of pullout or breakage and no strain is placed on the electronics module.

Specifications include: 5-300 MHz bandpass for one or two-way system usage; values every 3 dB from 11 through 36; high level impedance match; low insertion loss; and captive hex-head bottom plate screws.

Test Equipment

GenRad, Inc. Automatic Circuit Tester

GenRad's 1742 digital integrated circuit tester is a compact automatic test instrument that interrogates the parametric and functional performance of a wide variety of digital integrated circuits. The instrument displays pass or fail information during the test cycle, detects out-of-specification supply current, and identifies each input or output pin at which a parametric or functional failure is detected.

Total test time of the 1742 is 150 milliseconds. First, 96 parametric test phases sequence at a 3.1 kHz rate,

requiring 40 milliseconds. Then 44,000 functional test phases sequence at a 400 kHz rate, requiring 110 milliseconds. Three lower clock frequencies can be selected if necessary.

Tektronix New 851 Digital Tester

The Tektronix 851 digital tester is designed for the tasks of the first-line service engineer; including alignment and adjustment, electro-mechanical troubleshooting and electronic troubleshooting.

This unit combines many of the functions of a DMM, counter, timer, logic probe, thermometer and an oscilloscope into a single package weighing only 6 kg (13 lbs.)

The 22 functions of the 851 enables the user to perform a wide variety of tests and measurements. Eleven functions measure timing, two register plus and minus peak voltages, three carry out DMM measurements through separate leads and one reads line voltage at the outlet. The 851 also makes four self-measurements to correctly adjust each of its four input thresholds to the logic levels of the equipment under examination.

Mono-Probe's Single Probe Voltage Tester

Mono-Probe Corporation has introduced a new hand-held instrument using a single probe to permit faster, more positive electrical testing and troubleshooting.

The tester allows detection of 120, 240 and 480 volts with both light and sound signals—using only one probe. No neutral or ground contact is needed, saving time and labor. The single probe tester is particularly useful in knob and tube, blown fuses, breakers and checking for a broken, hot or neutral wire.

The Mono-Probe tester also provides an auxiliary probe to allow continuity testing. The unit can be used alternately from continuity to voltage or voltage to continuity without any switching device. With or without current, the probe tests switches, relays, motors, primary or secondary sides of transformers, fuses and light bulbs.

Avantek, Inc. Signal Level Meter

Avantek's model SL-300 signal level meter is specifically designed for the CATV industry. The unit is portable, dependable and incorporates innovative design features providing fast and accurate readings under both bench and field conditions.

The SL-300 operates over the 4.5-300 MHz frequency range. The frequency of the aural or visual carrier being measured is indicated on a large three-digit LED readout with 1 MHz resolution and ± 1 MHz accuracy.

A new concept in video peak sync detectors is used in the SL-300. The design uses the sample and hold technique found in complex digital instrumentation to actually hold the peak sync level without the problems of time constant or capacitor leakage of compromise peak detector designs.

Miscellaneous

Elan Enterprises' Motor Generator

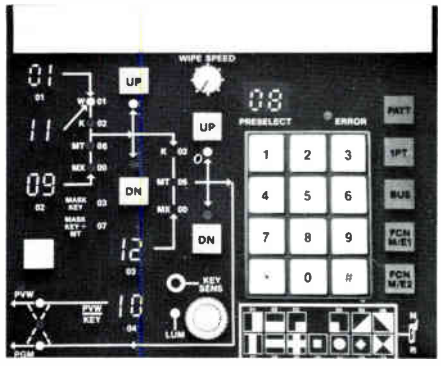
Elan Enterprises' Redi-Line motor generators supply 120 volt 60 Hz (sine wave) power to operate a variety of tools, motors and test equipment. The generators can be used to build an auxilliary standby power system.

The generators may be mounted on vehicles, used portably or with a battery pack. Models are available in 12, 24 or 36 volt DC inputs, with outputs from 500 to 1600 watts.

Dynasciences New Program Switcher

Dynasciences has introduced a new compact program switcher, model 7400/A, that has all the capabilities of Dynasciences' full-size four-bus model 7400—plus two additional wipe patterns. This unit is approximately 75 percent smaller than the 7400.

The 7400/A provides 26 wipes, joy stick positioning, pushbutton controlled wipes and many other features previously available only on larger, more costly production switchers.



Closed Circuit TV Accessory Catalog From RCA

A 40-page catalog, *CCV-113A, Closed Circuit TV Accessories*, offering a quick selection guide to over 700 CCTV accessories from RCA closed circuit video equipment is now available.

This guide, arranged by major product categories for easy access, gives a brief description of each product, its model number, the Optional User Price and the data sheet number on which more detailed information will be found.

Copies of this catalog may be obtained from RCA CCTV sales offices or by writing to RCA Publication Services, Box 3200, Somerville, New Jersey 08876.

VMOS From AMI Brochure

Sophisticated Carrier Telephony Principles Made Simple

Simplified and understandable presentations of telephone carriers or multiplexing techniques are the trademark of the Revised Third Edition of David Talley's *BASIC CARRIER TELEPHONY*, just published by Hayden Book Company.

Subjects such as carrier-frequency operations, modulation and demodulation methods, multiplexing, the design of attenuation pads, electrical filters and equalizers are all presented in a clear, precise manner.

Changes in this new edition include: updated statistical data on the growth of the telephone industry, new cable carrier systems, developments in transmission and signaling methods, improvements in PCM techniques and interconnections of cable carrier systems with microwave radio terminals.

This 224-page book, available for $6.85, can be obtained by contacting Michele Hornsby at Hayden Book Company, Inc., 50 Essex Street, Rochelle Park, New Jersey 07662 (201) 843-0550.

Compositor I Literature Released by Telemation

This new 12-page brochure describes the features of the software-based graphics system: the graphic quality of the characters, its 999-page memory and one-button call-up of sequence pages; three-edge styles; three spacing modes; system installation, expansion and ordering information.

The brochure is highlighted by monitor photographs depicting various styles of characters, edges, spacing and step-by-step examples of the communications between the computer and the operator keyboard.

For additional information, contact Paula J. Parker, Advertising Department, Telemation, Inc., P.O. Box 15068, Salt Lake City, Utah 84115 (801) 972-8000.

Hughes Offers Brochure on Satellite Terminals

A six-page brochure describing the new 4.5 meter antenna satellite video receiving terminal is now available from Hughes Aircraft Company's microwave communications products.

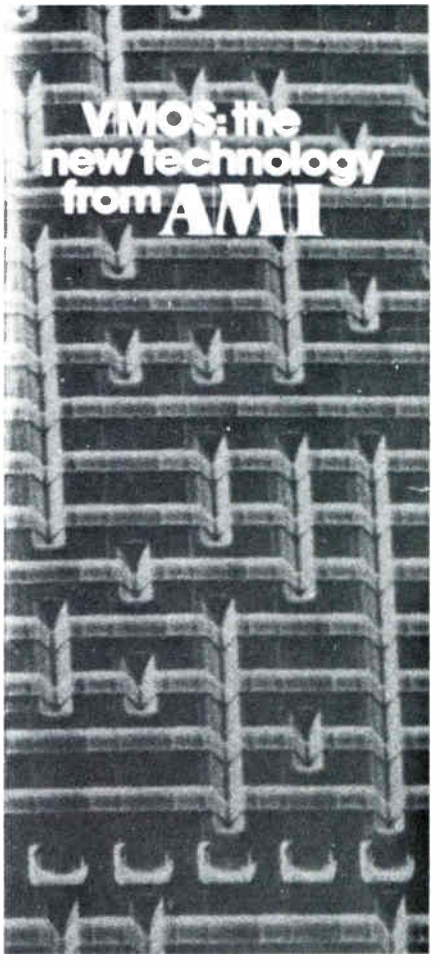
The booklet describes the various components of the terminal, including the antenna, video receiver, amplifier and accessories, and gives performance characteristics and technical specifications.

Free 16-Page Brochure on VMOS LSI Process

VMOS (V-Groove Metal-Oxide-Silicon), the newest semiconductor technology which has resulted in large scale integrated microcircuits forty percent smaller than competitive MOS devices but with bipolar speeds, is the topic of a 16-page brochure now available free from American Microsystems, Inc. (AMI).

Covered in *VMOS: The New Technology From AMI* is a basic description of VMOS, its impact on the marketplace, memory components and a technical description of the process.

Inquiries for *VMOS: The New Technology From AMI* should be addressed to Tom Edel, manager, marketing services, American Microsystems, Inc., 3800 Homestead Road, Santa Clara, California 95051 (408) 246-0330.



RCA Closed-Circuit Catalog

New Services New Revenues

By Kenneth Hancock, Director of Engineering

In Canada, as in the United States, the cable industry is maturing after a long period of continued expansion. In Canada, as distinct from the United States, the cable industry is dominantly an urban phenomena. With the single exception of Windsor, all major cities in Canada have cable TV, and the vast majority of these have very high penetration. Even in Windsor, which is a special case due to the large number of local stations both from Windsor itself, and from Detroit, the Canadian Regulatory Body of the CRTC has called for applications for cable TV licenses.

The only major exception to very high penetrations in urban areas is in the French-speaking Province of Quebec, where there is somewhat less demand for distant programming, the vast majority of which is in English. However, even in Montreal and Quebec City, penetration is near 35%.

For rural communities that have cable TV, penetration is frequently high. But, due mainly to the high cost of terrestrial microwave and lack of satellite distribution to the cable industry in Canada, many rural communities are without cable TV.

In the face of high penetration and continually rising costs, the cable industry in Canada is looking towards new ways of increasing its revenue. Rates are strictly controlled by the CRTC and every signal that is carried over a cable system must be approved by the CRTC, regardless of whether the signal is an off-air program or not.

One obvious way of attracting new revenue is through the medium of pay TV. Over the last two years, many Canadian Cable Television companies have attempted to go this route, only to be frustrated by the regulatory process. A decision on whether or not pay TV will be permitted in Canada is still awaited, despite detailed submissions and hearings over a period of some fifteen months. It cannot be said that the decision is being awaited with confidence by the Canadian Cable Television Industry.

In the face of this, more and more CCTA members are seeking new revenue producing services that have some hope of speedy approval by the CRTC.

The possibilities are many and varied. Our coaxial distribution system has the capability of carrying all types of signals from low speed digital through audio and video to high speed data, using all common types of modulation. From this viewpoint, the choice is virtually unlimited.

From the revenue aspect, new services can be split into those producing direct revenue, such as pay TV, security services and many others; and those which produce indirect revenue by attracting a large enough number of subscribers. Typical of the latter are information services, special programming for handicapped groups and so on. In Canada interest centers on direct revenue producing new services. The interest in indirect revenue producing new services tends to be limited to attract interest in those areas where penetration is comparatively low, and to those systems that require additional services to make a viable converter service package.

Approximately six months ago, the CCTA set up a New Services Task Force to look into the whole problem of new services for the Canadian Cable Industry. This Task Force has divided all possible new services into eight specific groups:

- security service
- leasing of video channels
- education services
- control services
- entertainment services
- non-video digital services
- subscriber services
- information services

The emphasis is now on implementation of these new services. In Canada, one of the main stumbling blocks for implementation is convincing the regulators that such services should be permitted. In an effort to speed implementation of new services, the CCTA New Services Task Force is holding a three-day seminar on new services in Montreal, between the 21st and 23rd of November 1977.

The Seminar is specifically designed to:

a) provide hard new information to delegates on what new revenue producing services are realizable; how these can be obtained and what problems must be overcome to implement them.

b) generate within the Canadian Cable Television Industry cooperation in developing new services.

c) develop specific new service application plans leading to implementation.

As a result of this seminar, it is hoped that 1978 will see the implementations of a number of profit-making new services in the Canadian Cable Television Industry. For those American friends who are interested in attending this seminar, further details will be announced in a few weeks time.

Automatic Audio Test Equipment

A novel automatic audio testing device, the AATE, will be marketed by V G Electronics Ltd., who will be responsible for further engineering developments and for the manufacturing of the equipment.

The AATE was developed to meet a requirement for a relatively low-cost automatic measuring instrument able to rapidly determine the amplitude/frequency response and noise levels of telecommunications circuits including music channels. The unit measures the two performance parameters which normally present most problems to broadcast and telecommunications authorities and users, and is suitable for use on all audio transmission paths, including point-to-point links.

The equipment can be operated unattended, and the receiver unit automatically provides a chart print-out of the parameters undergoing tests. The transmitter unit concerned is clearly identified by a coded pattern on the print-out.

International Mains Plug And Socket System

The idea of creating a world-wide mains plug and socket system for domestic and general use, first discussed at an IEC meeting in Tel Aviv in 1966, has resulted in firm proposals on which the British Commission hopes for agreement in 1977.

The plug likely to be adopted will be rated at 16 amps with flat pins, and the socket outlet will have three contacts (live, earth and neutral) in an inline configuration, with the earth contact centrally positioned and offset.

Jim Fallon, director of external relations, at MK Electric, has produced an excellent 48-page booklet, "The Proposed International Plug and Socket System," providing an explanation of the present situation, a detailed review of events leading to the present proposals, and his company's comments on a number of vital questions associated with adoption of the new system.

The MK booklet, which includes illustrations of plugs and sockets used throughout the world, and the proposed international types, will materially assist public comment and debate on the question of Britain's adoption of the new system. Copies can be obtained on application to J.J. Fallon at the External Relations Department of MK Electric Ltd., Shrubbery Road, Edmonton, London N9 OPB.

CATV Agreement For Saudi Arabia

International Video Systems Ltd. has concluded an agreement with Modern Electronic Establishment of Jeddah, in Saudi Arabia, for the supply and installation of a complete television studio and community antenna distribution system in Riyadh, Saudi Arabia.

The total value of the contract has not been disclosed, but Peter Funk, managing director of I.V.S. (UK) Ltd., the UK subsidiary of IVS, stated: "This is a large contract involving IVS facilities and personnel both here and in Japan. I expect that at least $525,000 of the project budget will be spent here in Britain and Gordon White, IVS technical director, will be in overall charge of the project."

Work has already commenced on the Riyadh site and completion is expected by mid-1977. It involves the construction of three non-broadcast color-equipped television studios, a central studio control and a CATV system.

The complex will be used mainly for the projection of educational programs and distribution of pre-recorded entertainment programs to patients and employees in a new medical complex being built in Riyadh.

IVS is responsible for the design, engineering, equipment purchasing and installation of the complete system, while MEE is providing local support and the balance of the communications facilities. MEE is the Saudi Arabian distributor for Sony and is one of the largest electronics companies in the Middle East.

Labgear Teletext Adaptor Now in Production

The first production versions of Labgear's Teletext Adaptor are now being dispatched to customers.

The Labgear Teletext Adaptor, Model 7026, is basically a "black-box" which connects to the aerial socket of a television receiver as opposed to other techniques which involve considerable alteration to the receiver's internal circuitry. Labgear believes that the aerial adaptor approach, generally believed to be impracticable until last May, will make Teletext an attractive proposition to users of relatively new and expensive color television receivers.

British Programs For Republic of Ireland

British television programs, already available on cable systems in many parts of the Republic of Ireland, are to be relayed to areas (in the south and west) where off-air reception is not possible.

Cooperative relay companies will pay $350,000 to the Eire Ministry of Posts and Telegraphs for the privilege of relaying signals from Dublin.

BBC and ITV programs have already been used by Belgian and Dutch cable networks, and this further example of their use in other countries, in apparent contravention of international copyright agreements, is thought to be the reason for Britain's Department of Trade decision to refer the whole question to the Council of Europe.

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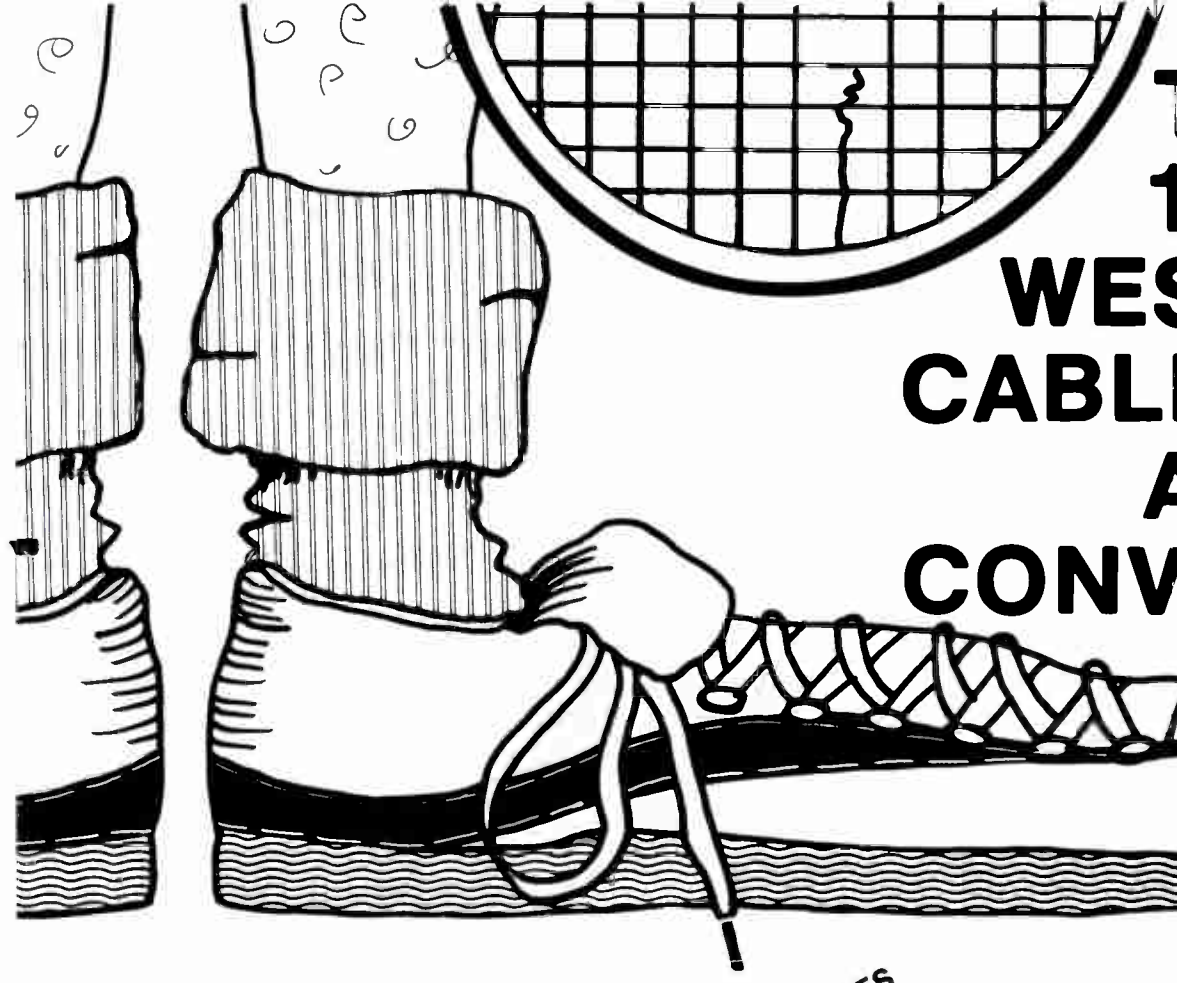

THE 1977 WESTERN CABLE SHOW AND CONVENTION

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Major MSO is looking for an experienced, well organized chief technician for a 600-mile system under construction in the southeast. First or second class license disired. Excellent benefits and potential for advancement. Resume held in confidence. Write Box C/ED-1077-2.

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Major MSO is seeking experienced technicians for growing operations. Duties include troubleshooting, repair and field maintenance. Microwave experience and First Class FCC License preferred. Good salary and benefits package. Send confidential resume and salary requirements to:

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MSO needs technician for mainly Jerrold System. Send resume to:

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Major CATV Operator based in New York City has immediate need for a qualified marketing professional; candidate should be a creative person with marketing, direct sales, direct mail and advertising experience. Responsibilities include developing effective campaigns, hiring and training a staff, and organizing and directing a large direct sales operation. For prompt consideration, please forward a detailed resume, in confidence, stating salary history to: Box C-ED-1077-1.

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Ground floor opportunity with rapidly expanding company for individuals with all purpose (manager/technician/installer) cable TV background. Advance your career into the highly sophisticated field of operational bi-directional cable TV with the added feature of computerized alarm services via two-way cable. Digital knowledge a definite plus. Positions immediately available in Arkansas and Texas. Other positions opening up around the country and in Canada. Many company benefits including profit sharing and employee stock purchase plan. Send resume or call:

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Major MSO is looking for chief technician for 600 mile plant. Prefer 4-5 years technical experience with FCC2 class license required for AML microwave utilized in plant and 4 hop cars band for one channel. Salary commensurate with background. Send resume in strict confidence to:

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Athena Communications
4455 South Padre Island Suite 20
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Solid State RF Instrumentation

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Including one rack, wiring and assembly for both
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2 213-740 Antenna
2 15-140 Mounts
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High Power Output (+27dBm) and Low Receiver Noise Figure (9dB) for Long Paths.
All equipment still in crates.

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By the end of the second night, he had collected the resumes of three renowned cable engineers. On the third day, he met another little classified, a "business opportunity" with great potential. They decided to work side by side forever.

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- ☐ Sales Representatives
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We know making a decision to hire someone is only half the battle. The hardest part is finding that special someone.

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