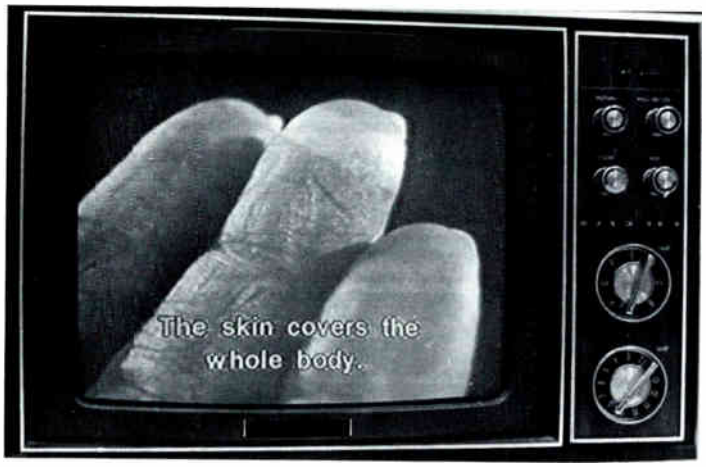
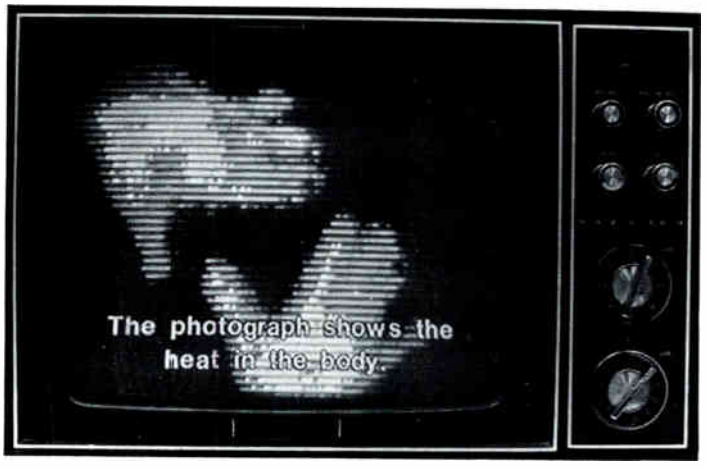
communications/engineering digest

reporting the technologies of broadband communications

february 1977
volume 3, no. 2





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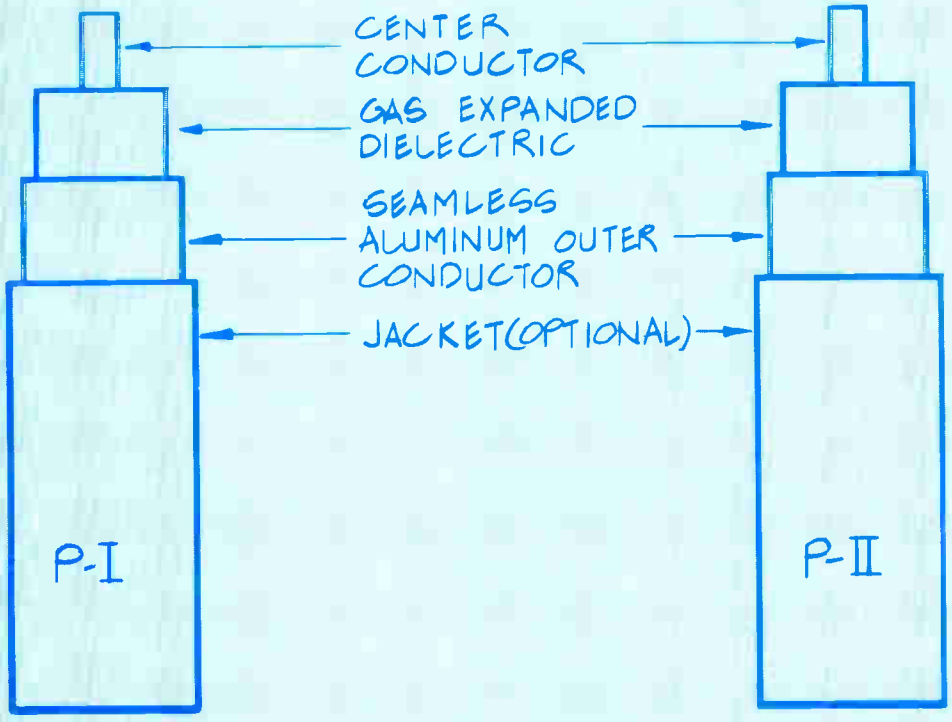

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february 1977
volume 3, no. 2

communications/engineering digest

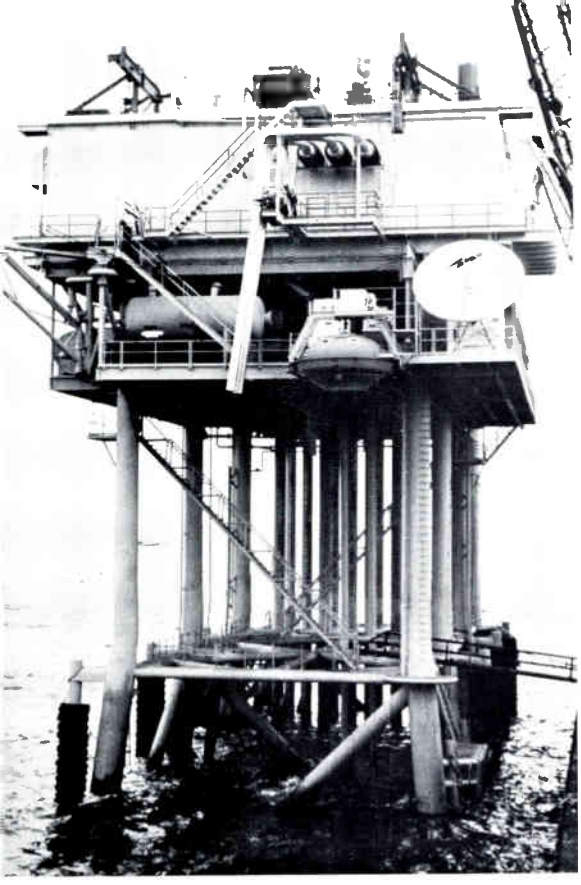
SPECIAL REPORT

FEATURES

DEPARTMENTS

COVER: Two and a half million people in the U.S. are deaf. Another estimated eleven million suffer from significant hearing loss. As a result, this single largest disability group in the nation is deprived of true enjoyment from watching and *listening* to TV. Our cover depicts one possible solution—captioning.

communications/engineering digest is published monthly for the Society of Cable Television Engineers by Titsch Publishing Incorporated, 1139 Delaware Plaza, Suite 200, P.O. Box 4305, Denver, CO 80204 © February, 1977. Subscription cost is $12 per year U.S. and possessions, $15 Canada and Mexico, $17 foreign. $1 single copy. Controlled circulation postage paid at Denver, Colorado.



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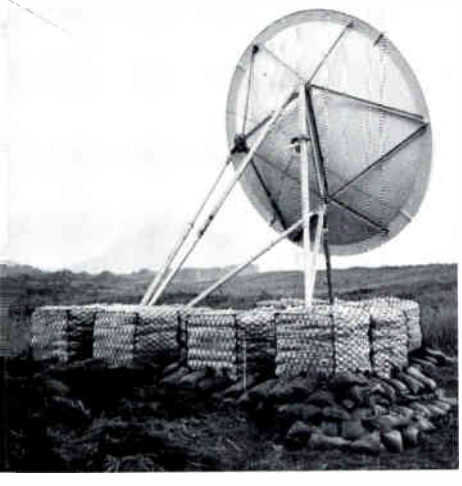
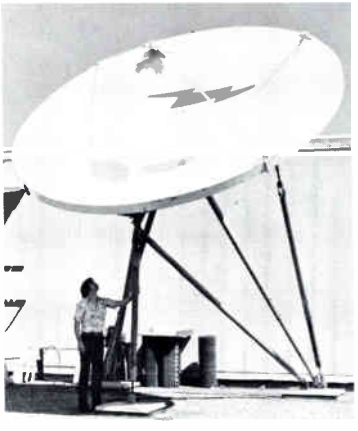
Parking Lot



Remote Location in Alaska



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opinion/editorial

Cable television now finds itself embroiled in another controversial issue—one not only based upon engineering discipline but one that is highly emotional: Air Safety/Cable Interference.

C/Ed was first to report on the topic; and have continued to be very much involved in the issue. Our technical editor Cliff Schrock took part in NCTA's presentation to OTP in January. But, as you read on, you'll see that Cliff and I do not necessarily agree on the same solution to the problem.

Many have said, "There is no way possible for interference from a cable television system to be the direct cause of an air disaster." Others refer to cable as a "closed" system and remark, "If the system is tight," using aeronautical voice and navigational bands for CATV is "nobody's business but our own." Some say, "Power levels are too low to cause interference problems" . . . and "We've been there for 25 years and nothing's happened!"

Perhaps the most logical observation was made by an FCC official when he said, "If this had been kept as purely an engineering matter, it could have been solved in 15 minutes." That's a good thought. Logic, for the most part, has been discarded in this argument.

Cliff is concerned that, if we give up the 108-118 MHz space, such a move will be "just the beginning." He also finds most people, including many engineers, do not understand enough about power levels of CATV systems.

I believe this is a losing battle; we should present a compromise: Get out of the 108-118 MHz bands completely and offset distress and emergency frequencies. I believe the economics are sound for cable operators; because, if we continue to operate in the air/nav bands, extreme pressures—and perhaps forfeiture—from the FCC will be on top of us in a minute. We "might" interfere, and that is enough for the FAA, ATA, AOPA and OTP to blow our roof off.

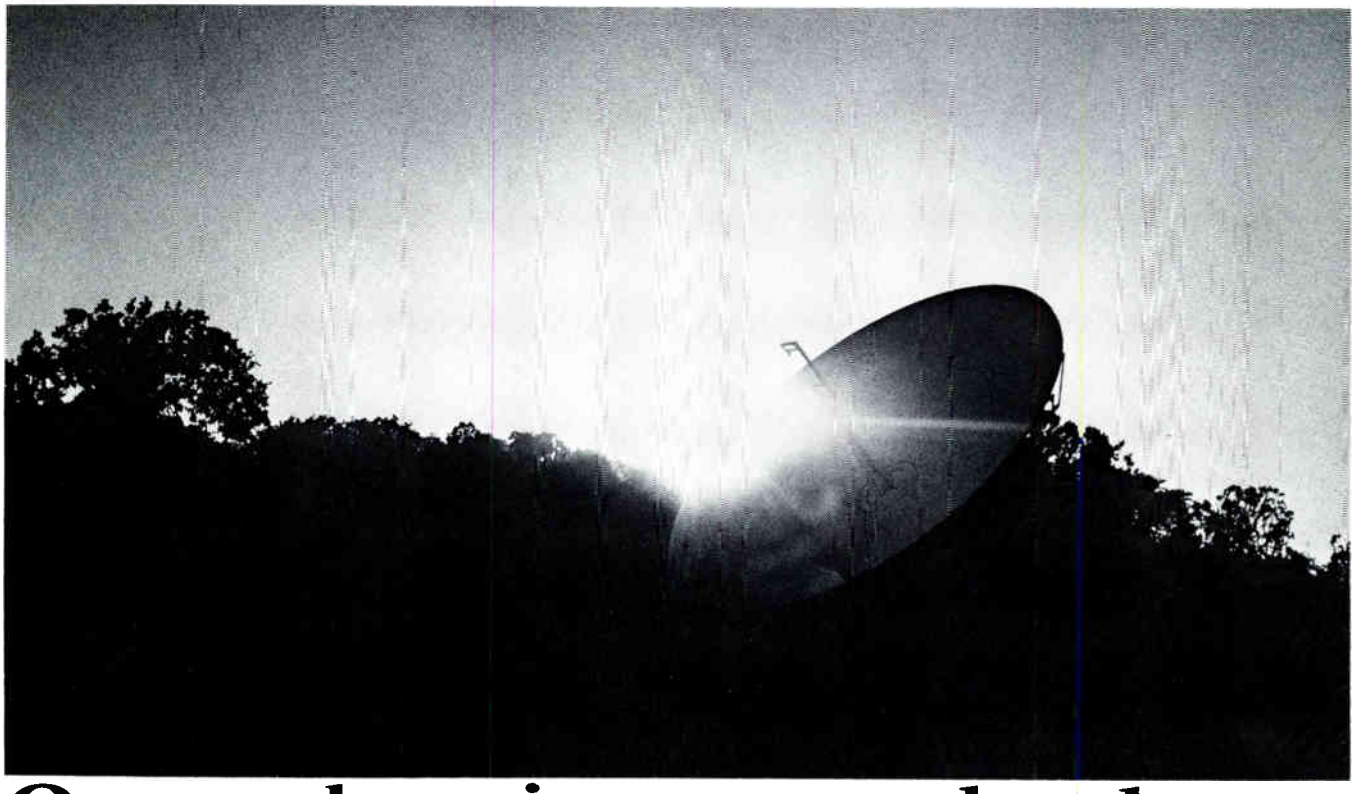
All the "against" forces are located in one spot—Washington, D.C. They are masters at dramatics. They've baited a major Washington newspaper to term CATV a "peril." There is no cable in Washington, so they have no interest—even as subscribers—in the industry. If the battle were going on in a community with cable service, we'd have a better chance of countering the propaganda that's being planted on the public. ATA brings up emotional examples in its plea of "near misses" over distant cities without cable systems. The FAA uses words like "urgency" and generates tapes that cause misleading observations about our industry.

What started out as fluke in Harrisburg (an 11 year old system with four pilot carriers beating against one another on the same frequency) has turned into what one non-industry type terms a "scary" incident. Congressmen read newspapers; clipping and wire services will disseminate press out of Washington; and your local system becomes a "menace."

Just what we need when we've been termed a "parasite" for years over copyright.

Change over the system. Get out of any frequency that might cause a threat to the public. Don't leave us wide open for forfeiture and more policing from the FCC. If there is any threat whatsoever—whether real or imagined, and now, even if there is additional complaining from pilots—we're not an attractive, dynamic industry with any future for investors.

Judith Baca



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That's why over 70% of the companies who've dreamed about cashing in on pay TV have come to us for a fully warranted and protected earth station. We're the only people who've made a commitment to the cable industry that's total in every respect. And we aim to keep it. Rest assured.

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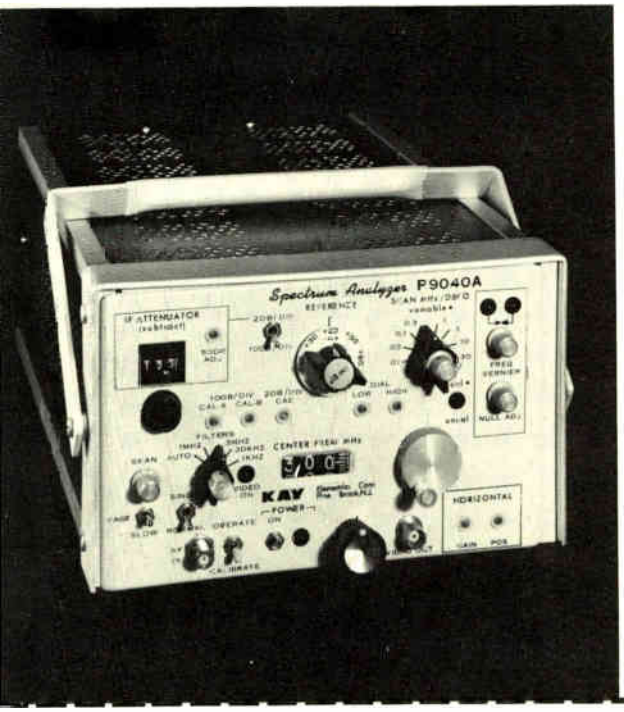

KAY spectrum analyzer P9040

Designed especially for CATV testing, the P9040 helps the System Operator to both conduct FCC proof of performance tests and properly maintain his system. 0.5 to 300 MHz, featuring a spurious free 72 dB dynamic range with phase locked 1 kHz resolution. Input sensitivity is -52 dBmv for 75 ohms. Scan width is variable from 3 kHz to 30 MHz/Div. with excellent linearity. Intermodulation and spurious responses are greater than 72 dB down.

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Technical News at a Glance

. . . *The* **Air Force** *and* **Navy, DOD, FAA, EIA, OTP, ATA** *and* **AOPA** *and* **NCTA** *met in Washington 1-11 to discuss* **"Air Safety/Cable Television."** *No resolutions came out of meeting. None was expected. (See* **C/Ed** *story inside). NCTA and EIA requested and got* **extension** *on comment* **deadline** *on Docket 21006 (Monitoring, Interference, Forfeitures and Channelling Plans all in one?) to* **3-02-77.**

. . . **Harry M. "Chip" Shooshan,** *counsel to House Subcommittee on Communications, and* **Dr. Joe Biedenbach,** *Director of Continuing Education at University of South Carolina's College of Engineering, are* **luncheon speakers** *at IEEE/SCTE* **Reliability Conference,** *February 23-24 in Atlanta. Shooshan talks on* **engineering's role in Communications Act rewrite; Biedenbach** *will* **encourage engineers to "take off their blinders."**

. . . *Speaking of* **Rewrite: Lobbying** *is going on to* **include engineers** *on both* **cable panel** *advising* **Van Deerlin's** *staff and the* **NCTA Rewrite Committee** *(contact Ralph Baruch). Neither has named a technical type. There's talk of* **"technical subcommittee"** *from NCTA but that's* **not enough** *in view of many industry leaders.*

. . . **CATA** *has* **asked** *for declaratory ruling* **to stay filing deadlines for CAC** *on systems* **under 1,000** *subs, stating FCC's scheduled to address definition (Docket 20561) falls after 3-01-77 filing deadline. Says CATA, "It would be ironic . . . if relief came just weeks or days too late." The entire question might be resolved by the time you read this, since Commission appears anxious to address the matter and push it onto the agenda.*

. . . **The Washington Star,** *in its January 19 edition,* **carried a page two story on another FAA effort to foil the cable industry.** *The article pointed out supposed dangers of cable to aircraft. It must be obvious to all who attended the OTP January 11 hearing the FAA story reflects a blatant refusal of that agency to consider or even weigh the facts presented. This is a classic case of, "don't confuse me with facts." Whereas the FAA may have intended the* **Star** *story would kill midband cable, it may IN FACT destroy the agency's* **credibility.** *Time will tell. A* **point-by-point** *rebuttal appears in this issue of* **C/Ed.**

. . . *An earth terminal based around a* **6 meter antenna** *has been announced by* **U.S. Tower** *in Afton, OK. This new size permits the* **use** *of lower cost preamplifiers with the* **benefits** *of larger dish performance. They are quoting total single channel earth terminals for* **$27,000.**

. . . **Bell announced** *a fiber optics total communication system will be in operation in Chicago by* **mid-1977.** *The system will use* **12 fibers,** *and handle voice, data, and Picturephone™ between central offices.*

. . . **Teleprompter's Kalispell, MT small dish** *(***C/Ed** *November, 1976) and Gaithersburg CATV, Inc. conical horn* **are first applications into FCC** *since small dish concept approved.*

NEW!

instrumentation

Mid State Leakage Testor ST-1

Over the past few years, it has been increasingly obvious that leakage testing cannot be satisfied with a three-point test once a year. Continual maintenance is required, and a variety of home brew schemes have been used to monitor the cable systems.

Now Mid State, innovators of other low cost and cost effective solutions to cable measurement problems, has announced the "Cuckoo" signal generator, paving the way for the use of standard, low cost FM radios as receivers. FM receivers have been used effectively before, but they had trouble locating the exact break or leak, because the FM receiver went into limiting. The ST-1 automatically steps 25 dB in 5 dB steps. When you are away from the trouble spot, you hear only the higher levels. The closer you get, the more levels you hear, and the louder the signal gets.

beeping effect which increases in severity the closer you get to a signal leakage point.

To see how this stepping helps you, refer to Figure 1. As you approach a leakage point, the first signal you hear is the high level signal. The closer in you get, the more leak you pick up When you are by the leak, you will even pick up the signal when it is attenuated 20 dB. The signal remains at each level for 1/3 of a second, which seems to work out nicely for patrolling at about 25 to 30 MPH.

This system enables you to equip every vehicle to patrol for leakage from messy illegals, minor breaks, loose housings and other things that might soon become major problems. If you have an FM radio in your car, just drive around town and check your system. This is the smallest, lowest cost system available. More than 30 systems have been operating in

Pat. Pend.

An ST-1 signal transmiitter bolts into your headend and produces an easily identifiable signal at any frequency from 86 to 110 MHz. The signal can be either FM modulated at 1 kHz, or FM warbled, like a cuckoo clock. The cuckoo signal can be easily recognized even in a noisy environment. A standard FM radio is used as a receiver. The sensitivity of the system depends on the quality of the radio you purchase.

The unique part of the ST-1 is that the output amplitude is automatically switched over five different output levels, each 5 dB apart. The different output levels produce a strange

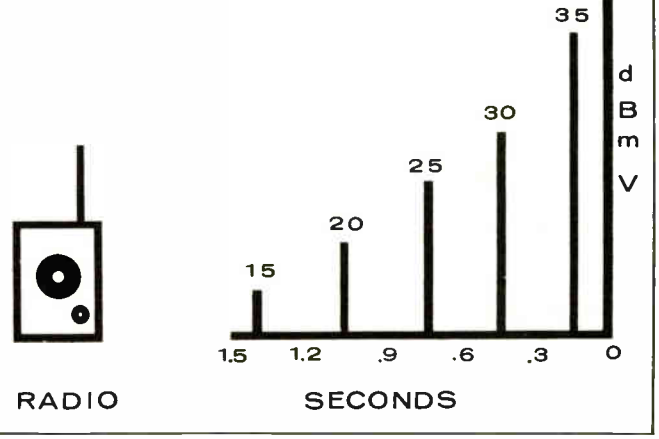
Canada for over a year. Operators report finding broken connectors even 5 feet underground.

The sensitivity of the system depends on the radio you purchase. It is very easy to find radios which are much better than 1 uv. We recommend operating the signal at about 5 dB above normal FM level. The advantage in running near the FM band is that the band of frequencies that most concerns the FCC is the VHF OMNIRANGE for aircraft, starting at 108 MHz. This system allows you to put a carrier just below this point, and lets you check for frequency selective breaks.□

Specifications

Output	35 dBmV (Min)
Frequency Tuning Range	86 MHz-110 MHz
FM Deviation	±75 kHz
Output Level Control Range	20 dB
FM Modulation Frequency	1000 Hz (Approx.)
AM Modulation	Four 5 dB Steps
AM Modulation Step Rep. Rate	Approx. 0.33 Sec./Step
Incidental FM Modulation	±10 kHz (Max.)
Supply Voltage	110 Vac

Figure 1



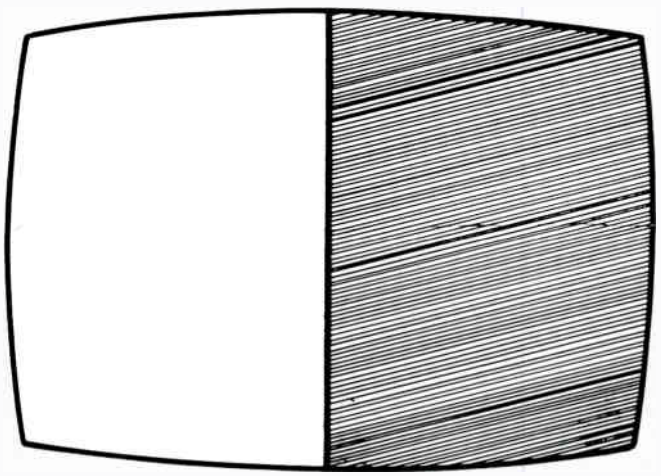
National Science Foundation Update

The problem of defining the difference between a good and a bad TV picture is difficult to quantify. What might appear good to one person used to looking at his TV programs through a SNOW storm (Bad S/N) might appear intolerable to another. It is this very reason that cause governing bodies like the FCC to have a difficult time establishing minimum performance standards. A good example of this problem occured in 1972 when the FCC first established standards for cable. The signal to noise standard of 36 dB was hardly realistic, if one wanted saleable pictures; yet some of the other standards were too lenient.

The TASO studies performed in 1959 have served as a basis in determining what constitutes a good or bad picture. While it was carefully handled, many questions have arisen over the years as to the actual measurement conditions for viewing. The viewing portion of the tests was carefully controlled, but the measurements that accompanied the tests leave room for suspicion.

This is why the TASO tests have to be repeated today. Now we have standards of measurements to ensure a viewer sees what we intend for him to judge. Also, we have many new parameters and distortions to contend with.

The NSF project was started many years ago in a C-TAC group. Archie Taylor was involved at that time in trying to establish realistic standards for cable. The size of such an undertaking was beyond the scope of the original group and a grant was obtained from the National Science Foundation to carry out the work.

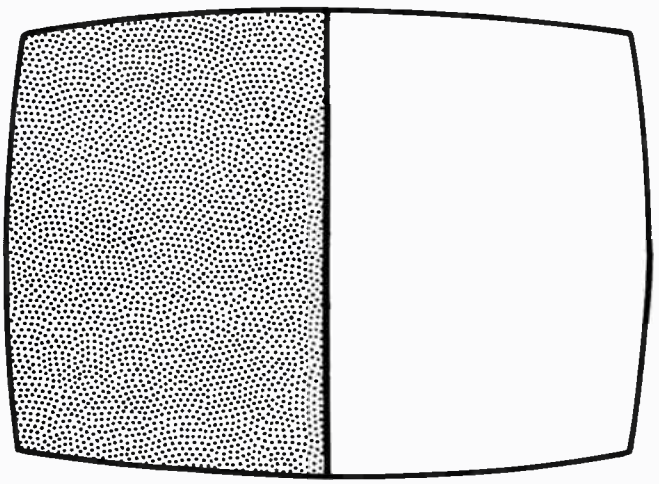


It was decided that some repeatable means had to be used so that many viewers' reactions to various picture distortions and combinations could be observed. Stationary slides with distortions would not be typical of the average "moving TV scene." Generating distortions over actual TV pictures would not provide the same results for different control groups and would require careful engineering and measurement for each session.

It was finally determined that a high quality video tape recording, or the test, would permit a degree of control over the test unattainable by any other techniques.

Full screen and split screen video tape recordings are shown to have many advantages in conducting viewer reaction tests, such as those conducted by TASO in 1959: timing is precise and uniform for all viewers; randomized interference levels are identical for all rating sessions; greater flexibility is provided in the location and time of the viewing tests; and because of these advantages, a much larger viewing sample can be comfortably accomodated.

The NSF test will cover the following distortions: signal-to-noise ratio; single frequency interfering signals; intermodulation noise, which is a combination of low frequency noise; cross modulation; and multiple video beats.



Many question as to susceptibility of interference will be addressed with the tests. For example, the susceptibility of single frequency interference close to the visual and the chroma carrier, as well as in other positions, will be tested.

The quantifying of the test result of the tests is another complex problem. The question of what different people will perceive as a good or bad picture may be surprising. However, Rod Welch, a psychologist, will use modern statistical techniques to arrive at the answer.

This is an exciting series of tests for the whole TV and cable TV industry, since it will provide us with a long sought-after answer. We will soon know what "MR. Average TV Viewer" expects out of a TV picture, and, hopefully, realistic technical standards can then be established from the information provided.□

news

OTP Hosts Meeting On Air Safety/Cable Issue

WASHINGTON, D.C.—More than 50 people representing airlines, private pilots, the FAA, Department of Defense, Navy, Air Force, the FCC and the cable television industry crowded into a conference room at the Office of Telecommunications Policy on January 11 to learn about the CATV industry. OTP Acting Director, Frequency Management, S. E. "Ed" Probst noted that he called the meeting "to draw no conclusions but to learn more in order to formulate an opinion" regarding potential cable television interference to voice and navigation channels used by Air Traffic Control.

Frank Bias of Tele-Vue Systems, who is chairman of NCTA-EAC's Interference Subcommittee, worked closely with Jim Lahey, chairman of the EAC, to develop and present an effective program outlining CATV's current technology. Nick Worth of TeleCable, Jim Palmer of C-COR, Cliff Schrock of *C/Ed*, Bias and Lahey took part in the presentation chaired by NCTA president Bob Schmidt. CATA's Bob Cooper had been invited to participate in the program but was unable to do so because of prior commitments. However, CATA has expressed willingness to "work with anyone in the industry" in presenting industry positions.

NCTA proposed "each cable television system will maintain at its operating office a list of the carrier frequencies currently in use in the cable system," because one difficulty in resolving the "Harrisburg incident" was lack of certain identification of the interfering signal. NCTA also suggested that cable systems operating in the 108-118 MHz air navigation band operate with a minimum offset of 25 kHz on those frequencies used by air navigation in their area. Citing recent tests by the Office of Telecommunications in Boulder, Colorado, NCTA said such offset "will insure CATV operation at frequencies far enough removed from air navigational uses to insure safety."

Additionally, NCTA's proposal suggests that each cable television system's operating carriers in the frequency range of 118-174 or 216-300 MHz offset appropriate carriers a minimum of 50 kHz from the emergency frequencies of 121.5, 156.8 and 243.0 MHz, because these frequencies are used by aircraft and vessels in distress under emergency conditions where power and frequency stability may be marginal.

In presenting NCTA's position, Bias stated his belief that adequate standards governing levels of leakage from cable systems cannot be established at this time, since levels required to protect voice communication to aircraft are unknown. Bias continued, "We support the desirability of leakage monitoring, but we do not now have reliable field data to relate the current practice to the levels necessary." Concluding, Bias said, "We feel the features of a frequency plan that can reduce the probability of interference have been incorporated in the recommendations above."

While each speaker from the CATV industry took his turn fielding questions, it became apparent that moving forces in this controversy are the Air Transport Association and the Aircraft Owners & Pilots Association, along with the Federal Aviation Administration. ATA represents the commercial carriers and AOPA represents approximately 195,000 licensed private pilots. "We're the largest trade association in the country," said Victor Kayne of AOPA.

OTP's Ed Probst spoke of the seriousness of the interference problem but stated that "until the Harrisburg incident, the only concern I had was catastrophic failure." Probst told *C/Ed* that his major concern is the "manageability" of potential interference problems as cable grows. "If one airplane falls out of the sky . . . I've made the wrong decision," said Probst.

ATA's Jim Diehl called for "numbers" and stated ATA "will accept a zero probability" of an interference problem. Diehl also said ATA is greatly concerned with the "distractive effect" of voice interference and let it be known that the major portion of air disasters are

a result of pilots and crew members being "distracted" in the cabin.

Charles Innes of the FAA listened to the entire program presented by NCTA and fired questions at speakers. Accompanied by Garth Kanen of the FAA (and the "producer" of the six minute tape being circulated on the Harrisburg event), the FAA held to its position that CATV should not be allowed to operate in the 108-118 MHz frequency range. "It is with a sense of urgency that we're seeking relief," said Innes at the close of the meeting.

C/Ed has learned that the NCTA presentation generally "went well," but there is still question with regard to signal leakage and interference from cable systems. Investigations and conversations with officials at the FCC have developed some question as to a continued misunderstanding about the levels of power generated from cable even though the meeting presentations attempted to prove that even a catastrophic leak could not upset the modern air navigation systems.

C/Ed's investigation has also turned up the possibility of the "interference concern" having been caused by "paranoia" on the part of the FAA and certification of less than adequate quality aircraft receivers. Replacement of such receivers would cost the airlines and private users a considerable amount of money.

A high level FCC official told *C/Ed* that "the FAA knows it has an image interference problem with many receivers, and is lashing out at any potential interference problem." The source continued, "They've had a great deal of pressure applied on them and are reacting . . . sometimes over-reacting."

Continued Growth At C-COR

STATE COLLEGE, PENNSYLVANIA—C-COR Electronics, Inc., recently completed the expansion of its manufacturing facilities at State College, according to the firm's president James R. Palmer. The expansion represents a 50% increase in manufacturing floor space.

Part of the expansion includes space for specialized construction tailored for the manufacture of printed circuit boards. This includes a photographic clean room facility, a chemical processing room and chemical waste treatment facilities. C-COR has total in-house vertical integration in its printed circuit board artwork to the completed product.

C-COR recently purchased its manufacturing facility from a former subsidiary, Centre Video Corporation, now a subsidiary of Tele-Communications Inc. C-COR formed a limited partnership, Decibel Associates, which qualified for a Pennsylvania Development Authority mortgage. (A Pennsylvania Authority mortgage produces interest that is tax free.)

C-COR Electronics designs and manufactures amplifiers and other electronics for cable television systems and engineers and builds those systems on a turnkey or bill-of-material basis.

Six Meter Earth Station/ The Best Compromise

AFTON, OKLAHOMA—U.S. Tower Company has announced a new six meter earth terminal. The 20 foot dish uses a steel framework and an aluminum skin.

Dan Weathers of U.S. Tower says, "The six meter dish is an optimum size, smaller than the 10 meter unit, yet capable of being used without 'Hot Dog' (expensive and sensitive) preamplifiers." The new dish has an antenna gain approximately 2.2 dB better than 4.5 meter dish and a beam width of .85°. U.S. Tower will offer the dish alone for $10K or a complete turnkey single channel earth station for $27K (F.O.B. Afton, Oklahoma).

Tony Bickel, who joined U.S. Tower about a year ago, has been responsible for the six meter dish project. He said he expects a reliable 48 dB S/N from the dish/preamp/receiver combinations they are using. Both Microdyne and Terracom receivers have been tried successfully with the new dish. Specially built preamplifiers are being supplied by Scientific Communications for the six meter project. U.S. Tower informs *C/Ed* the coffee pot is always on and you are welcome to drop in anytime to see its new system.

Ken Gunter To Head Technical Subcommittee Of NCTA Rewrite Committee

WASHINGTON, D.C.—Ken Gunter, executive vice president of UA-Columbia, San Angelo, Texas, has been named chairman of the Technical Subcommittee of the NCTA Communications Act Rewrite Committee.

In making the announcement, committee chairman Ralph Baruch said he was pleased that Gunter had agreed to contribute his considerable engineering expertise to the Committee. Gunter will head a subcommittee comprised of 10 to 12 of the cable industry's top technicians and engineers.

Gunter has been affiliated with cable television for nearly twenty years. Following his graduation from Rice University in 1958, he and his father built and operated the first cable system in San Angelo.

In 1961, the company merged with Florida Cablevision to form International Cablevision Corp., the nation's first all-cable public company. Gunter served as the company's technical director until 1969, when International merged with Columbia Cable Systems.

Gunter was Columbia's vice president for engineering until 1973, when the company acquired the cable television properties of United Artists Theaters and became UA-Columbia. Gunter has served as executive vice president of the company since 1973.

Gunter, who holds a BA in English, has been an avid electronics buff most of his life. He was a licensed amateur radio operator at 13, and holds amateur class license W52J. □

Cable TV Called Peril To Airp

Newspapers around the country have carried the following story by the Washington Star. *Even though the* Star *contacted many cable people directly involved in the NCTA interference group, the article, which contains misinformation and misquotes, guides the reader toward an erroneous conclusion. The FAA and OTP readily admit they were misquoted and were not pleased with the story.*

Parts of the Star *article are reprinted below with a point-by-point rebuttal by Cliff Shrock (in italics).*

Radiation leaks from cable television systems imperil instrument landing systems at many of the nation's airports and could cause a major disaster, the Federal Aviation Administration and Department of Defense have warned.

While the FAA may have said this, the fact remains that a cable system has never imperiled an instrument landing system nor is it possible due to two factors:

1) Cable power *is not high enough to interfere with an ILS, OMNI, or marker system.*

2) The FAA navigation systems are designed to operate correctly under extremely adverse interference conditions. It is important also to note one-half of the ILS (the glideslope or altitude portion) operates above 330 MHz, a band not now used or planned for use by CATV.

Worried because relatively minor leaks from CATV systems *can* interfere with airport instrument landing systems and communications between controllers and pilots, the FAA and DOD have asked that CATV operations on aviation frequencies be banned.

Again, nobody is sure that CATV can *interfere with aircraft and certainly not through minor leaks. However, all evidence, including a study by the* Office of Telecommunications Policy, *prove that interference to navigation systems is virtually impossible.*

But the Federal Communications Commission contines to allow the CATV companies to use the same frequencies which are used to guide pilots into a landing in foul weather.

Keep in mind the FAA is letting CATV companies use frequencies within a cable, *not in the air. Even under the worst break conditions, the power level is still thousands of times lower than levels used for airwave communications.*

A spokesman for the CATV industry denied that the danger is such that cable companies should be precluded from using aviation frequencies. What limited danger there is can be handled by changes in operating procedure, he said.

However, the situation is considered so serious in aviation circles that the International Civil Aviation Organization has asked all member nations to work for "the elimination and prevention of harmful interference to aeronautical . . . services, particularly navigational aids, arising from radiation from cable television distribution and analogous systems."

If the ICAO is working to eliminate and prevent all harmful interference from cable, particularly to navigation aids, then its goal is attained today. No case of interference to a navigation aid has ever been documented. The FAA criss-crosses the country to check navigation aids, and it has never found a problem due to cable. Furthermore, using FAA data on cable systems, with CATV power levels, interference can't happen in real situations. How can you eliminate and prevent that when it doesn't exist to begin with?

Television cables are shielded to keep radiation from escaping. However, if the cable is broken or a connection point designed to be attached to a television set is left open, radiation can escape.

This is true. But what escapes? A signal so weak (of low power) that it can be compared to the amount of signal an automobile ignition puts into the air. We are talking about minute *power levels.*

An accident totally severing a cable in the vicinity of an airport during bad weather when planes were conducting instrument landings could be a disaster, the FAA charged.

Yes, a disaster to the car that hits the telephone pole that knocks down the cable. Yes, a disaster to a person standing by the phone pole when it falls down. But no, not to an airliner, because there just isn't enough power *to cause any problems from a single leak.*

Let's cause an airline disaster . . . First we need 100 cars to break the cable in 100 places near the airport. Then we get the plane 300 feet above the breaks. The cable system would then have to match the frequency and phase lock to it. (If you don't understand that term, it is expensive, and hardly an accident.) Then the aircraft pilot would have to ignore the altimeter, the tower, the radar, the time of descent, the marker system, the other radios, and all of his instincts.

Ridiculous? You bet it is! But it has happened. Because of a burned out 20¢ indicator light in a jumbo jet over Florida, three crewmen tried to climb under the dashboard and replace the lamp while the jet fell into the swamp, killing most aboard. Did we ban indicator lights? . . . This is the kind of probabilities we're dealing with in CATV.

An FCC official raised the specter of a drunk driver smashing into a power pole, knocking it down and severing a major CATV cable. The radiation from the severed cable could disrupt communications with a jetliner coming in for an instrument landing, causing the plane to crash.

A lot of new cable is installed underground. But let's cause another disaster—New Year's Eve. We get out 1,000 drunken drivers, knock down all the telephone poles in the city . . . keep in mind we have to go back and connect power to all that broken cable since the power goes off when the pole comes down . . . then, maybe *. . . but it's a long shot.*

An industry official said that in this case the circumstances would have to be just right for it to cause a problem and that complaints from disconnected customers would alert the system so

ort Guidance

that the broadcasting could be stopped within a reasonable period of time.

Break a cable while 10,000 people are watching Kojak *and the telephone switchboard lights up like a Christmas tree. And one break isn't enough power to worry about.*

The FAA first raised the question of interference from the cable television industry in 1971, but the FCC went ahead and assigned the CATV industry the same frequencies as were used by air traffic control as well as other multi-use frequencies.

The FCC never assigned CATV the air frequencies: we were there already. The FCC simply let cable continue to use the frequencies because it understood the low power levels involved, and there were never any problems.

"At that time we foresaw what might be the problem if there were a catastrophic failure of a CATV cable." Charles Innes, chief of the FAA's spectrum management staff, said, "We didn't have any proof then," he continued, "so we asked the White House Office of Telecommunications Policy for a study.

"They did the study and it supported our fears," he said.

The OTP study hardly supports their fears. You don't have to be an engineer to read the concluding paragraph of the study. Just so there is no misunderstanding, here it is:

"The results showed that the victim aircraft would have to be close to the cable break and reasonably far from the VOR before the possibility *of interference existed." The report went on to say. "Indeed, significant interference can result when the TV signal is precisely offset in frequency by an amount peculiar to the modulation used with the navigation systems." (OTP report 75-75.)*

However, Frank Bias, president of Televue Systems in Pleasanton, California, and a spokesman for the National Cable Television Association, said, "We feel that the tests and documentation as accomplished by the Office of Telecommunications show that the possibility of interference with navigation by CATV is minimal.

And that is all the recorded work in the field," he continued.

True!

On April 1, 1976, pilots approaching Harrisburg, Pa., encountered such strong interference on their air traffic control channel that they immediately complained to the airport.

According to the FAA, an aircraft going up to investigate the problem began to experience interference at 500 feet and the intensity increased for an additional several thousand feet.

The cable industry knows there was interference to a voice channel. How much, we don't know. It is easy to play a tape with interference to a person on the street, and they will say, "I can't understand." A key point is that they probably wouldn't understand, (if the tower controller said it right to their face), "Wind 15 at 30, Barometer 29.40. Runway 29, expedite, traffic United 720."

The thing we still don't have is numbers to know how strong or weak the signals were. The FAA has not supplied numbers, and the cable industry was not called in to measure the situations. And once notified by the FAA, without *any formal or legal notice, the cable system* immediately *shut down.*

An open CATV connection at a customer's home was the source of the Harrisburg radiation.

The Harrisburg problem was not *because of one leak at a customer's house. In fact, a leak at a home is the lowest power point of a cable system. The radiation problem resulted from 1000's of leaks all over the system, accumulated over an 11-year period of time.*

After a meeting of representatives of the industry, aviation and other government agencies at the Office of Telecommunications Policy last month, the FAA and DOD asked that CATV operations on the aviation frequencies be banned until the industry could demonstrate that dangerous leakage could not occur. The stand was supported by the OTP and the Independent Radio Advisory Committee and forwarded to the FCC.

We have a problem here. During the OTP meeting, the FAA and DOD asked we be banned from all navigation frequencies *until we could prove that dangerous leakage could not occur. We* proved *that leakage, dangerous to aircraft navigation, could not occur. And on top of that, we also recommended frequencies different from those used in navigation be used on the cable.*

The problem is the FAA and DOD do not want proof *that cable cannot interfere. They just want cable off their hands.*

The FCC has announced it will consider changes in its policy toward CATV and will receive comments from interested parties until March 3, after which there will be 30 days allowed for replies. No date has been set for the commission to consider the question.

What a spot we have put the FCC in. There are engineers there and they know about power levels, radiation, interference, etc. The public reads articles like the Star *story. They are not engineers.*

We know the FAA, as all radio users suffer from interference. Pilots are concerned over any interference. The FAA and FCC receive thousands of interference complaints yearly.

Let's close with some facts. Cable TV is still an industry with little guys. Yet, they are pioneers in one effort, getting signals out of the air and into the cable where they don't cause a lot of problems. Another fact to consider is there has been only one documented case of cable interference to aircraft in 25 years. Yet, the FAA annually has thousands of cases of broadcast and other related interference.

If you take away from cable, you lose the one small industry that holds the promise of reducing the interference in the atmosphere. If cable loses parts of its bands, it will not be to protect the "lives of thousands from air disasters." We will only be scapegoats . . . poorly chosen scapegoats at that. □

Cable TV For the Deaf

By Cliff Schrock

Two and a half million people in the U.S. are deaf. Another estimated eleven million suffer from significant hearing loss. This silent minority form the single largest disability group in the nation.

Deafness has no respect as to race, wealth, color, or sex. There is no cure for profound deafness. Deafness can be inherited, but contrary to common belief, most children of deaf parents are able to hear and most deaf children have hearing parents. Deafness can also be caused by disease or accidents.

Deafness affects education, learning, employment, and more so, it causes a tremendous social gap. Lip reading is a relative rarity among the deaf. It is difficult to learn; so much in fact that it often displaces other valuable education. Lip reading is, at best, good only in general conversational English.

The Media and the Deaf

Broadcast media are virtually a loss for the deaf. Radio, of course, is out of the question. TV, contrary to common belief, does little more except in such instances as sign language or captioning. Even the lip reading deaf have little success with TV because of small picture size, lack of definition and poor facial positions.

Some notable exceptions to the general lack of material for the deaf have been the use of signed news on a variety of local TV stations. Also, ABC, funded independently by HEW, has been producing a special version of the Evening News broadcast on public television by 106 stations around the nation. WGBH of Boston was the originator of the captioned ABC news as well as other captioned and signed shows including *The French Chef, Charlie's Pad,* and *Making Things Work.* These shows have helped tremendously and should not be overlooked as making a significant contribution to the deaf. But the need for more entertainment programming is not being satisfied. The attention of the young and impatient cannot be held with only news and public service type programming.

The most extensive captioning tests have occurred

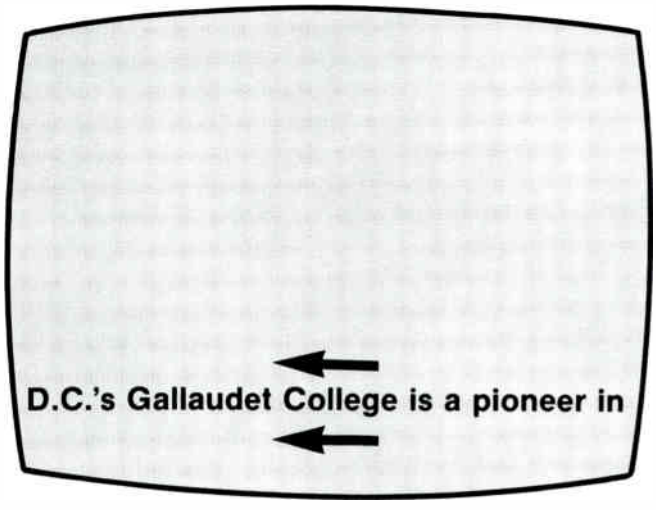


Figure 1: *Crawling captions move from right to left. They are easy to generate, but considered the most difficult to read.*

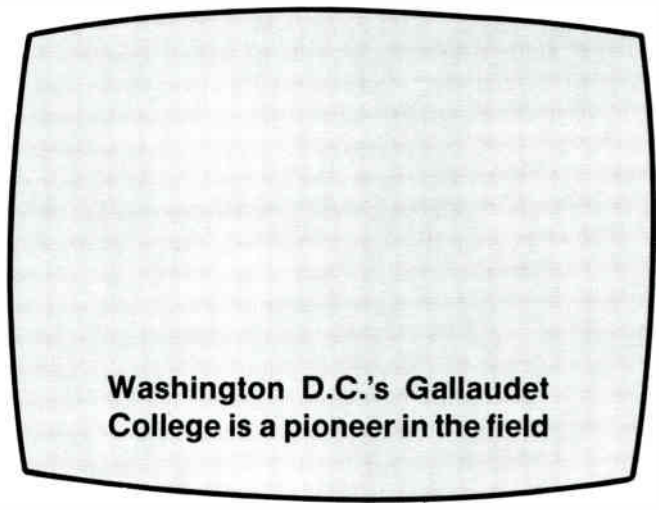


Figure 2: *Flash captions are two or three lines of a sentence that display with enough time to read. Then the whole caption changes.*

over the past four years and have been performed by the Public Broadcasting Service; the results have been gratifying. However, the public and the major networks have shown a tremendous amount of apathy and even opposition to the subject of reaching the deaf population. This was proven by the objections filed against the use of line/21 in the Vertical Interval/closed loop caption/. With a proper decoder, a deaf person could decode the information on line 21 and see captioned programs.

Throughout this entire episode, partially due to our own disinterest, cable has been bypassed. The choice medium, the wired city, the wired nation; with the words still echoing, nobody in cable is standing up to say that we are the ones to save the cause. With our preponderance of channels, the answer is simply to devote an entire channel in each community to the deaf.

There are many solutions to captioning and signed programs, many sources, many techniques. We in cable have shown ourselves to be a resourceful bunch when it comes to other forms of technical wizardry. Now it is our calling to help the deaf, the hard-of-hearing and maybe even the general audience we address.

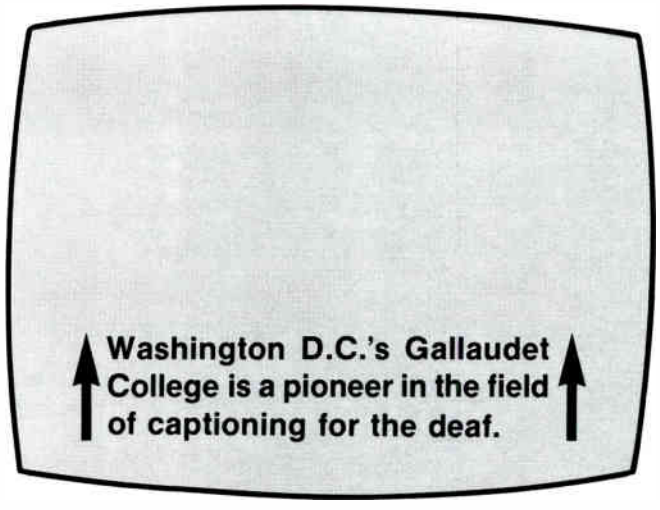


Figure 3: *Rolling captions can be a number of lines that move like reading a page.*

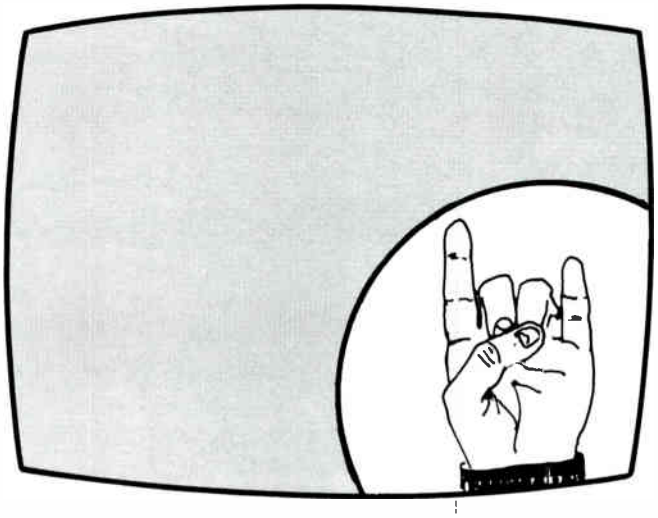


Figure 4: *One form of TV for the deaf uses a keyed insert in the picture of someone signing the program. This is usually expensive to do.*

Programming Options

There are two basic techniques used to add intelligence to programs. These are signing with the hands, usually added in an inserted corner of the TV screen; and captioning.

Signed programs have two problems. First, signing is regional and would not work well on a national basis. And second, signing is not as easy technically to produce on a national basis for distribution.

Captioning has been used in many forms; crawl from right to left, one or two line flashed captions and a rolling three line display are the most popular. Some restraints on captions are speed and the use of long words and sentences. Many of the deaf are poor readers. This, of course, could be expected to change if a massive captioning effort were to take place. But for the present, a limited vocabulary and short sentences produce the most satisfactory results.

Efforts to caption the entire program word for word has been proven possible by many, including PBS and Gallaudet College for the Deaf in Washington, D.C. Ideal programming would include a mix of perhaps three or more reading levels, beginning with simple sentence and word captions for the notice and word-for-word programming for adult and higher level readers.

Cable's Place in TV for the Deaf

Because of cable's reluctance to get involved and the public's misconception of the possibilities of cable, other cumbersome techniques are being studied. and used. The PBS system, while excellent, does have the restraint of requiring a decoder at each TV receiver. An answer for cable is to use one decoder at the headend and devote a channel to the deaf.

The truly unfortunate situation is that cable has had the capability or providing captioned programs for the past 10 years or more. A modified form of captioning done in real time with programs is technically possible and could be done by a battery of typists in step with the real programs. If this sounds expensive for an individual cable system, consider program captioning from one such center could be distributed by telephone line to all systems within time zone receiving.

What this means is the deaf could have access to a large amount of captioned program material. The cable systems would be able to provide a valuable service. And the deaf would learn to read better—become more a part of our society . . . were it not for one little hooker. Who decides what we caption? Which show do we choose in a given time slot. Which is better, *Kojak* or *McCloud?*

It is this reason, along with the logic of the networks that came to oppose the line 21 proposals, (and we must be fair, the cable industry's inability to move on their own), that is

stopping more than 13 million Americans from watching and "hearing" the same TV the rest of us enjoy.

It is technologically possible to caption large numbers of programs today and supply them via cable to many of the

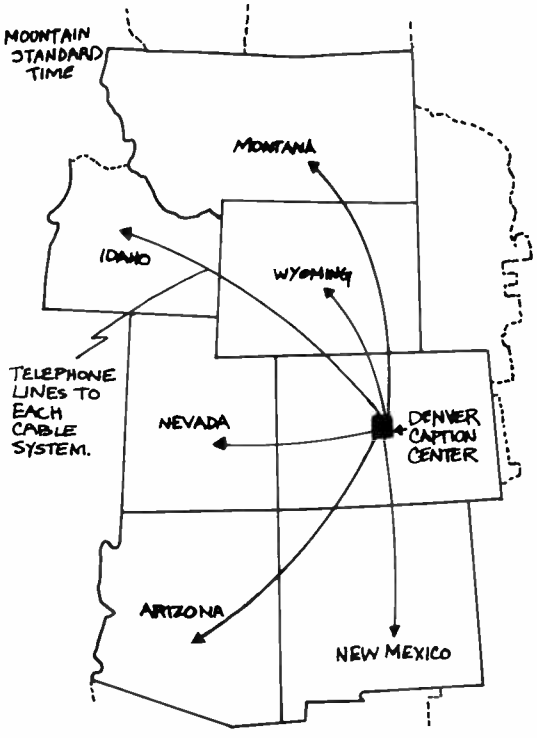


Figure 5: *Many cable systems receive programs off the air at the same time in a time zone. A centrally located captioning center can produce real time captioning distributed by phone lines to be added to the TV picture at the cable headend.*

deaf. Money is, and has been, made available through HEW to fund many expensive efforts and could certainly be funded for efforts that would reach so many. The networks could hardly complain (but they will) if some specialty group "cherry picked" an equitable mix of programming from the "Big Three" for captioning. They would be reaching an audience they now consider lost; an audience that *does* buy cars, soap, deodorant, food, beer and all the other products displayed in TV advertising.

The Action Plan

Cable for the Deaf is not a local cable company problem. To be cost effective, it can only be effected on a national scale. Our national organizations should probably form the nucleus of a group to establish national-level programming. Many sources of programming are presently available. These include captioned material as well as awareness programs for the general community. An organized national network should probably be established.

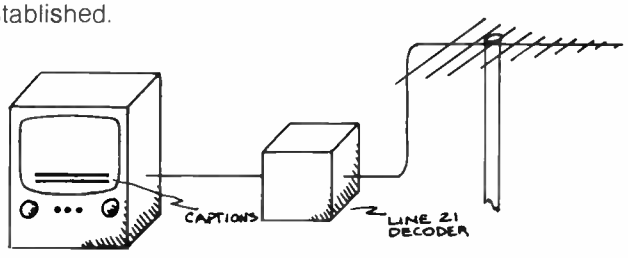


Figure 6: *The "line 21" decoder is connected between the antenna and the TV and adds the captioning information from line 21.*

The local operator would have to do little more than provide a space for the decoder and the channel modulator. He might also initially make available a VTR for a few hours a week of national level deaf awareness and educational shows. The bulk of his programming would be supplied off-air with captions arriving via phone line or line 21.

Some cable operators have reacted negatively when approached by a deaf community demanding studios, a channel, maintenance personnel, etc. Cable is a business, and this form of free channels is difficult to justify on a town-by-town basis. However, a high level of programming effort, where the cable operator would only supply the minimum, would be welcomed by most systems struggling to provide a maximum of community service on a small budget.

We must begin now or be passed by the broadcasters using more cumbersome systems to achieve something that is a natural for cable.

Allocate a Deaf Channel, Now! Find out how many deaf persons are in your community. Write your national associations. Join with the industry, and let's get this most beneficial service off the ground. □

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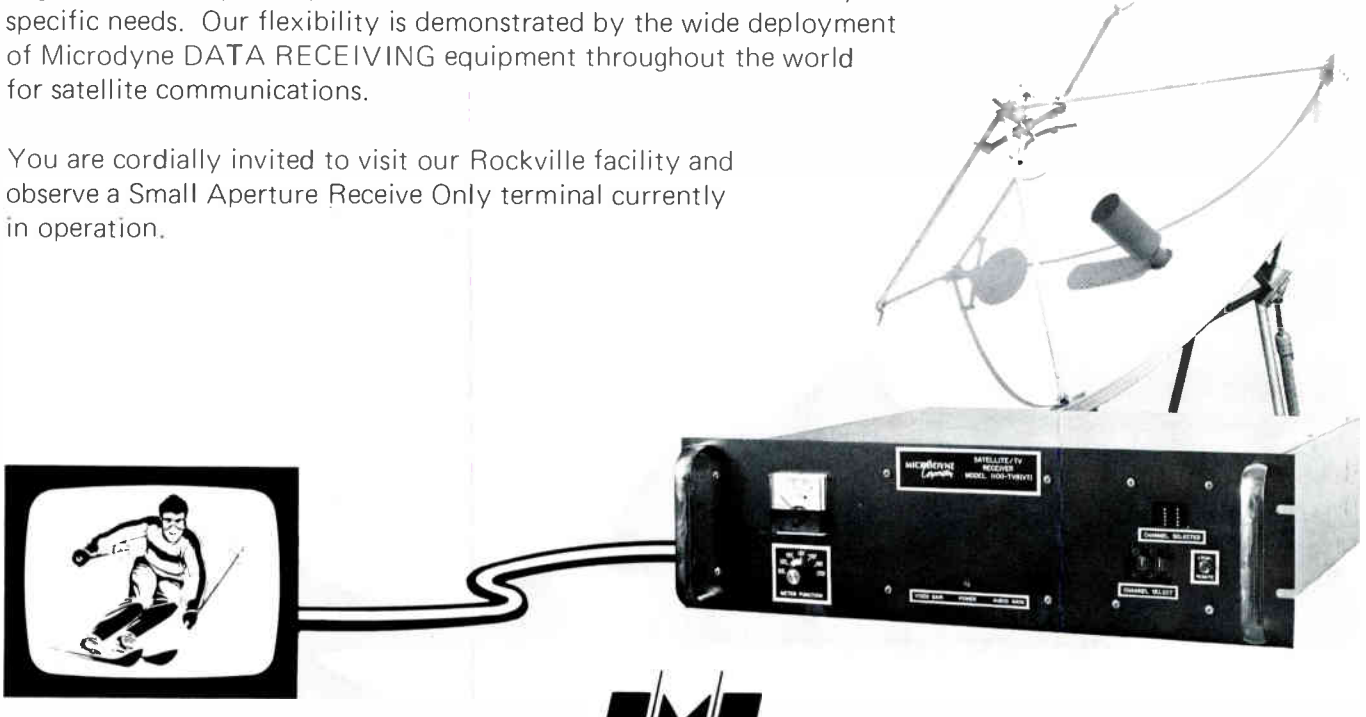

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The Promise of Visual Testing

By Cliff Schrock

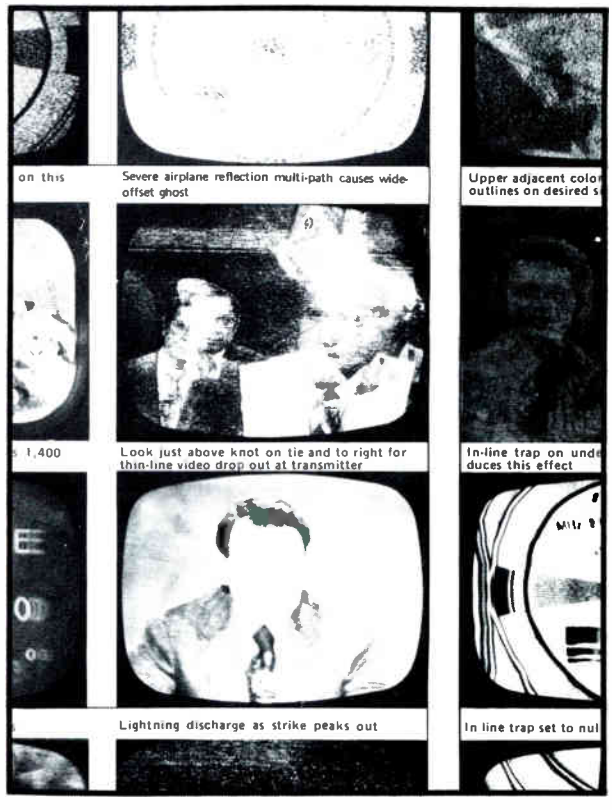
A few years ago when CATV was first confronted with the need to test its systems annually to satisfy the FCC, the testing costs were something many systems did not want to face. Some brave souls suggested that it might even be possible to test a system for compliance with the rules by looking at the TV screen. After all, as logic follows, the best indicator of a well functioning system is the quality of a TV picture.

Today, visual testing is no longer the main topic of discussion, as most cable system personnel have learned that compliance is neither as difficult nor as costly as originally expected. Yet, visual testing should not be left to die since it still has a very real place in cable TV as well as over-the-air TV. Visual testing has the potential of permitting rapid diagnosis of the problems without dragging out all the expensive test equipment. Visual testing can also permit the less technically inclined such as system managers, dispatchers, city council members and others to evaluate in a limited manner the picture quality.

Two kinds of visual testing were originally considered under the heading of Visual Testing. The first was the pure comparison of a picture book or chart to the TV screen. While a stationary photograph cannot entirely capture a moving distortion or noise (snow) impairment, carefully prepared photos and simple accompanying explanations have already shown amazing results. A number of individual and jointly sponsored attempts have been made in this area. Color slides have been used. Various tricks have been learned in the production of such devices. For instance, to produce a slide for a signal-to-noise ratio comparison to the TV screen, it is necessary to photograph a TV screen showing about a 4 dB worse S/N to obtain a photo that looks like a particular S/N. This effect is due to the fact that the eye integrates noise from a number of consecutive picture frames, and the photo captures only one frame. There are other tricks, too, Color TV masks many distortions rather than highlighting them. Some of the modern Japanese TVs with special picture tubes also tend to mask picture distortions.

The second form of visual testing uses simple test equipment to generate a known picture distortion; this known distortion is then compared to the signal being tested. The eye (the "calibrated eyeball" as some call it) is used to compare the cable or TV signal with the purposely distorted signal.

Another form of visual testing that is not being forgotten today is the testing of purposely distorted TV signals to determine what is an acceptable TV picture. This information is needed to formulate numbers used in standards. For instance, in 1972, when the FCC established co-channel and intermodulation distortion limits for cable systems, nobody knew what would produce a good or bad picture. The standards set then were unproven with visual testing; consequently the standards were dropped. Today, sponsored tests by the National Science Foundation are being performed to establish the numbers so that realistic standards can be established for cable and television systems. Current tests are exploring intermodulation, crossmodulation, signal-to-noise ratio and single frequency interference (like co-channel).



If you are interested in visual testing you might obtain one or both of the wall charts available through *CATJ* magazine. One is for headends and one is called an FCC tests wall chart. These charts show TV screen photos for all the standard distortions and various levels of each distortion are shown. Bob Cooper of *CATJ*, producer of the charts, said, "The little guys don't have anything like them . . . bigger systems have them for the technicians to aid in diagnosing problems." He went on to say, "We (*CATJ*) did not expect the charts to replace the uses of test equipment for proof of performance, but, within the uses intended, they are a very popular and useful item." To obtain visual testing charts from *CATJ*, send $7.50 for each Headend Wall Chart or FCC Tests Wall Chart to *CATJ*/Library, Suite 106, 4209 NW 23rd, Oklahoma City, Oklahoma 73107.□

Texscan & Theta-Com CATV

By Judith Baer

Any industry goes through periods of change. Individual companies are acquired, expanded, "bellied-up," cut back or withdrawn from specific activities. Others within the industry watch the changes, and the financial community reacts with observations that the industry is "soft," "viable," merely "static," "burgeoning," or any number of other "in" words. During 1976, a number of CATV-related forms changed structures dramatically. Most were on the supplier side of the business. The trade press reported on each change, mostly with rewritten press releases authored by the companies in question. With some changes there was preceding speculation; with others there were abrupt and quick announcements; but there was no further information about the "who," the "why," or the "what happened."

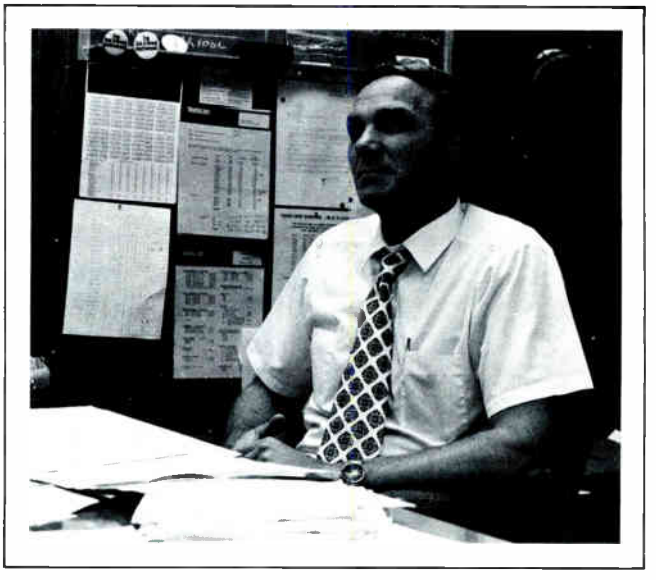
However, this is a report on one of the major changes in supplier management during 1976: Texscan Corporation's successful acquisition of the assets of the Theta-Com CATV Product Line, from Theta-Com of California, a wholely-owned subsidiary of Hughes Aircraft Company.

Not a Household Word

Texscan is not a "household" word in cable television circles. Top system management within MSO organizations

Biography: James A. Luksch

Executive vice president, Texscan Corporation. Co-founder with Pehlke in 1965. Formerly director of Engineering, Telonic Industries. Prior to that, microwave design engineer, RCA. BSEE, Magna Cum Laude from University of Buffalo. MSEE from University of Pennsylvania. Serves as chief operating officer of Texscan Corporation.



Biography: Carl N. Pehlke

President and chairman of Texscan Corporation. Co-founded company in 1965. Formerly general manager of Telonic Industries, maker of electronic test equipment. Pehlke is in his mid-forties, holds an engineering degree from Purdue and an MBA from the University of Chicago with additional training in the Air Force Nuclear Program.

A New Dynamic Duo

know little of the company. Texscan manufactures CATV test equipment and top management rarely decides such purchases. Since 1967, when it introduced the successful design of the Model 990 system analyzer, Texscan has been selling more to local system management, providing training programs for system technicians and taking part in industry engineering matters. They are well known by the "grass roots" of CATV.

Texscan was founded in 1965 by Carl Pehlke and Jim Luksch. They've worked together for 14 years and both came from Telonic Industries before starting their own business. Pehlke is the sales and marketing expert; Luksch is the engineer and administrator. Luksch is a member of NCTA's Engineering Advisory Committee and serves on the Editorial Advisory Board of *C/Ed*. They've successfully performed as partners while building up their business, becoming a public company and trading over-the-counter.

Texscan has manufactured a complete line of test equipment that has been marketed by Jerrold Electronics. "Jerrold-Texscan" appears on the front plate of a line that covers adapters, amplifiers, analyzers, attenuators, battery chargers, bridges, comparators, frequency counters, generators, oscilloscopes, RF detectors, signal level meters and sweep systems. But since Texscan's fiscal 1976 sales were nearly $4.5 million, it must also go into markets other than CATV test equipment.

Texscan's product line includes design and manufacture of high technology electronic test instruments and compoents used in communications systems (also other than CATV), FM radio, air traffic control, high fidelity stereo equipment, radar systems, television tuners and color as well black and white television. The company's principal products are sweep signal generators—coaxial, cavity, lump and tunable filters—display oscilloscopes, spectrum analyzers, oscillators and coaxial and microwave components.

It is active in an international market, and Carl Pehlke told us, "Europe continues to be a strong market for us." The company has two sales subsidiaries in Europe: Texscan Instruments Limited in England and Texscan GmbH in West Germany. It markets in Japan and Australia, and during 1976 it started programs to develop sales in South America.

In the past five years, Texscan's sales have averaged more than $4 million annually, and 1975 was a hair less than $5 million. The 1976 fiscal year ended on April 30, 1976, with Texscan's first reversal in yearly increases in sales. The slight reversal was caused by general business and economic climates and has nothing to do specifically with CATV or the company's position in any of its markets. Since the company is public, such financial information is available from its 10K reports filed with the Securities and Exchange Commission in Washington, D.C.

The Theta-Com Acquisition

The contract that closed the Texscan acquisition of Hughes' Theta-Com CATV product line is brief and to the point. Only 24 pages long, it has an addendum of inventory listings more than three inches thick. The acquisition fits nicely into Texscan's plans for growth. Theta-Com's reputable, recognized line of CATV distribution equipment was available. Theta-Com's engineering expertise was respected, sales were good and the personnel-in-place were extremely competent. Hughes is a very large company with diverse interests, and manaufacturing CATV distribution equipment just wasn't what it wanted to continue to do.

When Hughes made the decision to pull out, it was done quickly. There was little industry speculation, at least none that had become "public" knowledge. Pehlke and Luksch went to Hughes after developing their plan and presented a proposal to acquire the company. There were long negotiations; and, at one point, it looked like it wouldn't work out for Texscan. A number of other industry suppliers had also approached Hughes with offers. In the long run, Pehlke and Luksch won out. By purchasing Theta-Com CATV, Texscan has almost doubled the size of their company. Current sales backlog and potentials for 1977 are excellent.

A Visit to Home Base

Texscan's corporate headquarters in Indianapolis, Indiana, are located in the offices of a fair sized, efficiently laid out electronics manufacturing plant. "If you've seen one (electronics manufacturing plant), you've seen them all." There is nothing particularly exotic about high ceilings in the average production area of such a plant. Texscan's facility is open, clean, airy and gives a welcome feeling to a visitor. Its floor space is spartan and there is no "frill" to the facility. It appears every square foot of space is filled with activity that is producing something for the company. Pehlke and Luksch have simple offices that don't reflect the success they've achieved. They do represent the thoughtfulness that goes into their decisionmaking.

The production area was going through some major reorganization when we visited it, but the activity had not disrupted production and test areas. The reorganization and

refurbishing is necessary to accommodate expanding product lines that are being developed by the company.

The Dynamic Duo and the Team

Internally, management is a task performed by both partners. Pehlke and Luksch have known each other long enough to be aware of their complementary strengths and weaknesses. They do their homework before they jump into things, and, if there is a disagreement between them about pursuing a project, it is shelved for awhile until both feel comfortable with the decision to proceed. They don't allow "buckpassing" between each other. They believe in up-to-date management tools and have an extensive computer capability for in-house use. That computer system is being keyed into the Theta-Com plant in Phoenix, Arizona, so that Pehlke and Luksch can maintain a daily handle on that plant's sales and manufacturing activities. Luksch and Pehlke believe they have little to worry about due to the help of industry talent like Joe Romasco, who joined Texscan as vice president of the parent company and general manager of the Theta-Com CATV division in September; Duane Crist who remains the Theta-Com marketing manager; Robert Palle' acting as assistant general manager; Steve McGill, who transferred from Indianapolis to Phoenix as controller; Tom Swafford as manufacturing manager; and Bert Henscheid as Theta-Com CATV's chief engineer. They're developing an aggressive sales program and the transition of ownership went smoothly. They're looking forward to visiting Phoenix during the cold Indiana winters, but the majority of their time will be spent in Indianapolis.

THETA-COM CATV

DIVISION OF

TEXSCAN CORPORATION

Texscan's headquarters is located in a 22,000 square foot facility in Indianapolis where the company's line of electronic test instruments and components are manufactured.

Based on performance as well as education and professional background, Texscan's management has been characterized as "informed, experienced and aggressive." Based on their decisions in 1976, aggressive seems to be putting it mildly.□

NEW!

system profile

VANCOUVER CABLEVISION

It is called the largest cable system in the world. After all, with over 210,000 subscribers, it can claim the honor of being the largest. There are many tricks to handling a system of this size. Harry Pinkerton, public relations person for Premier Cablevision Ltd., which owns Vancouver Cablevision, shared some of them with us.

Vancouver Cablevision main office. Note that direct pickup from Seattle is accomplished with antennas on roof.

The Vancouver system serves three communities: Vancouver, Richmond and Burnaby from one headend located atop its main office building on Cambie Way in Vancouver. Pinkerton says that Seattle is picked up with antennas that point out to sea, picking up signals bounced off the channel islands.

Whatever the mechanism, its 1,008 miles of plant are fed from one basic headend. It is installing AML hub microwave to reduce some of the longer trunks.

Vancouver uses 10 permanent installers and up to ten subcontracted installers. A turnover of 20% per year (40,000 subs) requires careful scheduling and bookkeeping. Pinkerton notes Vancouver uses a minimum staff to handle operations and new installations. Attempting to relate the number of personnel to the number of subscribers, he cautioned, does not work, since towns differ in the transient population. For instance, in Victoria, one of its other systems, the transient rate is very low and the staff requirements are equally low.

Billing for the largest cable system is done with a computer. No radio dispatch is used for the installers and scheduling often takes two or three weeks from the first call to the installation.

A substantial portion (ten percent) of the system's profits are diverted into local origination. The studios are located in a separate building and

Control and dispatch center.

contain full color equipment. While it is technically a success, Premier questions whether L.O. is the right way for cable to go, since it serves mostly as a mouthpiece for minorities and political activists demanding time.

On the subject of pay-TV, Premier is now offering extra channels in the midband; but is not yet convinced that it should get into the converter business. In Canada, if you want extra TV, you can buy your own converter in a radio shop and use it for no extra charge on the system.

The Vancouver system is unique in many ways. It has charged $5.00 per month for 15 years without an increase. It is old, yet runs well. It has high turnover in subscribers; yet they are handled without a lot of personnel. It started wiring apartments in 1952 and now has the largest cable system in the world.

Specifications:

Canadian Wirevision Limited
5594 Cambie Street
Vancouver 15, B.C., Canada

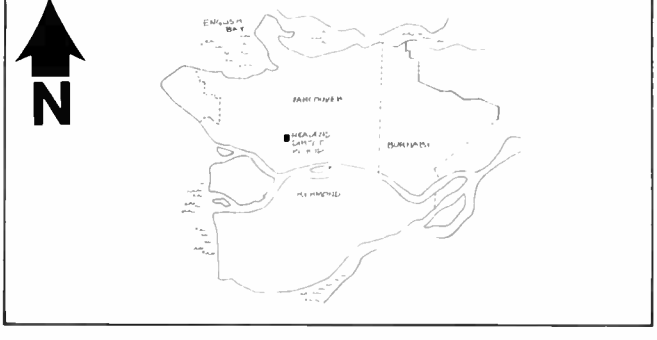
Cities Served: Vancouver, Richmond, Burnaby
Year Started: 1952
Owners: Premier Cablevision Limited

Plant: Miles Total: 1,008 (806 Aerial, 202 UG)
Trunk: 270
Subscribers, Household: 126,000
Subscribers, Multiple: 85,000

Fee's: Outlet: $5.00
2nd: $1.50
Installation: $25

Equipment: Amplifiers: CETC Series I & II
Unicom - Single & PP
Sylvania - GTE
Headend: Converting over to AML HUB System

Manpower: Installer: 10 1-Man Crews
10 Subcontractors
Construction and Maintenance: 90 Men
Bookkeeping: 20



Channel Card

CBU-FM Radio		Dial 2	Music
CBUT Vancouver	2	Dial 3	CBC
KOMO-TV Seattle	4	Dial 4	ABC
KING-TV Seattle	5	Dial 5	NBC
CHEK-TV Victoria	6	Dial 6	CTV/CBC
KIRO-TV Seattle	7	Dial 7	CBS
CKLG-FM Radio		Dial 8	Music
KCTS-TV Seattle	9	Dial 9	PBS
Time & Weather	10	Dial 10	Community Information
CHAN-TV Vancouver	8	Dial 11	CTV
CHQM-FM Radio		Dial 12	Music
KVOS-TV Bellingham	12	Dial 13	CBS

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James Palmer, C-COR Electronics

QUALITATIVE RECEPTION ANOMALIES - DETERMINATION, EVALUATION & SOLUTIONS:
Warren Braun, ComSonics, Inc.

RELIABILITY/PERFORMANCE ASPECTS OF CATV AMPLIFIER DESIGN:
Michael McCombs, TRW, Inc.

EARTH STATION RELIABILITY:
James Hart, Scientific-Atlanta

BACK-UP POWER POWER SYSTEMS:
Robert Sherwood, GTE Sylvania

ALUMINUM VERSUS GOLD:
Allen Wagstaff, Motorola

EUROPEAN CATV RELIABILITY:
Thomas Polis, Magnavox CATV Division

IMPROVING RELIABILITY OF CABLE FM:
Richard Old, CATEL

LONG TERM CONNECTOR RELIABILITY:
Paul Rhodes, Pyramid Industries

SCRAMBLER RELIABILITY:
Richard Hickman, Cox Cable

INTERFERENCE & LEAKAGE PROBLEMS:
Robert V. C. Dickinson, E-Com Corporation

CABLE HANDLING PROCEDURES:
Rex Porter, Times Wire

NOTE: Registration opens February 23 at 8:15 a.m. Programs will begin at 9:00 a.m. February 24, programming starts at 8:30 a.m.

SCTE

scte comments

Bob Bilodeau, President

On Choosing A New NCTA Engineering Head

The initial shock of losing the engineering capability of the NCTA has dissipated. In Delmer Ports' passing, we have all lost a good friend and strong supporter of the SCTE. The NCTA Board should now review its responsibility to provide technical services to its membership with dispatch through a well engineered plan.

Several years ago an austere move on the part of the NCTA Board reduced the engineering staff to one—Delmer Ports. At that time, Delmer saw the immediate need to expand and draw heavily upon the Engineering Advisory Committee (EAC) to provide adequate technical services to the membership and the industry at large. Within the EAC he established subcommittees for specific projects. This arrangement worked effectively and continues today with a few notable successes to its credit. One is the proposed Standards of Good Engineering Practice for measurements on cable TV systems. Another is the articulation of the industry's position on the SA/OTP/CATV interference matters.

I say it worked effectively because it worked as effectively as any volunteer body that is dependent upon the rise and fall of the fortunes and interests of its constituency. In this particular case, three quarters of the 24 or so members were active in the operations of the committees; they attended meetings on a regular basis and participated in the committee's output. This is probably a higher than average participation level for similar structures.

As a member of the EAC and a representative of the technical side of the industry, I recommend the following program to the Board:

1) Seek a career engineer to fill the position of department head with a history of good performance in technical management and know-how who would view this job as a growth opportunity. The right candidate should bring to the office a low profile which will promote broad industry support for needed programs.

2) Provide technical staff to assist the department head and provide continuity in his absence.

3) Seek names and recommendations from EAC in the selection process with emphasis on the broad field of engineering. There should be several qualified candidates in non-CATV jurisdictions.

4) Maintain an active and viable EAC to support the new technical force.

5) In Delmer's memory, rename the engineering award to the Ports Award.□

SCTE

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CABLE TELEVISION
ENGINEERS

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CableVision's
Financial Report

Editor: Michael Gumb

Just How Do You Get a Rate Increase?

As a general rule, each rate request has its particular, peculiar circumstances. Nevertheless, the overall approach usually depends on the franchise authority involved—local or state.

In theory, the best approach to a successful rate increase at the local level is to have the system manager develop a friendly relationship with the city council and for him and his employees to be active in community affairs. Under these favorable public circumstances, rate increases tend to be granted with a minimum of resistance from the council or the community.

In practice, the cable company usually has to make a detailed presentation pointing out how every imaginable cost—except cable rates—has risen since the franchise or last rate increase was granted. The real "trick" is to find a happy medium between baffling the council with statistics and putting them to sleep. During the formal presentation, the best approach appears to be to provide the council with a copy of the significant documents and refer to them on occasion.

A more extreme approach was used recently in Gladewater, Texas, (a Communications Properties system). When the city council denied the request to increase the basic rate from $5.95 to $7.95, CPI "pulled the plug" on the system. It took the city less than one day to approve the new rate. (A CPI official said the decision to walk away was made easier by the fact Gladewater is such a small system—800 subs with an investment of $300,000.)

A more realistic solution would be to delete the local rate making function—since it is no longer required by the FCC—as a part of the franchise changes required by the March, 1977 deadlines. If not deleted altogether, the local rate-making function could be given a passive voice. Thus cable companies could get rate increases the easy way—by notifying the subscribers to pay more—until they price the service out of the market. (FR 10/1/76 Issue)

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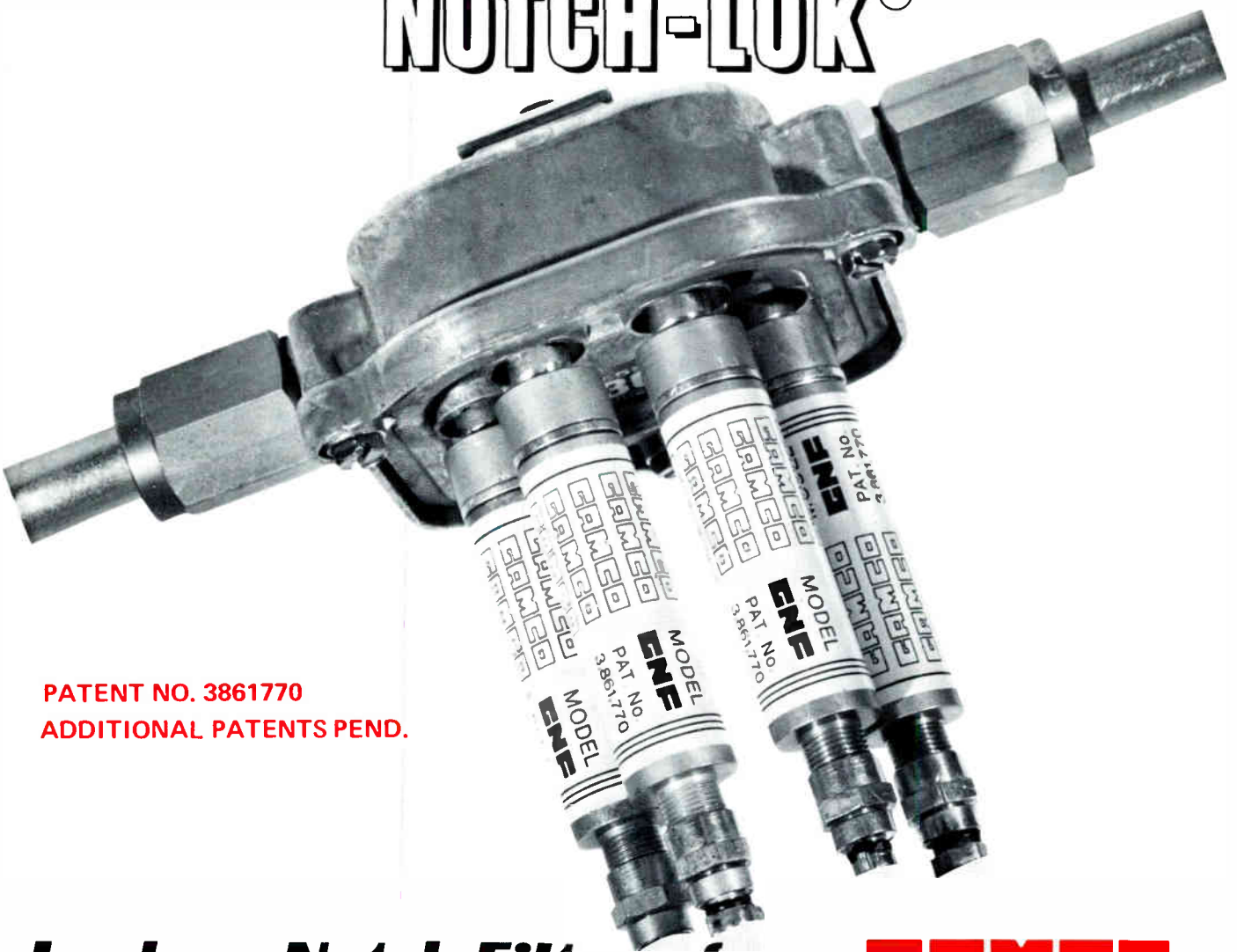

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Ma Bell Moves Ahead With Fiber Optics

Editor's Note: At last December's Western Cable Television Show in Disneyland, Teleprompter's president Bill Bresnan gave a remarkable address about fiber optics and the history of the Bell system. He outlined past Bell efforts to gain monopoly positions in the communications field, and, with remarkable accuracy, predicted future AT&T fiber optic involvement. Now, barely two months after Bresnan's address, AT&T's chairman John deButts has announced "the world's first lightwave communications system" which will be unveiled later this year in Chicago. The following is an account of Ma Bell's intentions.

The world's first lightwave communications system to provide a wide range of telecommunications services to customers will be evaluated in Chicago this year.

The system evaluation will begin by mid-year under the direction of Bell Laboratories and AT&T, in cooperation with Illinois Bell and Western Electric.

Bell Labs work on lightwave communications, which began more than 15 years ago with the invention of the laser, has involved a broad effort in a number of engineering and scientific disciplines. During 1976, a complete experimental lightwave system was tested successfully at the joint Bell Labs/Western Electric facility in Atlanta. This system experiment, though it represents only a part of Bell Labs' work in lightwave communications, was an important step in evaluating the potential of the new technology for Bell System use. And the experiment brought together the results of many pioneering efforts in lightwave communications technology.

Bell Labs-designed lightwave communications components such as lasers and light emitting diodes (LEDs), signal detection devices, and glass fiber lightguides will be used in the system evaluation. A lightguide cable will carry voice, data and video signals for about a half mile between the Brunswick building—a modern office building in Chicago's Loop—and an Illinois Bell central office (Franklin); then, between the Franklin office and a second central office (Wabash) about a mile away, the lightguide cable will carry video signals, as well as other voice and data signals normally carried between those two offices. The video signals in Chicago will originate from Bell System Picturephone® Meeting Service rooms at a customer installation in the Brunswick building

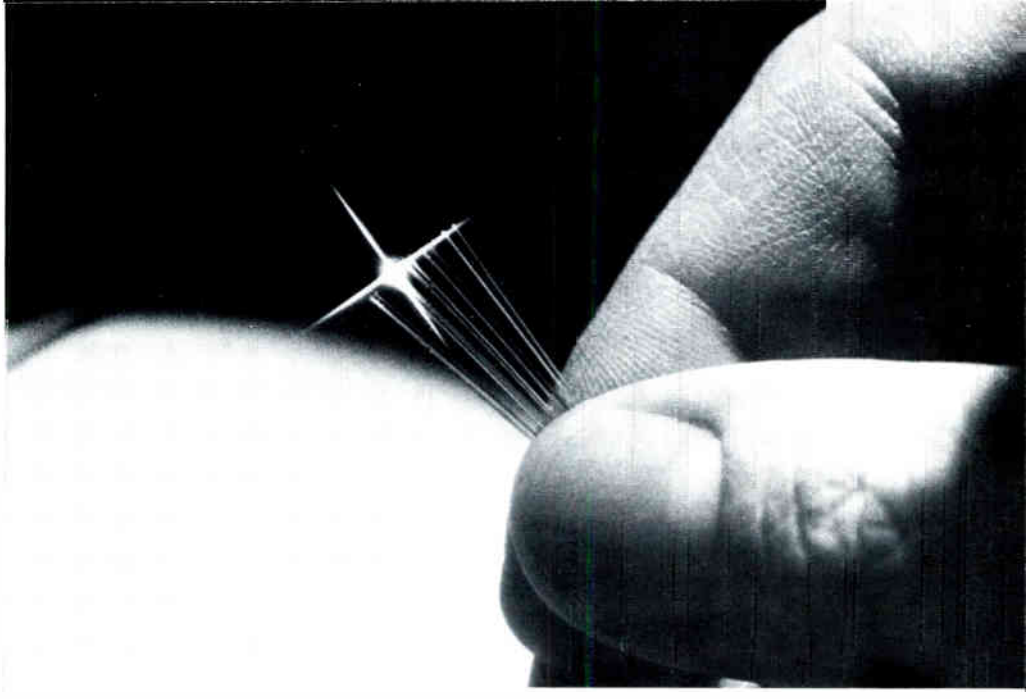
and at Illinois Bell's headquarters (see illustration).

Light sources used in Chicago will include gallium-aluminum-Arsenide lasers developed and fabricated by Bell Labs. These lasers send infrared light signals at a wavelength of 0.82 micron into fiber lightguides. Average power output into the fiber is about one-half milliwatt (thousandth of a watt). Accelerated aging tests conducted at Bell Labs suggest that this type of laser could operate continuously for more than 100,000 hours at room temperatures.

Each laser will be part of a transmitter module that includes a modulator circuit pulsing the laser at 44.7 MHz—providing 44.7 megabits of digital, or pulsed, information per second. The module also includes an electronic circuit that holds laser power constant over temperature variations encountered in telephone company use.

The fibers will be made by Western Electric. Lightguides are coated to protect against humidity, abrasion and losses due to bending, and are combined into flat ribbons, each containing 12 fibers. Two ribbons will be enclosed in the cable that cushions and protects individual fibers against damage in field use, and helps minimize transmission losses. Average signal loss in the encabled fibers is expected to be six decibels (dB per kilometer (or ten dB/mile). This indicates that laser light pulses could be transmitted for seven kilometers, or about four miles, or more before requiring regeneration. In many cases—such as the Chicago installation—adjacent telephone switching centers in cities are less than four miles apart, so lightwave systems might not require any amplifiers in manholes to boost signals along a typical route.

A silicon "avalanche" photo-detector developed and built by Bell Labs converts the light pulses to electrical signals at the receiving end of each lightguide. The photodetector is part of a receiver module that contains circuitry needed to process signals for transmission through the nation-wide network.□



Upper right: Twenty-four hair-thin lightguides—arranged in two ribbons enclosed in a specially-designed cable—will be used to carry Bell System customers' voice, video and data traffic under the streets of Chicago by mid-1977. The lightguides are part of the world's first lightwave communications system that provides a wide range of telecommunications services to customers.

Lower right: Western Electric technician Mike Hyle monitors a pilot production operation at the Atlanta Works, where precisely fabricated glass rods called "preforms" are softened and pulled into hair-thin fiber lightguides. A cable containing twenty-four lightguides will be used in the Bell System's lightwave communications installation in Chicago

Opposite Page: Bell Labs engineer Art Warner places a lightwave communications receiver module into a laboratory equipment rack. Modules like this—containing tiny photo-detector devices—will be used in the Chicago lightwave installation to convert light pulses to electrical signals compatible with those transmitted within the nationwide Bell System network.

critique/letters

Gentlemen:

As an active member of the amateur radio fraternity, as well as the CATV industry, I deeply resent the implications of your December 1976 cover. I specifically refer to the spectrum 220-225 MHz and the reference to Citizens Radio Service Class E.

The object fact is this spectrum is assigned to governmental radio positioning and *amateur* radio (ham) and not one Hertz of this area is allowed for citizens radio service. Not only is this inaccurate, it is misleading. I hope you will be sufficiently motivated to correct this condition.

Ham radio has provided the exploration and development of many VHF/UHF processes and techniques that are part and parcel of the CATV community. To ignore their portion of spectrum is unfortunate. While I am sure no overt act is intended here, I do feel a clarification is in order.

Ted E. Hartson, Director of Regional Engineering, ATC, Battle Creek, Michigan.

Dear Mr. Schrock:

I am compelled to comment on your comment concerning the letter from the ARRL person in your November, 1976 issue. You touched on a sensitive nerve by arbitrarily assigning what is essentially a "ham" band to CB—which really torques the ham banders. That's hardly the point, however.

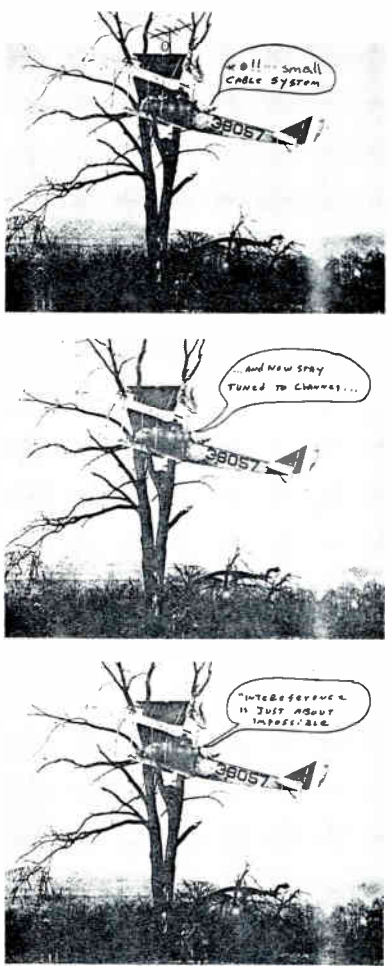
The major flap between hams and CBers is that the hams take an exam to get their licenses, and the CBers get their licenses by sending the FCC four bucks, if they bother at all, and generally do not use the call letters assigned them on the air. While ham banders are certainly not without sin, the general attitude of the CBer to complaints of TVI are 1) I am running legally (implying that the unit has not been adjusted by an unauthorized person and that no power amplifier is being used); 2) I have a license and I can do what I wish; and 3) since the CB bands and TV bands are of different frequencies, the CB could not possibly be generating the interference, and therefore there must be something wrong with the TV set.

Not content with the four-watt units they have licensed, or the frequencies assigned, many use "slider boxes" to get into the "high frequencies," power amplifiers which generate batches of harmonics, power microphones to overmodulate with. To this, the FCC does very little—sometimes they answer the phone with a recording, or not at all. Investigations and arrests are minimal, and fines slight.

If you don't believe all this is happening, just wait 'til one of them parks at your headend and rats up your chanenls 2 and 5 (mainly), 9, and 13 (somewhat) and others.

Unfortunately, all this gives hams a bad name since most of the general public doesn't know the difference. The amateur radio exams pertain as much to the actual operation of radios as learning about bones and muscles and blood vessels (all required topics) have to do with a barber's license, but at least screens out the less serious. Hams keep tabs of each other better, too, although that isn't perfect, either.

Aviation in itself is not inherently dangerous. But to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity or neglect.



The pity is that the ARRL is directing much of its effort at tackling CBers, when they should be pinging on congressmen to force the FCC to enforce the existing rules, and calling attention of the community to ANY abuse of the spectrum (including ham radios, noisy motors, cable leakage (!), as well as CBers, to indicate their knowledge and concern), and generally getting the real electronic experimenters in the CB ranks to upgrade their licenses to amateur radio. Truth is, however, most hams don't want any more people on the bands—which will eventually lead to their demise at worst, and will make them a small minority voice at best.

Needless to say, I couldn't care less about any of the CBers problems if they kept them to themselves. When I have to watch television through their herring-bones, hear them on my stereo set, or get calls from them to help settle their arguments (which is several times a week), I'm unimpressed. Incidently, I have a First Phone, a Ham License, and a CB License—and I got them in that order.

If you like to get letters, you might also try mentioning abortions, hand-guns, or gay lib.

Jim Rieger, Engineer, Kitchen Productions.

Dear Mrs. Baer:

First I want to congratulate you on the November issue on spectrum analyzers, exceptionally well done together with its own Buyer's Guide.

I have been thinking that after the spectrum analyzer issue, it would be nice to have an amplifier test issue which would involve sweep generators, etc., and also our equipment, in particular our equipment. I am enclosing two short write-ups on our products; they are admittedly written very "salesy" and would have to be reworked. Please let me know what you think about it and if the material can be used.

W. Rheinfelder, President, Alpha Engineering Corporation, Phoenix, Arizona.

Editors Note: Just want to thank you for the manuscript you enclosed with your letter and advise you that we are planning one of our famous feature issues on amplifiers in the April NCTA show issue. It will include amplifier specifications, testing techniques, and a number of short articles on current state of the art in amplifier design. □

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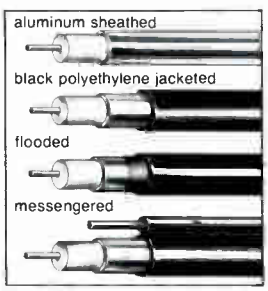

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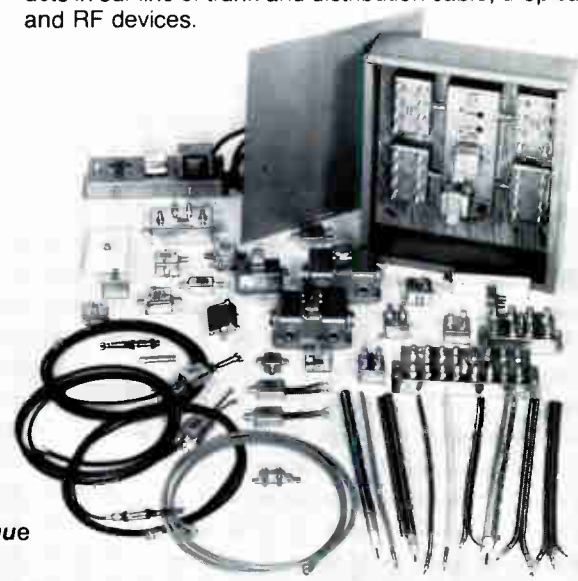

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BOOKS & LITERATURE

Handling and Installing Cable

Times Wire and Cable Company is now offering *Procedures for Handling and Installing Aluminum Sheathed Coaxial Cable for CATV Application.* The booklet is designed to aid the technician in handling aluminum sheathed cable so as to maximize life and minimize fractures and cracks upon installation. It contains recommendations on drip loop size and bending radius, along with hints on lashing and installing connectors. The book is available from Times Wire and Cable, 358 Hall Avenue, Wallingford, Connecticut 06492.

1977 Catalog

B&K Precision has announced its 1977 catalog of test instruments. Long known among the TV repair community for a variety of cost effective, quality instruments, their new catalog contains oscilloscopes, multimeters, probes, frequency counters and TV alignment gear. This is a nice wish book for any cable technician. For more information, contact B&K Precision, 6460 West Cortland, Chicago, Illinois 60635.

Measuring with the Spectrum Analyzer

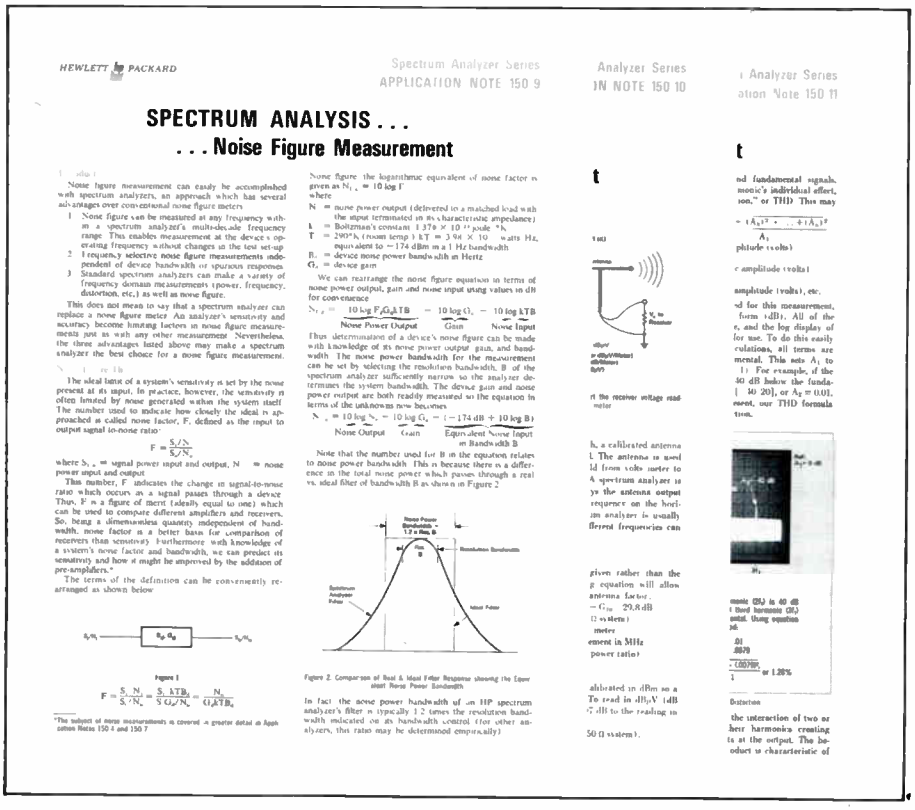
Hewlett-Packard has recently made available new brief application notes on noise figure measurements, field strength measurements and distortion measurements, all accomplished with the spectrum analyzer.

The Noise Figure Note (AN150-9) reviews the theory and then presents the measurement procedure along with an example. The spectrum analyzer technique offers the capability of making frequency-selective noise figure measurements. A calibrated noise source is not needed with this method.

Hewlett-packard's Field Strength Measurement Note (AN150-10) discusses antenna calibration factors enabling the operator to transform the results obtained with the spectrum analyzer to field strength values.

The Distortion Measurement Note (AN150-11) describes the types of distortion normally encountered (harmonic and intermodulation) and explains the role of "intercept point" determination in the evaluation of intermodulation distortion products.

These three subjects should be of interest to every cable operator. To receive the application notes, contact Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94304. □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APPLICATION NOTE 150 9

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. . . Noise Figure Measurement

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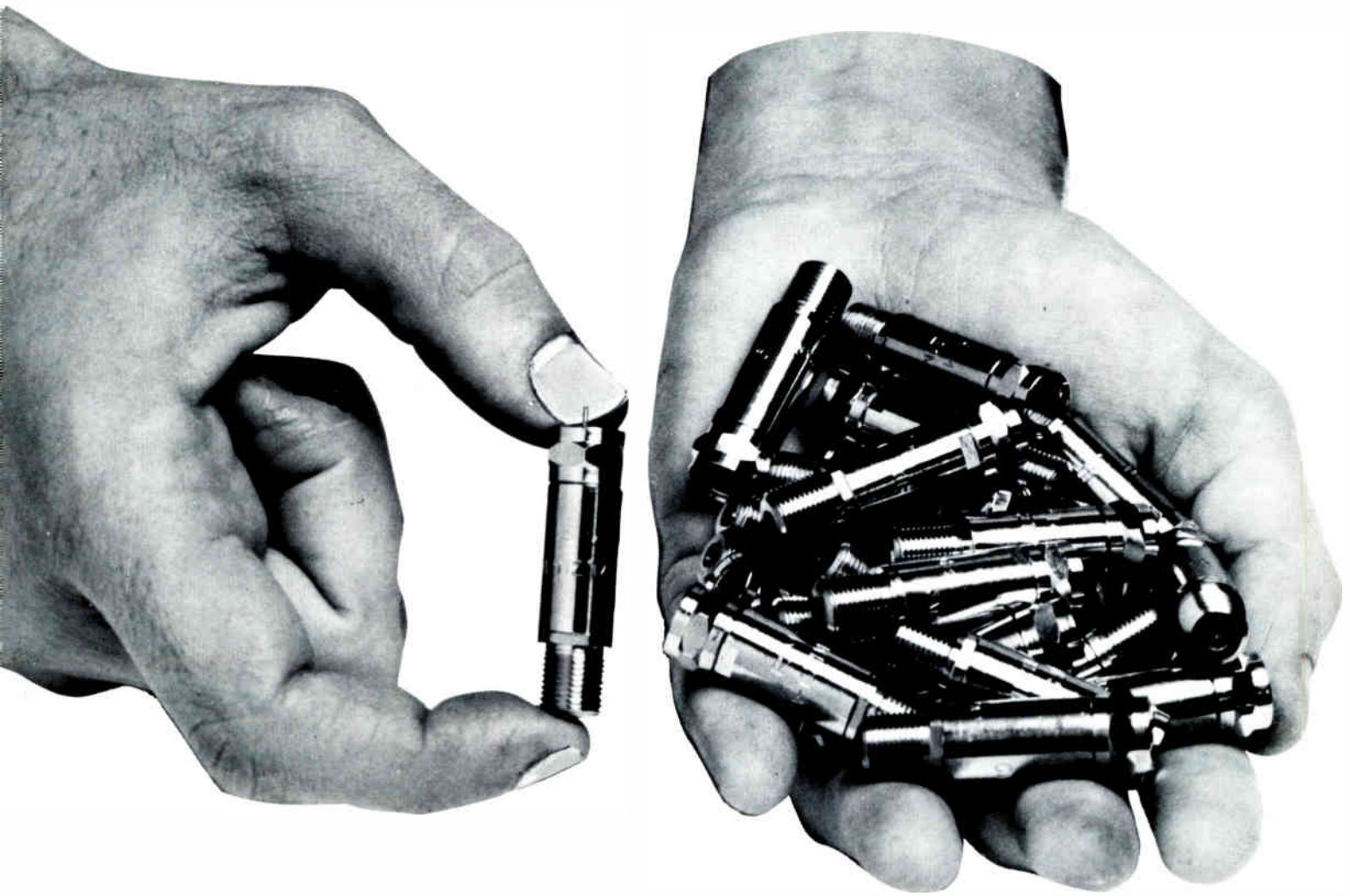

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