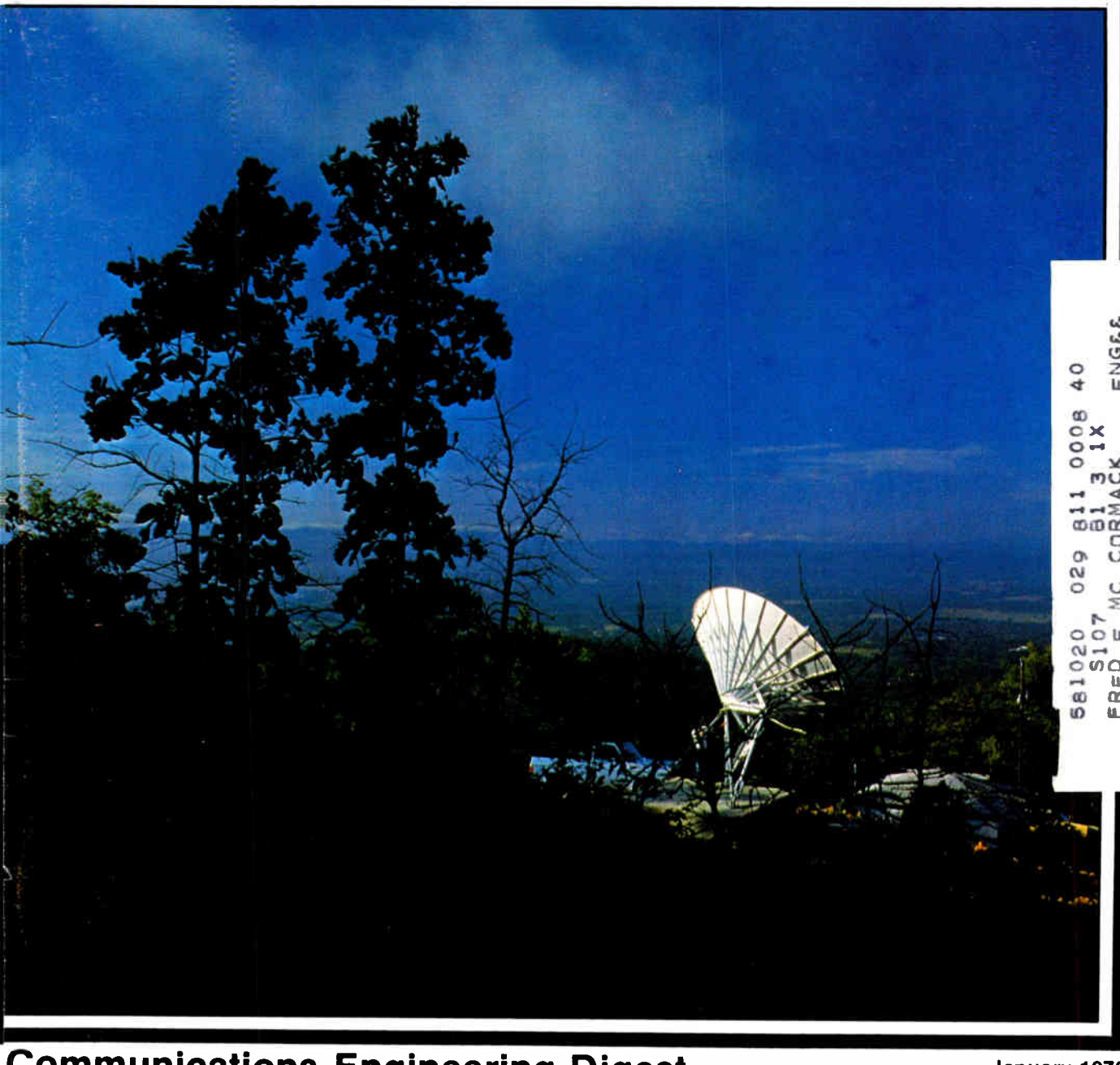
C-ED

Factors Influencing Earth Stations
LNA Trade-offs in Earth Stations
FCC Earth Station Applications



Communications-Engineering Digest
Reporting the Technologies of Broadband Communications

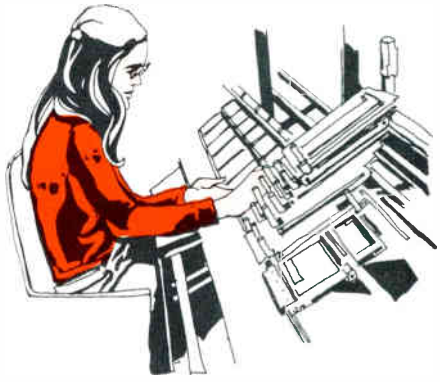
January 1978
Volume 4, No. 1

The Oak one-two punch... a knockout for profits!

This is the Trimline II— a champion 35-channel AFC converter.

It's a high quality unit with the toughness and versatility to meet the varying operational parameters of cable systems. It has wide dynamic range and high selectivity to defend against such opponents as cross-modulation and adjacent-channel interference—even at high input levels.

We build them in our plants. All Oak CATV products are made in company-owned facilities. We have a commitment to our customers and we back it up with prompt delivery and rapid service turnaround.



Great seats for the fans. You can offer your fans the convenience of set-top or remote "Jewel Case" operation. In either event, a built-in Automatic Frequency Control eliminates the fine tuning shuffle. The Trimline II is also available with an optional self-contained descrambler for premium programming with unbeatable security.

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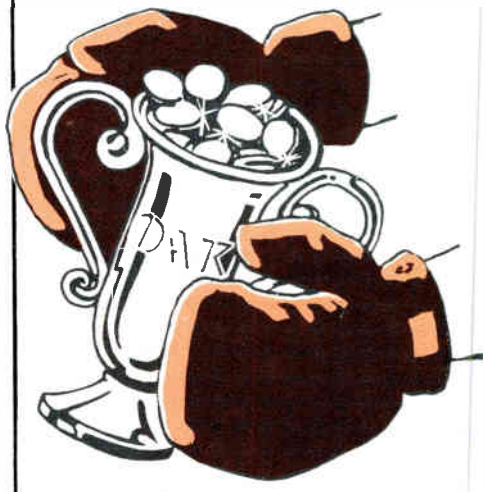
The initial cost of a converter is only round one. Before you score the totals, ask yourself where and how the product is made, and by whom. Remember, reliability counts. The reliability of the Oak product stems from our control over the total production process.

The winner...Oak!



Compare Oak converters with all other contenders...but remember that there's more to the comparison than just the "black box." Market leadership and technological expertise are your assurance that the Oak Trimline II and Econobloc converters will go the distance. Oak converters are winners and your profit-wise choice.

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TELEPHONE: 815-459-5000 TWX: 910-634-3353

C-ED News at a Glance

WASHINGTON, D.C.—**In response to** the **FCC's inquiry on** the **use of sub-carrier frequencies in aural baseband of television transmitters, NCTA recommends** a **"flexible approach**—an approach that would establish the minimum of technical standards to prevent signal degradation or interference to other signals and a permissive policy that would permit any reasonable use . . . that could be accomodated by the technical standards."

ST. PAUL, MN—**New state rules concerning communities franchising cable companies** became effective December 5, 1977. This alternate procedure **shortens the** length of **time needed to complete the franchising process**. The new process may take a minimum of three months, whereas the standard procedure may take a minimum of five and one-half months. See *C-ED* page 19.

WASHINGTON, D.C.—The **delayed round-table discussion on** the **state's role in protecting CATV** finally **convened. Robert Schmidt, president** of the **NCTA**, was absent but had the following remarks read: In discussing why cable TV should not be subjected to utility type regulation, Schmidt **said that cable was "not a necessity" and did not "supply monopoly services."** He called the demand for cable service "price sensitive." See *C-ED* page 19.

WASHINGTON, D.C.—The new **Copyright Royalty Tribunal heard testimony** on December 7 **from representatives of the cable industry. Cable** was included under the omnibus revision of the Copyright Law in 1976 and **will pay copyright fees on a sliding scale based on the gross revenues of the individual cable system.** See *C-ED* page 18.

WASHINGTON, D.C.—Although the FCC has not set down a firm quarterly schedule for the first part of 1978, Chairman **Charles D. Ferris may return to** the practice of **establishing detailed time tables for commission proceedings.**

While the exact schedule of activities remains uncertain, **Jerry Jacobs** of the FCC Cable Television Bureau, **attests that a number of topics are "ripe for consideration"** and will receive attention from the FCC during the first quarter of 1978. See *C-ED* page 18.

FCC Chairman Charles D. Ferris

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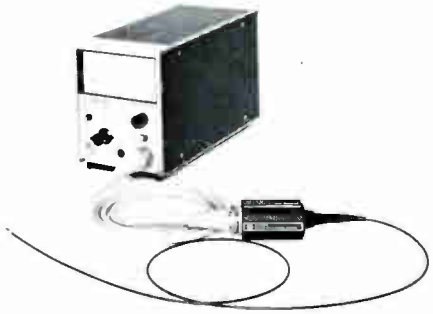

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FEATURES

DEPARTMENTS

OPINION

Cover: Our cover photo, provided courtesy of John Feight, Scientific-Atlanta, is of Scientific-Atlanta's first five-meter earth station located on Coldwater Mountain in Anniston, Alabama.

Editor's Letter

The year 1978 promises significant improvements and surprises in the cable industry and *C-ED* will try to provide the most complete coverage possible. For starter's, beginning on page 20 is a *C-ED* exclusive by Robert Luff, vp of engineering for NCTA, on the FCC's plan to speed up earth station applications. This article comes complete with a handy tear-out sheet to help you get through the cumbersome earth station application process.

Complementing this feature article are two other features: "LNA Trade-offs in TVRO Earth Stations" and "Factors Influencing Earth Station Frequency Coordination" on pages 14 and 29, respectively. Since earth stations are a topic foremost in everyone's minds, we think you'll find these features informative and helpful.

In addition to these timely stories, *C-ED* rounds-out its January issue with a profile of Warner Cable's emergency alert system in Ft. Walton Beach, Florida. You'll find it on page 32.

In the next month's issue, *C-ED* will bring you everything you always wanted to know about addressable taps and how they work. And that's just for openers.

From all of us at Titsch Publishing we wish you all a healthy and profitable New Year.

Paul A. FitzPatrick

What *is* a Small System?

Groups and individuals alike wrestle with the concept of "small system" and the appropriateness of "small system" regulation. They would universally agree that a system of less than 500-1,000 subscribers is a "small system." The U.S. median is closer to 2,500 subscribers. This subject matter has surfaced on occasion by way of Petition for Rule Making and Inquiry Notices at the FCC.

What is a small system technically? Some would agree that a "small system" has few amplifiers or few in cascade. Perhaps the "median" amplifier cascade is 20 and "small" is under 10? "Large" might be from 40 amplifiers to whatever in cascade. Those who have experienced amplifier cascade maintenance appreciate that a 10 amplifier cascade of "anybody's gear" will operate with a good reliability and little maintenance. It is my personal experience that amplifier cascades of 10 or less require very little attention.

Accepting the above assumptions, one could conclude that "small systems" are incorporated into large system networks (and serve large population bases). This configuration is the result of the social habits of people, which tend to group them together into "bunches" for purposes of common defense, self-assurance, borrowing each others tools, preserving the flora and fauna or whatever. If the population (known as dwelling units in cable TV terminology) was distributed evenly in small geo-political units, they could be serviced, for cable TV purposes, by a myriad of "small," less than 10 amplifier cascade, CATV systems. In real life, systems are configured into networks consistent with the uneven distribution of the population and vary accordingly.

For regulatory purposes, my proposal is that CATV systems be treated incrementally by part of cascade length. All systems would be reclassified by isolating cascades into size categories and applying regulation proportionately. In my plan, a system with one cascade of 40 amplifiers or more, regardless of subscriber count, would be classified as a "large" system. It would indeed have distortion products and maintenance requirements consistent with 40 amplifier cascades in larger networks of mixed amplifier cascades. Forty amplifier cascades, regardless of location, would be subject to certain minimum technical standards. The rationale is that *all* such long cascades have like performance standards and degradation via lack of level control and maintenance. A "small system" (even if within a large network) with a 10 amplifier cascade or less, would indeed be a "small system, require "small" maintenance, have "small" distortion products and "small" probability of producing poor pictures. All systems would thus be subject to tiers of regulation consistent with the cascade length principle - ranging from exemption to full compliance.

The features of this proposal are:

- All systems would have uniform cascade requirements. This would eliminate the second class status of a subscriber connected to a long cascade in a small subscriber count system.
- In the large subscriber base system, maintenance efforts would be concentrated on the longer cascades, which by regulatory definition would be large systems. This system's short cascades would require no more, no less compliance than a short cascade in a small subscriber base system. The net result is parity of cascade performance vs. length.
- Further technical definitions of "small system" would be moot. Exempting "small systems" means exempting all cascades of "small system" length (10 or less) - regardless of where they occurred.
- The exemption or relaxation for short cascades provides a motivation that would influence system designers and owners to qualify for compliance relief by meeting the desirable objective of 10 amplifiers or less. Eventually in large metropolitan systems, long cascades would decrease or perhaps disappear. Even the need to regulate decreases. Exemption status would become commonplace, leaving some of us free to do more fishing, or build more small systems (10 amplifiers or less). Of course this is all in the public interest.

There are those who stubbornly accept the challenge of the long cascade, who strive to made it work as well as a short one, and who beg the day when the FCC examiner asks to see meticulously kept records. And there are still those who say, what is an amplifier cascade?

Bob Bilodeau, President

Ad Index

Maryland and Pennsylvania CATV Associations Host Seminar with SCTE

HARRISBURG, PA—The Maryland and Pennsylvania Cable Television Associations, in cooperation with the SCTE, conducted a technical seminar in November on "Improving System Reliability With Stand-By Power."

Presentations were made by Check Turner, Control Technology, Inc., and Jim Carroll, manufacturer's agent for C & D Batteries. This highly successful session included topics on Stand-By Power Equipment and Concepts and Batteries for CATV Stand-By.

SCTE Developing Cable Safety Program

WASHINGTON, D.C.—In January 1978, SCTE began distributing a complete series on safety and OSHA requirements, designed specifically for use by CATV operators, managers, engineers, technicians and administrative personnel. SCTE will offer the series on a subscription basis to individuals or companies. SCTE sustaining members will receive a discount on the subscription price, as will SCTE members.

The program includes teaching and training aids, problem-solving tests and quiz formats. Brochures and booklets from the Occupational Safety and Health Administration and a series of posters for use as reminders on points of safety are included.

The entire program is being developed under the direction of a degreed instructor and is based on input from a number of sources, including CATV operating companies. A complete review of NCTA's manual on CATV Safety is being done as part of this effort and the text released to SCTE safety subscribers will be reviewed by OSHA prior to publication.

Service for Deaf and Blind

WASHINGTON, D.C.—SCTE member Cliff Schrock is chairman of NCTA's Study Group on **Services for the Deaf and Blind**. "We have some new committee participants," says Schrock. Thomas Freebairn of the New York University produced a guide on CATV for the deaf a few years ago and will help the committee produce a similar guide according to Schrock. "Barry Katz of HEW's Captioned Films and Telecommunications Branch will be watching our activities," Schrock added, "and he'll be helping us with any grant requirements."

SCTE Charter Members to Receive Special Recognition

WASHINGTON, D.C.—As SCTE begins its tenth year since being founded in 1969, SCTE charter members will receive special recognition of their efforts in forming the Society. A "reunion" will be scheduled during the 1978 SCTE Annual Meeting and special commemorative plaques will be presented to the 64 people listed as charter members of SCTE.

Senior Members Will Form Committee

WASHINGTON, D.C.—SCTE senior members will be advised to form a committee of their peers early in 1978 to develop programs and schedules for their special requirements. According to the SCTE By-laws, the senior member grade "... is reserved for members who have made significant technical contributions to the cable television industry." Thus, the SCTE Member of the Year must "automatically" become a senior member upon receipt of the award. Due to this, a number of regular members should be elevated to senior member grade.

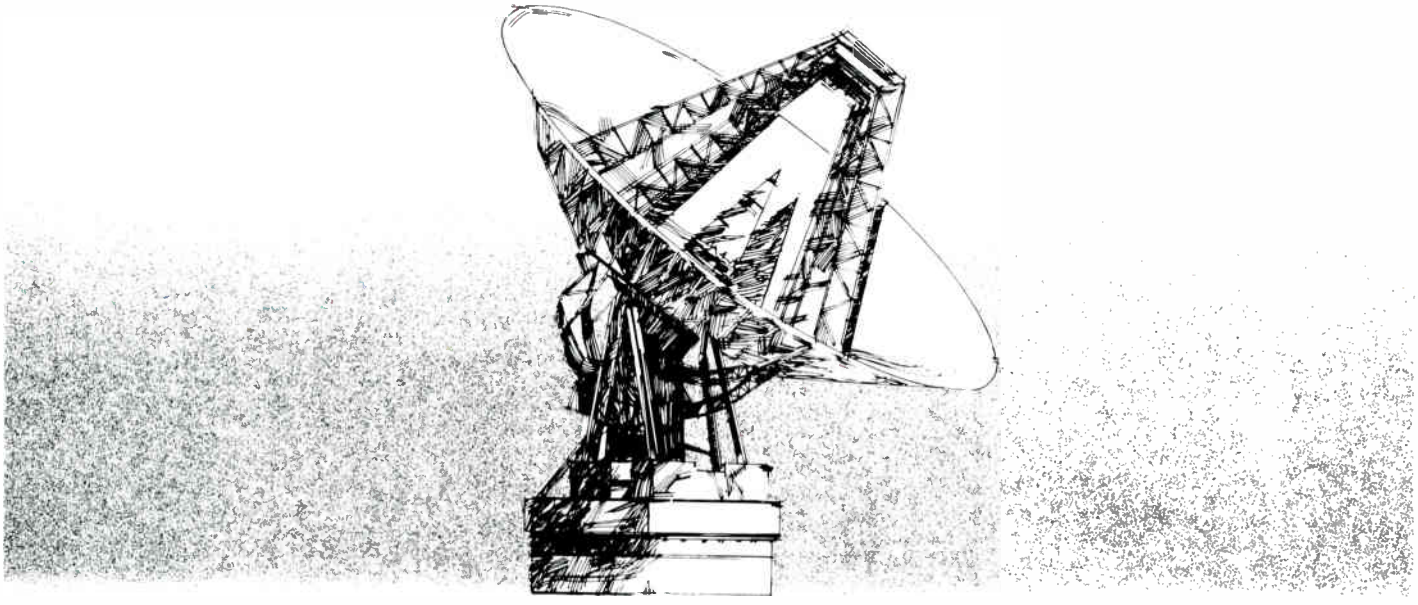
Elevation to senior member grade is only one topic this committee will be charged to discuss. Special engineering programs should be developed and presented for experienced engineers in the CATV industry. This becomes an almost mandatory responsibility of SCTE as CATV system engineering evolves.

SCTE in New England

WHITE RIVER JUNCTION, VT—SCTE charter member Sam Shearer and a number of other engineers and technicians met at the Holiday Inn at White River Junction in Vermont on September 23. The purpose of the meeting was reorganization of the chapter and the result is the election of officers, discussion of meeting formats and formal adoption of SCTE national By-laws.

A Word of Advice about Satellite Earth Station Placement:

COMPUCON.



As you embark upon your first experience with satellite earth station placement, let us give you a word of advice: COMPUCON.

That's the first thing you need to know. Deciding that satellite transmission was the best way for receiving programming was an important decision for you. Choosing a company to achieve this goal will be an equally important decision.

Compucon is a leader in the field of communication engineering services. We have complete facilities to help you with satellite transmission from initial planning for placement to frequency interference measurement at the earth station site.

At the core of our service to you is our accurate and extensive data base. Stored in its memory banks is complete information which has been compiled from years of painstaking research with clients, FCC filings, public notices, licenses, and prior coordination notices. With this specialized library our experts can guide you to the best placement for your earth station.

But that's not all.

Compucon provides all necessary technical exhibits in compliance with the frequency coordination requirements of part 25 of the FCC Rules. Additionally, we assist in the preparation of the FCC applications for approval and licensing. We perform technical analyses to ensure compliance with established design and performance criteria. Finally, we continue to monitor the frequency interference environment around the satellite earth station to detect and prevent potential frequency interference from new or changing terrestrial microwave routes.

So you see, all you really need to know when you plan your next satellite earth station is one thing: COMPUCON.

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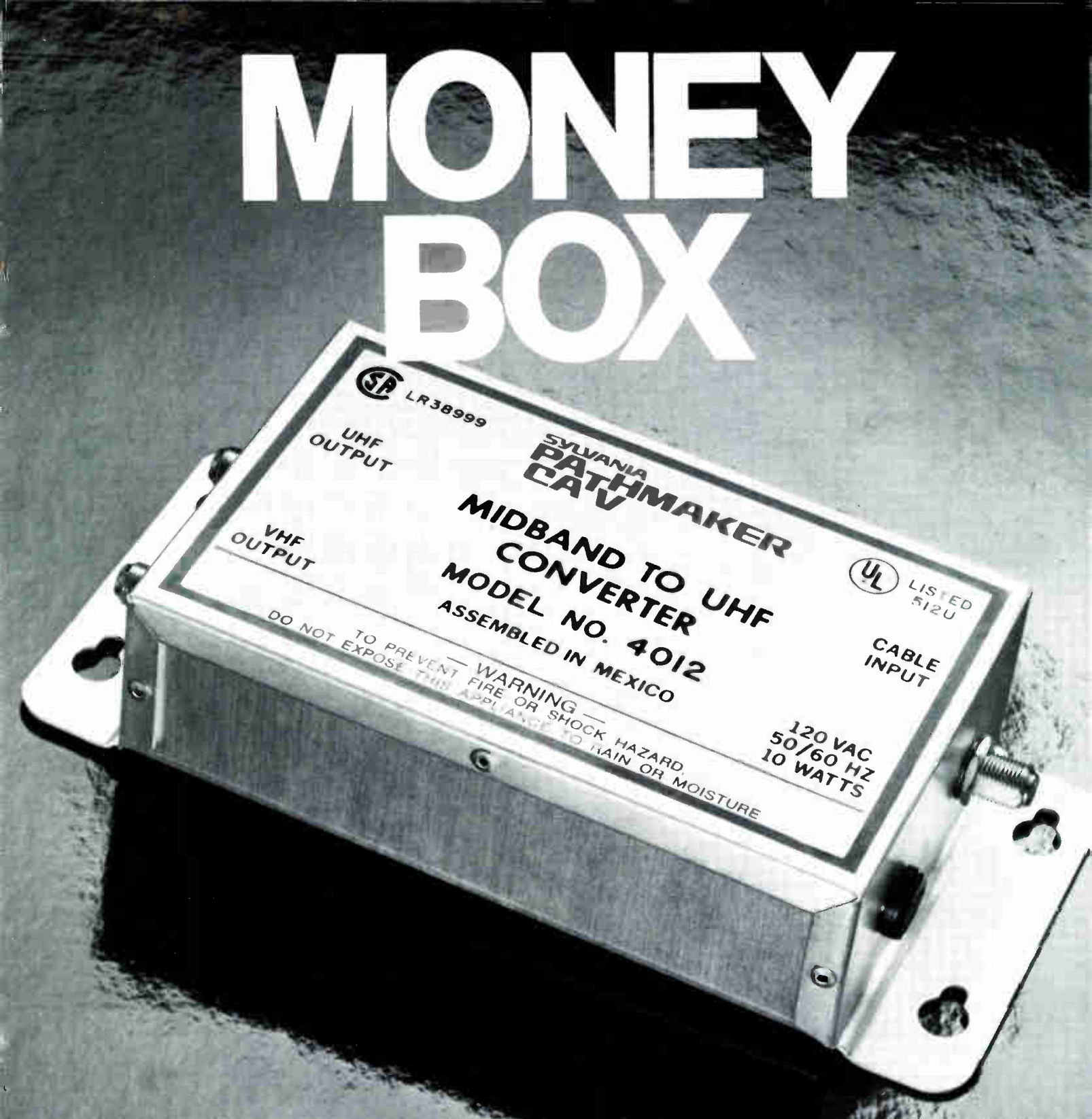

Our Series 4010 converter is the inexpensive way to get more channels and subscription TV capability.

The Series 4010 can convert up to seven midband channels to UHF using the subscriber's tuner for switching.

There are no moving parts to maintain. Your subscriber never has to touch the converter. And in most cases, neither will you.

One converter can handle all the TV sets in a typical subscriber's house and it can be installed anywhere from the basement to the attic.

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To find out how, contact your area salesman, or call toll-free (800) 351-6010 within the continental United States except Texas. From Alaska, Hawaii or Texas, dial (915) 544-7550. Ask for Ray Pawley.

GTE SYLVANIA

LNA Tr
Sma
TVRO Ear

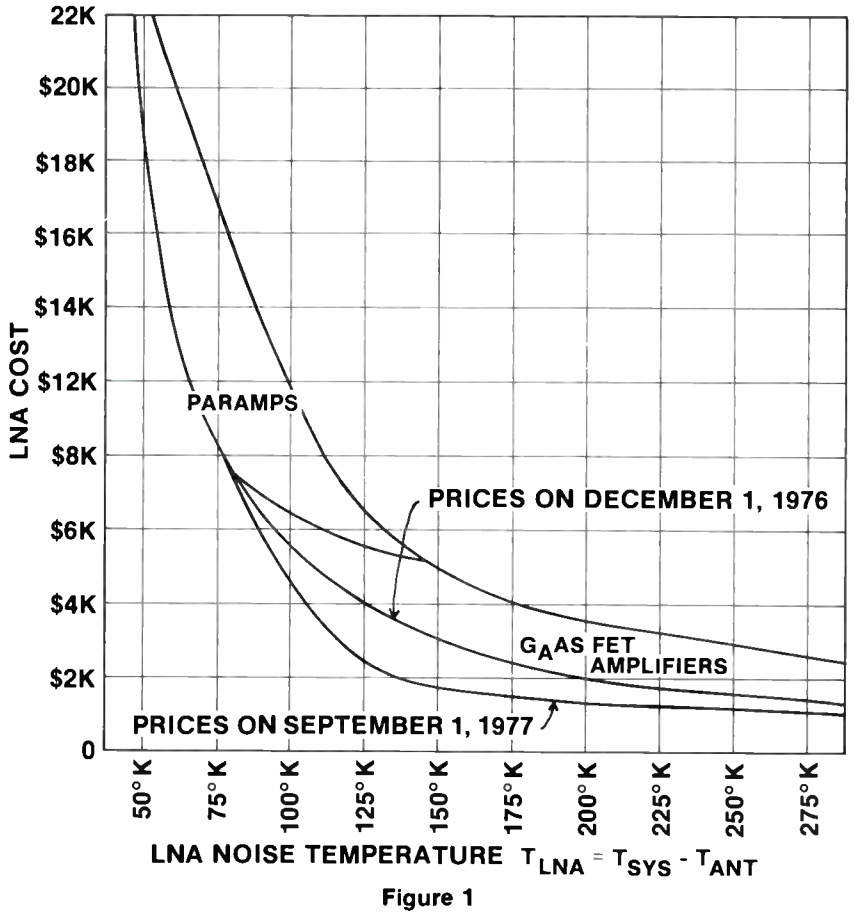

Figure 1

By Tom Humphries, sales manager Scientific Communications, Inc.

The letters LNA stand for Low Noise Amplifier. The low noise amplifier is differentiated from other amplifier types by its application. It is used to amplify incoming signals while contributing as little noise to that signal as possible. The design of such an amplifier is different primarily in the first stages where the lowest "noise contributing" devices or circuitry are utilized. After these first stages it is much like any other amplifier.

Improvements in the GaAs FET transistor coincided with the market need for better solid state performance at a lower cost for the small aperture earth stations. Without that recent improvement the choices would be either a parametric amplifier for small antennas or the larger antennas would still be needed. It has only been in 1977 that 120°K (1.5 dB) noise performance has been readily available in transistor LNAs. Look at the chart in Figure 1 and notice what has happened to pricing of the GaAs FET LNAs since the FCC approved small aperture TVRO stations. The amount of demand and competition pressed pricing to where it is today but is unlikely to go much lower in the near future.

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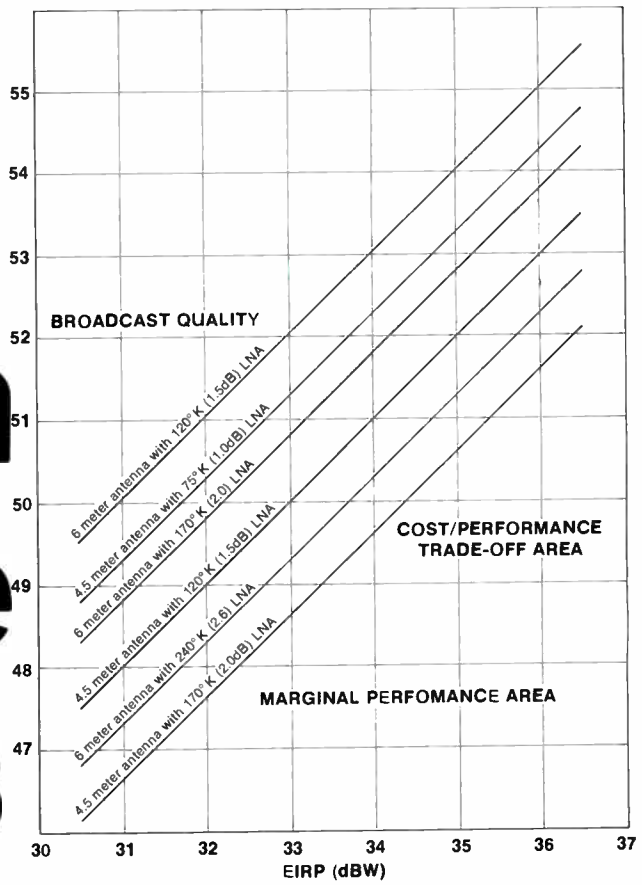


Figure 4

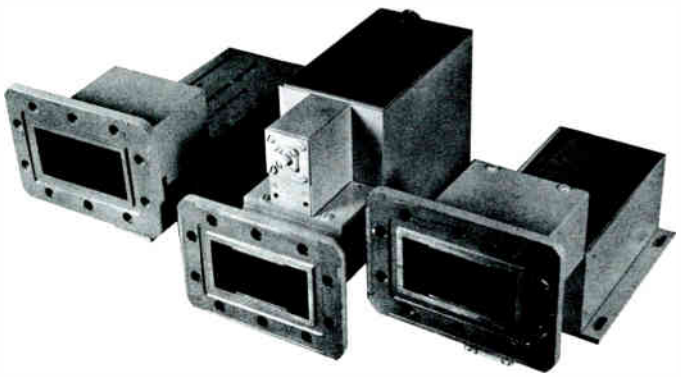


Figure 2

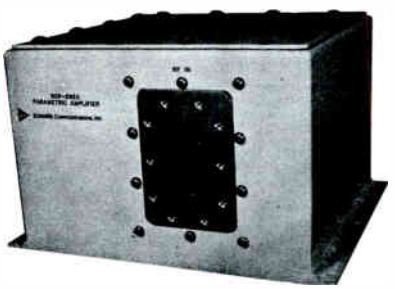


Figure 3

In Figures 2 and 3 are pictures of a GaAs FET LNA and a parametric LNA, respectively. The parametric amplifier is a more complex component than the GaAs FET but can achieve a much lower noise temperature than the present GaAs FETs. For low EIRP levels and very low antenna elevation angles, the parametric amplifier is typically more economical than selecting the 10 or 11 meter antenna. There are areas like the Caribbean Islands which may require both the larger antenna and the parametric amplifier.

At this time the performance crossover for thermoelectrically cooled GaAs FET LNAs and uncooled paramps is between 90°K (1.17 dB) and 100°K (1.29 dB). Each have advantages and disadvantages to consider. Due to their relative levels of complexity the prices are similar for given levels of performance.

LNAs for TVRO: The LNA is usually specified to have a gain of 50 dB minimum. In most cases this amount of gain so overcomes the noise after the LNA that the system noise performance is set by the LNA noise performance plus the antenna noise for its given elevation. For example:

$$T_{system} = T_{antenna} + \frac{T_{LNA}}{G_{feed}} + \frac{T_{receiver}}{(G_{feed})(G_{LNA} - \text{line loss})}$$

T_{system} = total noise of system

$T_{antenna}$ = noise temperature of the antenna at some given elevation angle-For this example 28°K

T_{LNA} = noise temperature of the LNA-For this example 120°K (1.5 dB)

G_{feed} = the gain (loss) of the antenna feed as interfaced with the LNA including mismatch-For this example .98

$T_{receiver}$ = noise figure of the video receiver in °K-For this example 12 dB (4300°K)

Line Loss = the number of dB loss due to the RF coax cable between the LNA and the video receiver-For this example use 3 dB

G_{LNA} = overall gain of LNA - usually 50 dB minimum-For this example use 50 dB

$$T_{system} = 28°K + \frac{120°K}{.98} + \frac{4300°K}{(.98)\ (50000)}$$

$$= 28°K + 122.45°K + .088° = 150.54°K$$

Earth Station Figure of Merit: The basic figure of merit for an earth station is the expression G/T. This is the gain of the antenna divided by the total system noise.

$$G/T\ (dBw/°K) = G_{ant}\ dB - 10 \log (T_{syst°K})$$

$$= G_{ant}\ dB - 10 \log (150.53°K)$$

$$= G_{ant} - 21.78$$

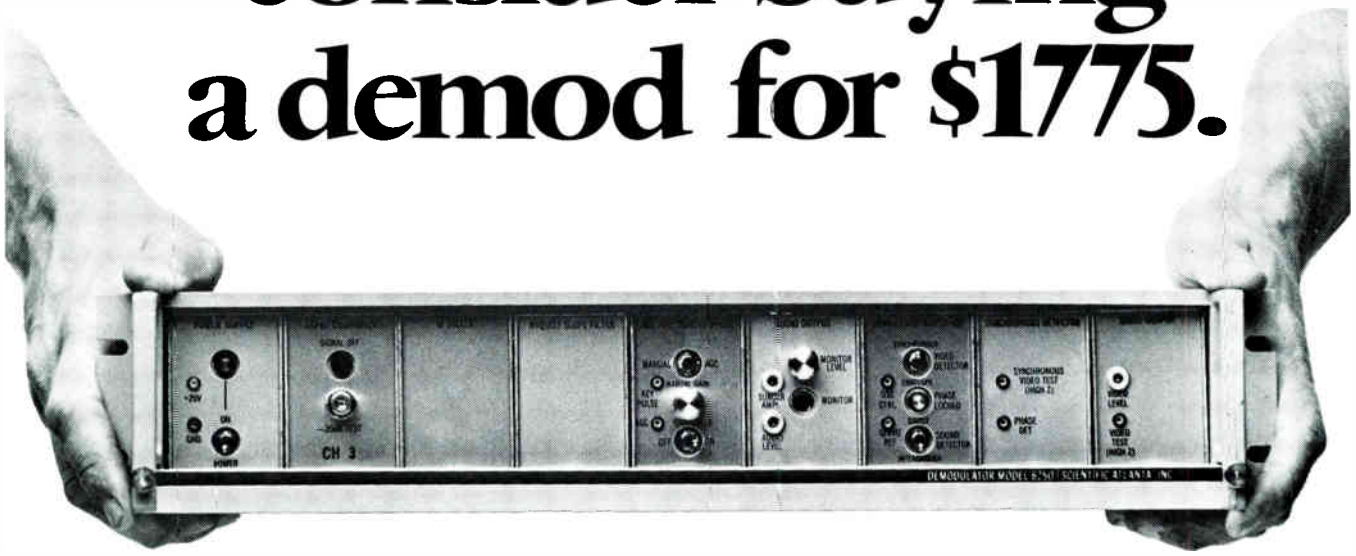
For a 4.5 meter antenna with 43.5 dB gain this becomes G/T =43.5 - 21.78 = 21.72 dBw/°K

You can readily see the performance of your LNA is as important as antenna size in the total earth station figure of merit.

EIRP: The signal levels we deal with from the satellite are usually referred to as EIRP and are given in dBw. For the United States and our domestic satellites this EIRP has a range of 30-36 dBw for the 48 contiguous states. Alaska and Hawaii have lower EIRP levels because of their distance from the center of the beam.

Trade-Offs: A chart was drawn to show some trade-offs of LNA performance to antenna size for different EIRP areas (Figure 4). The 4.5 meter and 6 meter sizes were used for simplicity of charting and average specifications were used. Antenna elevations were considered to be greater that 30 degrees. Other antenna sizes may be extrapolated from the chart directly by the difference in gain. In other words, when all other factors remain constant, the gain difference from one size antenna to another causes S/N to differ dB for dB. The chart shows that for small aperture TVRO terminals for cable systems the 48 dB to 52 dB S/N range offers a large variety of options. This variety of options should help the system owners to overcome most environmental and political obstacles as well as find an economical trade-off for their application. C-ED

Until now you wouldn't consider buying a demod for $1775.



The remarkable Scientific-Atlanta 6250 falls about $7,000 short of the price you might normally pay for a comparable high quality demodulator. But it doesn't fall short in engineering and performance. We've sold over 300 6250 Demodulators since its introduction a year ago. In fact one group of station engineers wrote, "we are amazed at your demod's performance," after comparative bench tests against a unit close to the $10,000 range.

Consider the specs. 100 uv input sensitivity. Video response ±0.5 dB to 4.18 Mhz, ±2.5% differential gain and ±1° differential phase. With audio response ±0.5 dB 30 Hz to 15 KHz.

Consider the features: Zero chopper capable of operation from external as well as internal command. Envelope detector with optional synchronous detector. Intercarrier sound detection, also direct mode with synchronous detection option. Local or remote control of chopper on/off, envelope/synchronous detection, intercarrier/direct sound detection. Automatic switch-back to envelope mode if phaselock is lost in synchronous mode. AC operation with optional +DC standby powering. Optional powering from −DC.

Consider the organization. At the forefront of the companies who are revolutionizing world communications via satellite, Scientific-Atlanta has had to meet some of the toughest requirements for performance, reliability and economy. The results of this experience are evident in our advanced 6250 Demodulator.

For a demonstration, call Harry Banks at (404) 449-2000. Or write us.

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Europe: 1-7 Sunbury Cross Centre, Staines Road West, Sunbury on Thames, Middlesex TW16 7BB, England,
Telephone Sunbury on Thames 89751, Telex 896015

FCC Faces Cable Issues in 1978

WASHINGTON, D.C.—Although the FCC has not set down a firm quarterly schedule for the first part of 1978, Chairman Charles D. Ferris may return to the practice of establishing detailed time tables for commission proceedings.

While the exact schedule of activities remains uncertain, Jerry Jacobs of the FCC Cable Television Bureau, attests that a number of topics are "ripe for consideration" and will receive attention from the FCC during the first quarter of 1978.

Among the issues he noted are:

- further notice in the definition of cable systems and comments on the possibility of extending general exemptions at the 1,000-subscriber level;
- a decision on petitions for reconsideration of a 500-subscriber exemption level;
- the question of syndicated exclusitivity—to what extent will recent developments and the new copyright law render specific rules unnecessary;
- clarification of cable obscenity policy in dealing with the question as to whether a cable operator has an obligation to assure that no obscenity will be transmitted on access channels (abridgement of First Amendment rights and complaints against cable operators functioning as government censors are among the complexities of the obscenity issue);
- petitions for rulemaking in deleting most franchise standards and the simplification of application procedures;
- petitions for reconsideration of fixed mileage zones and the extension of UHF carriage beyond the 35-mile limit;
- proposed rulemaking or notice of inquiry into the question of the carriage of pay-TV scrambled messages; and
- appeals on cross-ownership rules

Cable Copyright Rules "Based on Reality"

WASHINGTON, D.C.—The new Copyright Royalty Tribunal heard testimony on Wednesday, December 7, from representatives of the cable industry. The tribunal made every effort to hear from the industries provided for under the 1976 Copyright Law before the legislation went into effect the first of the new year. Cable was included under the omnibus revision of the Copyright Law in 1976 and will pay copyright fees on a sliding scale based on the gross revenues of the individual cable system and the number and type of programs each system carries on imported distant signals. The fee base included under the new law reflects an agreement between the Motion Picture Association of America and the National Cable Television Association.

Appearing before the tribunal were Daniel Aaron, chairman of the National Cable Television Association (NCTA) and vice president of ComCast Corporation; Russell Karp, president of Teleprompter Corporation—the nation's largest operator of cable systems; and Steven Effros, who spoke on behalf of the Community Antenna Television Association (CATA).

As a spokesman for the cable television industry which began making copyright payments on January 1, Aaron asked that the tribunal base any future developments of its cable-related policies on the realities of the industry. He explained, "Because of the technological nature of our industry, we are always in a state of transition and require constant review of rules governing the industry. Furthermore, we are made up of small units and the operators of those units are already burdened by over-regulation." According to the NCTA chairman, it has taken years for cable to begin to reverse many federal regulations which have served to restrain the industry.

Joining Aaron before the tribunal, Russell Karp reviewed the two Supreme Court rulings that held cable not liable for copyright payments under the Copyright Law of 1909. He noted that, "The FCC has long used the auspice of a copyright law as an excuse to impose restrictions on the number of signals a cable system may carry and as justification for the rules limiting carriage of certain syndicated programs." Karp went on to say, "With cable now paying copyright, it is time for the FCC to review and change those rules."

The third witness, Steven Effros, spoke on behalf of the cable operator faced with the burden of record keeping. He emphasized that copyright filing is a new experience for cable operators, many of whom may be baffled by unfamiliar and complicated forms and record-keeping procedures. Effros urged the tribunal to work closely with the Copyright Office in the development of easy-to-follow rules and forms.

ATEX Premieres in Boston As the First of a Series Sponsored by ATEA

LOS ALTOS, CA—The first conference and trade exhibit dedicated to "create better communications between manufacturers and users of automatic test and measurement equipment"—ATEX—is scheduled next fall for Boston's Hynes Auditorium, September 26 - 28, 1978.

The trade group sponsoring ATEX is the Automatic Test Equipment Association (ATEA), formed in May 1977 to address the specific needs of the automatic test industry. Cal Edmonds, president of ATEX and sales manager at Data Test Corp., indicated that charter members of the newly formed association were fully supportive of ATEX and will participate in the first ATEX show. These charter members include Hewlett-Packard, Tektronix, Computer Automation, Data Test Corp., Digitest, EH Research, Everett Charles, Inc.,

Faultfinders, Fluke-Trendar, Instrumentations Engineering, Omnicomp, Siemens and Westinghouse Electric.

The three-day ATEX program will feature roundtable conferences, applications-oriented technical papers and over 100 working product displays. Edmonds stressed that the show will be universal in its appeal to electronics manufacturing firms, industrial, communications, military, research and other users of automatic test and measurement equipment. He reemphasized that all seminars and exhibits would be heavily applications oriented.

New Rules in Effect for Cable Communications

ST. PAUL, MN—New state rules concerning communities franchising cable companies became effective on December 5. An alternative procedure, to be followed by smaller communities that are franchising cable systems, shortens the length of time needed to complete the franchising process. By reducing time for comment periods and eliminating some publication requirements, the new process may take a minimum of three months, whereas the standard procedure may take a minimum of five and one-half months.

Other changes in rules that affect minimum standards for cable service in the state include the cable companies' provision of guaranteed public access services to all persons subscribing to any type of cable service and minimum 12-channel capacity for systems in communities with less than 15,000 population or a minimum of 20-channel capacity if the population exceeds that number.

The new rules also encompass variances, cable service territories and cable system reports submitted to the Board.

The rulemaking has been an 18-month process punctuated by a number of open meetings and public hearings to enable interested persons to comment on the proposed rules. The rules, guided through the process by the Minnesota Cable Communications Board (MCCB), culminated in the recent approval by the state attorney general's office. The rules have the force and effect of state law.

The MCCB is a state agency mandated by the state legislature to promote cable communications in the public interest. One hundred and five cable systems serve 460,000 subscribers in 143 municipalities in the state.

Communications Experiment: "Communications of the '80s"

PALO ALTO, CA—Computers located thousands of miles apart will be able to share resources via satellites as a result of an experiment in "Communications of the '80s" initiated in November.

The three-month long business communications experiment, known as Project Prelude, is being conducted by Satellite Business Systems (SBS). A Communications Technology Satellite (CTS)—in stationary orbit about 22,300 miles above the earth—is being used to transmit computer data, facsimile documents, both full motion and freeze-frame television pictures and voices on an interactive basis.

Rockwell International Corporation is the first of three companies to participate in Project Prelude. The experiment links the company's facilities at Pittsburgh, Penna., and Seal Beach, Calif.

SBS is using two Hewlett-Packard 3000 Series II general purpose computers—one at each site—during the series of tests. In addition, Hewlett-Packard computer terminals and line printers are used to complete the data processing systems.

Round-Table Discussion on State Role in Protecting Public Interest in CATV

WASHINGTON, D.C.—Robert Schmidt, president of the National Cable Television Association, was unable to attend the delayed round-table discussion on cable television but had his prepared remarks read. In discussing why cable TV should not be subjected to utility type regulation, Schmidt said that cable was "not a necessity" and did not "supply monopoly services." He called the demand for cable service "price sensitive" and he warned that if the industry charges more than the service is worth, "our subscribers will simply disconnect and turn to alternative sources."

Schmidt referred to cable TV as a "discretionary purchase in the same category with magazines, movies, and other forms of entertainment media." He suggested a "public interest detriment" in regulating cable. He concluded: "State utility regulation of cable television would not prempt FCC regulation but would merely inhibit the growth of this new industry and would, in our opinion, severely limit its ability to realize its vast potential."

A C-ED Exclusive

Cutting Red Tape at the Commission

By Robert Luff, vice president of engineering
National Cable Television Association

On August 8, 1975, the Federal Communications Commission released a Public Notice that launched the cable industry into the space age. The Notice was a direct result of cable industry's victory in convincing the FCC that the use of small aperture receive-only satellite earth stations in the cable industry was in the public interest. The release contained Commission-adopted guidelines to assist potential domestic satellite earth station applicants and provide for a more orderly and efficient application processing procedure.

I was asked by C-ED to provide some insight into the details of the FCC meeting on earth station applications. The following is a rundown on the outcome of that meeting.

Recently, the application rate for TVRO earth stations has grown to between 25 to 35 per month. The cable industry became alarmed when the FCC processing backlog delays reached an all-time high of 120 days with no end in sight.

Compounding this problem were industry-wide hardships such as: ground-freezing problems prior to winter which would further delay construction until spring; cancellation of turn-on dates and loss of promotional gain because of unscheduled delays; economic problems due to loss of *would be* revenues to offset substantial legal and engineering fees necessary to prepare the FCC filing procedure; and most important, loss of services to subscribers.

Members of the FCC staff and cable representatives try to find solutions to the backlog of earth station applications.

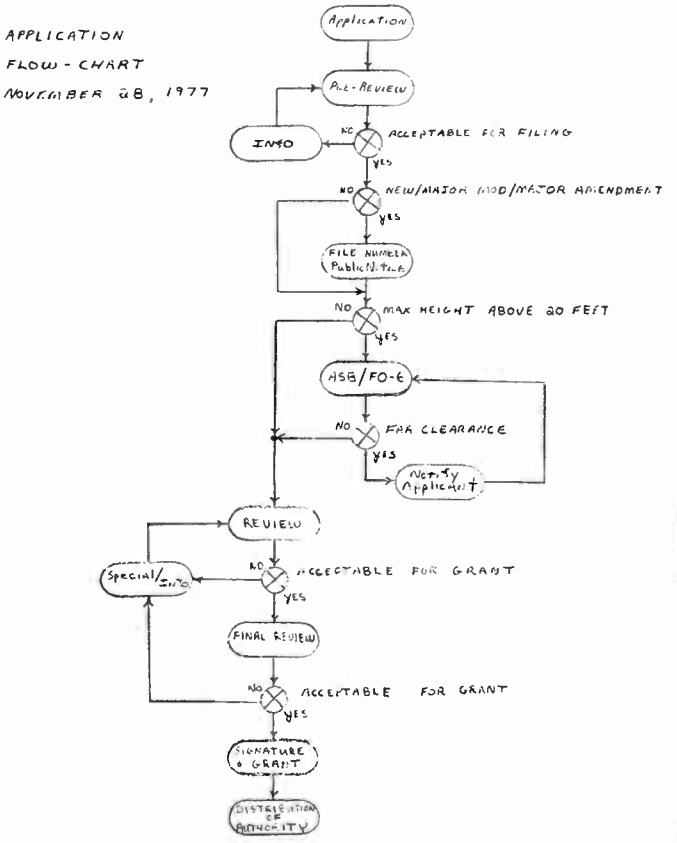

Figure 1

As industry concern mounted, so did the frequency of individual phone calls and personal visits. As a result of the industry's alarm, and self-destructive effects of individual attempts to better the situation, I thought the best approach would be to arrange a joint FCC/cable industry meeting as soon as possible.

NCTA Sponsored Meeting at the FCC

On November 29, 1977, I initiated a meeting at the FCC with members of the International Satellite Common Carrier staff and several prominent members of the cable industry. The meeting

RECEIVE-ONLY EARTH STATION FOR CABLE TELEVISION SYSTEMS

APPLICANT'S NAME:

SITE LOCATION: (City, County, State)

SERVICE:
- a) Domestic Fixed Satellite
- b) Fixed Earth Station
- c) [choose one] Common Carrier or Private
- d) Receive-Only

LATITUDE: (Deg.-Min.-Sec.)[units]

LONGITUDE: (Deg.-Min.-Sec.)[units]

OPERATING BAND: 3700 to 4200 MHz

POINTS OF COMMUNICATION: [choose appropriate satellite(s)]
- KS20 WESTAR I
- KS21 WESTAR II
- KS30 RCA SATCOM I
- KS31 RCA SATCOM II

SITE ELEVATION: (Meters)[tenths] and (Feet)[units]

RANGE OF SATELLITE ARC: (___._) to (___._) [at coordinated operating band]

ELEVATION ANGLE RANGE: (___._) to (___._) [at coordinated operating band]

EARTH STATION ARC: (___._) to (___._) [at coordinated operating band]

ANTENNA FACILITIES:
- a) Communications
- b) (size in meters)
- c) (type of feed)[e.g. Cassegrain, Gregorian, prime focus,etc.]
- d) (manufacturer and model)
- e) (gain)[dBi @ MHz]
- f) (max height)[meters(tenths) and feet(units)]
- g) (centerline)[meters(tenths) and feet(units)]
- h) (3dB beamwidth)[deg.@MHz]

RECEIVING SYSTEM NOISE TEMPERTURE: (°K @ Deg. Elev. @ MHz)

COORDINATION FREQUENCIES:
- a) Receive
- b) (frequency(ies) or/and frequency range)
- c) Horizontal and Vertical Linear Polarization
- d) 36000F9

MODULATION CHARACTERISTICS:
Carrier frequency modulated by a television signal consisting of a video carrier with a baseband of 10Hz to 4.25 MHz and an audio sub-carrier at 6.8 MHz with a baseband of 20 Hz to 15 kHz.

FCC check list *(courtesy of C-ED)* to help speed up earth station applications.

FILE NO.	PUBLIC NOTICE:

INFO & ENTREX ☐

__ Applicant/Code
__ City/County/State
__ Service
__ Latitude
__ Longitude
__ Operating Band
__ Pt of Communications
__ Site Elevation
__ Range of Sat Arc
__ Elevation Angle Arc
__ Earth Station Arc
__ Horizon Max Den

TRANSMITTER EQUIP
__ Number
__ Manuf/Model/Code
__ Power Output
  __ Tolerance

ANTENNA FACILITIES
__ (Communications/TT&C)
__ Size in Meters
__ Type of Feed
__ Manuf/Model/Code
__ Gain(s)
__ Max Height
  __ 3 dB Beamwidth

__ Remote Control
__ Rec Syst Noise Temp

FREQUENCIES
__ R:T/f/Polarization
__ Emission
__ EIRP
__ EIRP Density
__ Special Provisions

__ Conditions
__ Informative

APPLICATION ☐

__ Caption
__ Overall Description
__ Public Interest
__ Addresses
__ Waiver of Sec 304
__ Appropriate Signature
__ Tech Certification

__ Legal Showing/Form 430

__ Financial Showing
  __ Cost:

__ Environmental(Maj/Min)
Sec 1.1311
  __ Description
  __ Zoning & Proceedings
  __ Source of Controversy
  __ Adverse Impact NRHP

__ Site Availability
__ Site Layout
__ Block Diagram
__ Antenna Mounting
__ Sidelobes
__ Sec 25.209/32-25Logθ

__ Construction Period
  __ Form 403

__ Programmer Permission

__ Radiation Levels
10 mW/cm^2

INTERNATIONAL COORD ☐

ASB CLEARANCE ☐

COORDINATION ☐

__ Dated Letter/Carriers
__ Waiver of Sec 25.203
__ Antenna Size/Gains
__ 15 dB Beamwidth
__ Centerline/Elevation
__ Frequencies/Emissions/Mod
__ Power Density/Power
__ Pmax (%)
__ Climate Zones
__ Hor Elev Plot
__ Hor Gain Plot
__ Great Circle
__ Rain Scatter
__ Certification

TECH SHOWING (Cable-Video) ☐

__ LNA Manuf/Model
__ LNA Noise Temp

__ Receiver Manuf/Model
__ FM Threshold

__ C/N Uplink
__ C/I Total
__ C/I = 18 dB for 4.5m
__ C/N Downlink

__ FM Threshold Margin

__ S/N Video
__ S/N Audio

Reviewed By

Upon review of the narrative information submitted in the application, no significant adverse environmental effects are expected to result.

NOTES:

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Discussing some of the earth station application problems are (left-to-right) FCC staff members Brian Fransco and Bill Lombardi.

was designed to discuss the problems created with the increased load of processing cable TV satellite receive-only earth stations. Prior to the FCC meeting, the group of industry participants met at the NCTA offices to review some of the areas for discussion with the FCC:

- Rapid growth of TVRO earth station applications
- FCC delays in processing earth station applications
- Possible speed-ups in FCC processing and the effect of the FCC's increased staff
- New formats for FCC applications as speed-up solutions
- Emphasize economic impact of processing delays on cable systems, program suppliers and equipment manufacturers
- Question necessity for financial disclosure by cable systems and the need for Articles of Incorporation.

The meeting was well represented by the entire Common Carrier Processing staff: Roni Ahern, Bill Lombardi, Brian Fransco, Clifford Hollis and Dan Couppe. Representing the cable industry were Dan Yost, Compucon; James Juncker, Hughes Aircraft Company; Steve Effros, CATA; Harry Stemple, Comsearch; Fred Finn, NCTA; Brian Lamb, *C-ED* and *CableVision*; Sel Kremer, Southern Satellite Systems; Mike Smith, Scientific-Atlanta; Ted Pierson, Jr., Home Box Office; Marty Bandler, Microdyne; and myself.

Putting their heads together to iron out the application delays are (left-to-right) Dan Yost, Bill Lombardi and Robert Luff.

The meeting began on a positive note by my introductory comments of praise for the processing staff for being able to keep up with the increasing application rate as well as they have been. All of the industry representatives reinforced this important point. We indicated that we had arranged the meeting in a spirit of cooperation and hoped to learn more about the details of the Commission application process to be better informed and have an exchange of dialog that would provide both the Commission staff and the industry representatives with suggestions that would ease the processing backlogs.

We were met with equally enthusiastic statements of welcome and cooperation from the chief of the processing operation, Roni Ahern. She indicated that our concern of the rising application delays was understandable and hoped that we would be pleased to learn of the many changes recently introduced designed to cut the FCC processing time substantially.

The discussions with the FCC staff concentrated on three vital areas concerning cable TV earth station applications.

FCC Staff Procedures and Processing

The FCC staff provided a flow chart of the current processing flow with estimates of time schedules involved. See Figure 1. In addition, the staff is attempting to speed-up application processing by completing the development of a computer system to store all data on an earth station. This system will print out public notices, construction authorizations and application material for review. There is a good possibility that a partially working system will by on-line later this month and operational in February.

SATELLITE RECEIVER UPDATE FROM MITEQ

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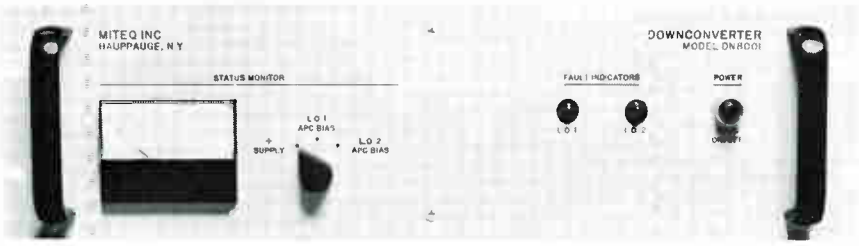
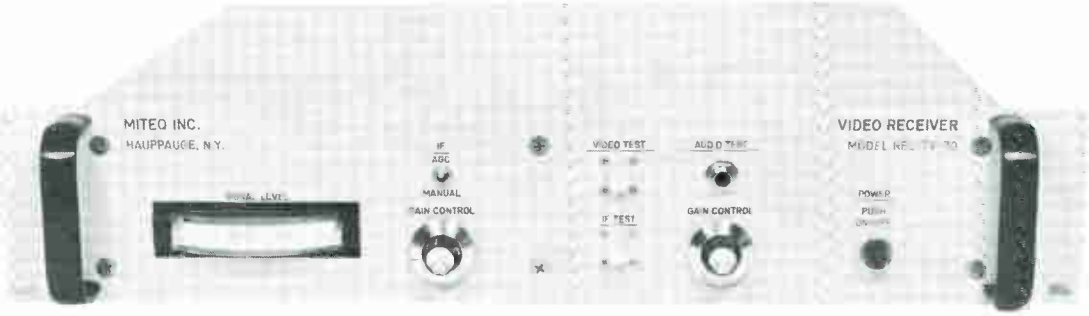
Low noise GAS FET amplifier with 1.8 dB noise figure, single conversion converter and a video receiver for only $5500.





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FCC Staff Expansion

Two new staff members, Clifford Hollis and Dan Couppe, were added in September and October. These two new staff members, currently undergoing training, will have a noticeable impact on the processing of earth station applications. No additional staff additions are planned.

Sel Kremer of Southern Satellite Systems and Roni Ahern of the FCC discuss industry problems and solutions.

FCC Regulations

A new Public Notice, updating the Notice of August 5, 1977, is now being prepared and will likely be issued in February. Also, even though the use of the Form 430 is inconvenient, the FCC staff has no substitute. A revised form for the earth station would entail a great deal of time and effort. It was also understood that the elimination of any regulations is questionable and not likely within the next few months.

Particular attention was given to the aspects which added significantly to the overall processing delay. Basically, the delays occur in the last phases of the process and can be categorized into two groups: those caused by the applicant, and delays caused by too many applications handled by too few processors.

Delays caused by the applicant are generally due to incorrect or incomplete information. Figures show that 60 percent of the applications must be taken off-line and the applicant called or the application sent back. One item causing more problems than most is that of proper signatures on the applications. Presently, the application requires two or three separate specific signatures.

The industry representatives questioned the need for some of the items presently requested on the form such as the strict adherence to the signature requirements. They felt that if a cable system has spent the engineering and legal fees to make such an application any signature from the company should be enough.

Further, the point was raised that the cost of receive-only earth stations has reached a level where smaller systems are filing. These small systems do not have Articles of Incorporation and they must now pay legal fees to develop such articles—just for the purpose of the FCC filing process.

The meeting concluded with Ahern encouraging everyone to drop her a letter on any suggestions they might have on how the filing process might be improved. C-ED

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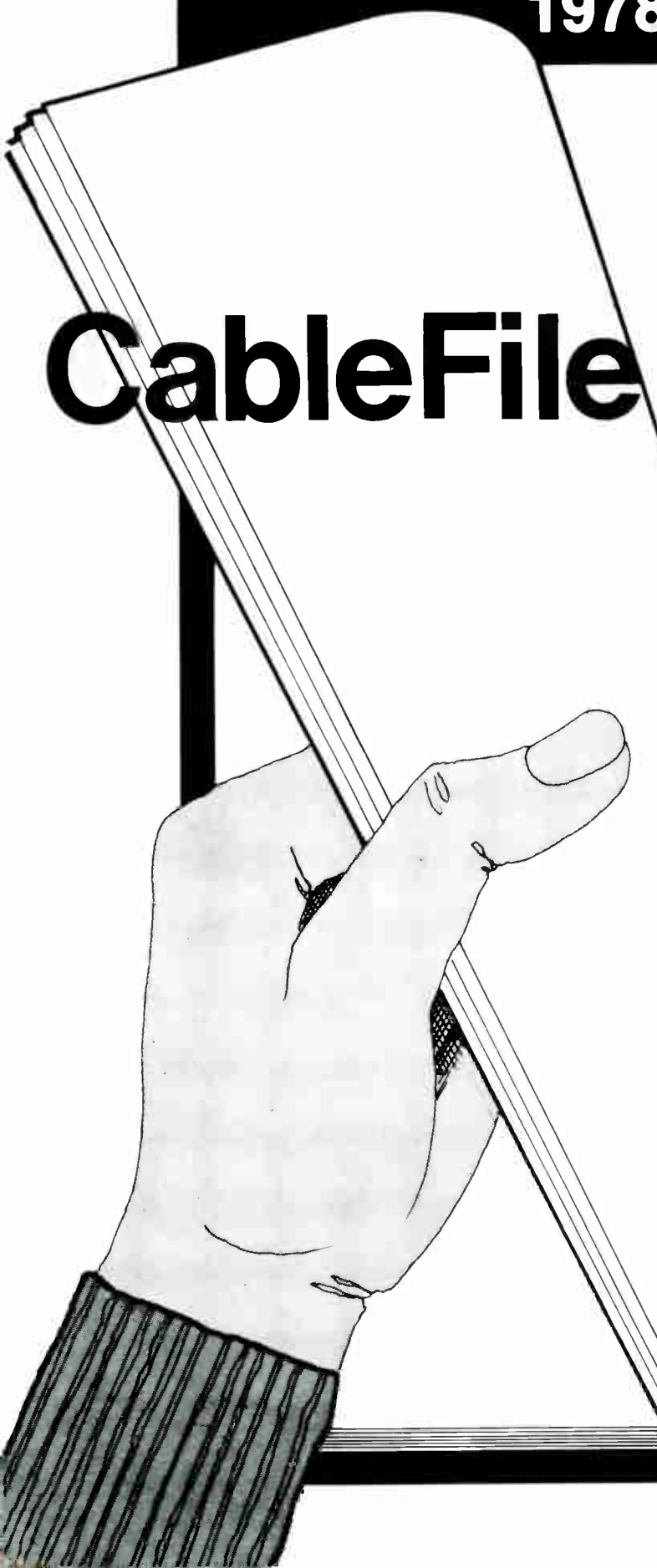

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—An analytical financial comparison of publicly held cable companies.

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Factors Influencing Earth Station Frequency Coordination

By Harry L. Stemple, PE, Comsearch, Inc.

Interference Objectives

Before any discussion of interference factors can proceed very far, some comments on interference objectives must be offered. The basic problem in this area is in relating the subjective measures of interference (viewing quality) to engineering terms (carrier-to-interference ratio or interfering signal level). This is typically done by viewer juries where various levels of interference are created under controlled situations and the viewers indicate at what amplitude the picture is degraded. Many tests such as these have been conducted with basically the same results. Although the modulation of the interfering signal affects the relationship between the subjective interference situation and the equivalent objective measure, the tests have shown that for a wide range of modulations normally encountered in the 4 GHz band, the interference threshold varies only a few dB among the types. The frequencies used in the 4 GHz band are highly standardized and each is offset 10 MHz from the centers of the satellite transponders. Given this frequency separation and the types of modulation predominantly used, the interference to the earth station appears as an increase in thermal noise. At a C/I ratio of 15 dB the interference becomes visible on a TV monitor; and below 10 dB the effect is intolerable. The degradation of the picture quality occurs very quickly once the interference becomes noticable as the C/I is decreased further. To provide a safety margin, the earth station is coordinated to insure a C/I in excess of 25 dB all but 20% of the time and 15 dB for all but 0.01% of the time.

One should keep firmly in mind that these are objectives, not strict cut-off values. Recall that at a C/I of 25 dB there is no preceptable interference, and at 15 dB the interference is barely visible on the waveform monitor.

The traditional unit for interference in satellite earth station analysis is absolute received power levels rather than C/I. Therefore to set the interference power level objectives for an earth station, one calculates the nominal signal level received from the satellite and reduces that value by the C/I objective.

Interference Factors

Once an interference objective has been established, the received signal levels for each potential interference case must be computed and compared to the objective. The major factors affecting the transfer function from the interfering transmitter to the victim receiver are the antenna systems and the propagation path.

An ideal microwave antenna would radiate all its energy in a narrow beam with none escaping in any other direction. In practical antenna systems, most of the energy is in the main beam, but significant levels of radiation are emitted (or accepted) at angles off the main beam. The angle at which one considers this radiation is called the discrimination angle and the level of radiation relative to the main beam is termed the antenna discrimination. This effect is applicable to both the earth station and terrestrial station antennas.

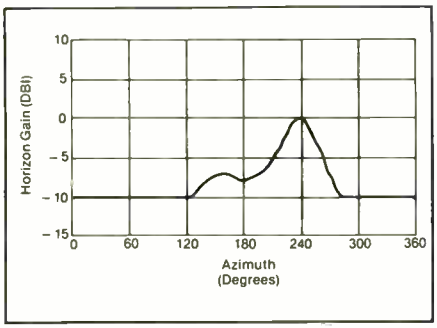


Figure 1: Typical Horizon Gain Curve

Propagation loss between the interference source and the victim receiver has a great effect on the levels received. Local earth station site shielding has a substantial effect on the loss with more distant obstacles contributing as well. For line-of-sight conditions, free space loss calculations are used. Here the separation distance is the factor of importance, the loss increasing as the square of the distance. For obstructed paths, separation distance still affects the loss by the same relationship, but the terrain features add to the loss. Generally speaking, on shorter paths which are obstructed the interference propagates by the diffraction mode, bending over the blockage. On paths with a single obstacle the amount of loss realized is dependent on the percentage of blocking relative to the first Fresnel zone radius and on the character of the obstacle. Rounded obstacles produce significantly more loss than knife edge blocking.

Horizon Gain Function

Calculating the horizon antenna gain for the terrestrial microwave stations in the direction of the earth station is a straight forward procedure. One simply determines the discrimination angle for the terrestrial station and obtains the discrimination value from the appropriate radiation pattern envelope. The antenna gain is then the difference between the main beam gain and the discrimination.

Calculating the earth station horizon antenna gain in the direction of the terrestrial station is not quite as simple. To do this, one must consider that the earth station antenna can be oriented to view an arc of satellites. It is not directed horizontally, and very often the horizon it sees is elevated. To provide the earth station horizon gain for the interference calculations one must develop a gain curve such as the one shown in Figure 1. This graph gives the earth station antenna gain toward the horizon as a function of azimuth. It considers the horizon elevation angles, the various pointing angles of the antenna and its radiation pattern envelope. After the plot has been developed, one determines the bearing from the earth station to the terrestrial station, enters the curve at that azimuth and reads the value of gain to be used for the interference calculations.

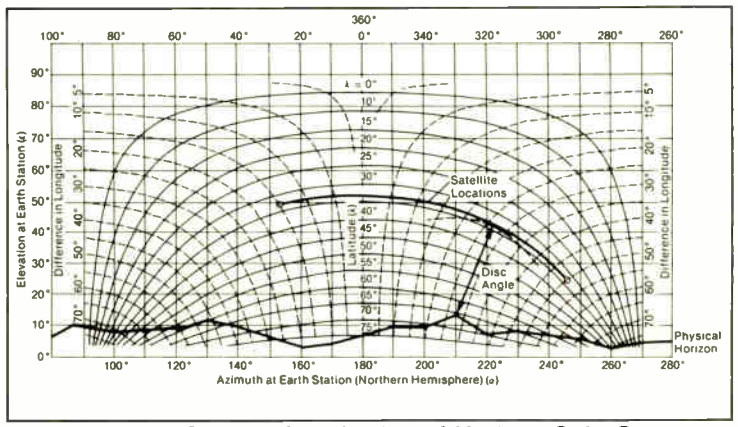


Figure 2: Graphical Derivation of Horizon Gain Curve

Figure 2 illustrates how the earth station horizon gain plot can be derived graphically. The curved solid lines show the arc of the geostationary orbit visible from the earth station at latitude and the longitude difference between the satellite and the earth station. The heavy solid line in Figure 2 shows the locations of satellites from 70 to 135 degrees west longitude as they would appear in the sky for an earth station near Altanta, Georgia. Toward the bottom of the graph, the horizon elevation as viewed from the earth station is depicted. For any particular azimuth, the earth station discrimination angle is defined as the smallest angle between that point on the horizon and the geostationary arc. Figure 2 also shows an example for an azimuth of 210 degrees, where the discrimination angle is seen to be 32 degrees. Now that the angle has been determined, the gain can be read from the earth station radiation pattern envelope. This process continues for the full 360 degrees to generate a complete horizon gain plot.

Received Signal Level Calculations

The relationship between the factors discussed above and the received interfering signal level is given by:

where

$$P_r = P_t + G_t - L + G_r \quad (1)$$

P_r = received signal level (dBW)

P_t = transmitter power (dBW)

G_t = gain of the transmit antenna toward the earth station (dB)

L = basic transmission loss (dB)

G_r = gain of the earth station antenna toward the transmitter (dB)

Equation 1 applies to interference propagated via great circle mechanisms as differentiated from the precipitation scatter mode of interference, even though the equation is basically the same with some of the terms combined and redefined.

Coordination Contours

Great circle coordination contours are another required data element of a frequency coordination package. Now that sufficient background information has been developed, the contours can be discussed. The purpose of the coordination contour is to define an area outside of which the potential for interference is so remote that stations beyond this limit need not be considered. The procedure is to establish the amount of loss required to reduce the interfering signal levels below the objective and then relate the loss to a distance. The basic relation for the loss required is obtained by solving equation 1 for L.

To obtain the loss required, one must make some worst case assumptions. Maximum legal values are assumed for P and G with no antenna discrimination for the terrestrial systems.

$$L_{req} = P_t + G_t + G_r - P_o - H \quad (2)$$

L_{req} = loss required to meet objective (dB)

P_o = interference objective (dBW)

H = correction factor for earth station station horizon (dBW)

The coordination contours are very sensitive to horizon elevation angle; if the horizon for an earth station is less than 0.2 degrees, then the contour should be smooth with an elongation toward the southwest, southeast, or both depending on the earth station location. This elongation is a result of the lower satellite elevations which increase the earth station horizon gain in that direction.

The jagged nature of the contour shown in Figure 3 is due to the horizon effects. The correction factor H of equation 2 is also specified by FCC rules.

Figure 3: Typical Coordination Contours

Precipitation Scatter Interference

Precipitation scatter interference results if the beam of the earth station intersects with the terrestrial station beam and if precipitation in the common volume formed by the intersection is sufficiently heavy to scatter the transmitted signal into the receive antenna. The factors which influence the magnitude of the interference are the geometry (how nearly do the centers of the two beams intersect) and the efficiency of the scattering (usually expressed as the rain rate). Once again the angular separation of the beams is used to obtain the terrestrial station antenna gain; the greater the angle, the less potential for interference. The interference model currently used throughout the industry has no correction for earth station antenna discrimination, as it assumes that the earth station off-axis radiation decreases more rapidly than that of the terrestrial station. This is a good assumption as long as the earth station antenna is large with respect to the terrestrial antenna. As the earth station antenna size decreases, this assumption is not as good. Fortunately, the present method gives conservation results under these conditions.

The precipitation scatter coordination contours is intrepreted the same as the great circle contour: stations beyond the contour need not be considered.

Effect of Small Diameter Dishes on Frequency Coordination

The first characteristic of the small diameter dish to be considered is the reduction in main beam gain. This reduces the received level from the satellite and requires a dB for dB tightening of the interference objectives. As compared to a 10 meter system, the interference objectives for the same location with a 5 meter antenna are 6 dB more stringent.

A reduction in antenna diameter also brings a broadening of the beamwidth. As long as the beam does not get so broad that adjacent satellite interference becomes a problem, the wider beamwidth does not affect the terrestrial interference situation. It is the sidelobes beyond 25 degrees which are most important for coordinating with terrestrial systems.

An interference advantage of the small dish is its lower centerline. This makes it more easily shielded by the natural terrain and yields greater horizon angles which in turn result in higher propagation loss. Artificial shielding of the small dish is obviously easier.

A wider variety of small aperture antennas is available, enabling greater design flexibility. Trade-offs can be made between the gain and sidelobe performance required and the cost. **C-ED**

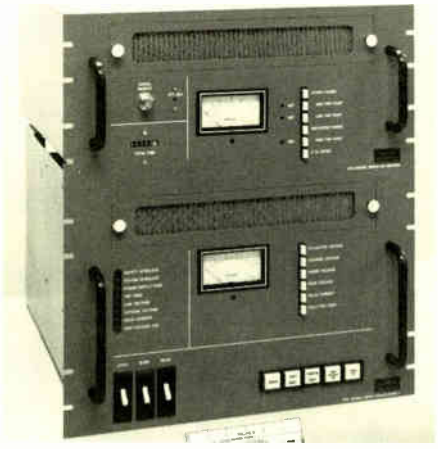
Satellite Communications

Hughes Offers New Amplifier Subsystem

A new high-power amplifier subsystem, designed to operate as the ground transmitter in a commercial satellite communications system, has been introduced by Hughes Aircraft Company's electron dynamics division.

This new unit, model 9240H-02, provides 400 watts (350 minimum) of CW output power and 55 dB saturated gain at 5.9 to 6.4 GHz. It consists of two assemblies: the RF drawer, containing the PPM-focused travelling-wave tube and associated components; and the power conditioner drawer, containing the power supply and all logic/control functions.

Designed for high-reliability earth station applications, the amplifier features the Hughes model 662H ruggedized metal-ceramic TWT. Operational features include fault and status indicators, and provisions for remote control.



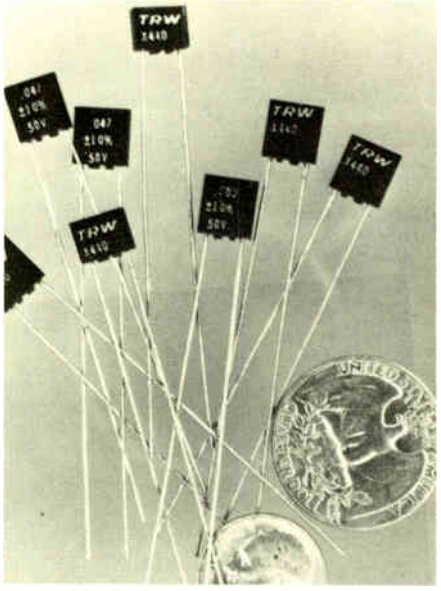
and mag-amp units, according to manufacturer.

In addition to a two year warranty, other features include reduced electromagnetic interference, better regulation, lower disturbance on power line, higher power factor and higher permissible operating temperature.

Micro-Miniature Capacitors From TRW

A "micro-miniature" metallized polycarbonate capacitor, with a voltage rating of 50V dc, is being marketed by TRW Capacitors.

TRW's type X440, with capacitance values ranging from .001 mfd to .10 mfd, are packaged in an epoxy case with standoffs and comply with mil spec MIL-C-27287. The X440 also features tolerances to ±1 percent and a dissipation factor of less than .3 percent at 1 KHz at 25 degrees C. The units have an operating temperature range of -55 degrees C to +125 degrees C.



Power Supplies

Ratelco Introduces Ferro-Resonant Chargers

A new line of controlled ferro-resonant regulated battery chargers has been introduced by Ratelco, Inc.

The new type FF (Float Voltage Filtered) chargers have many advantages over comparable silicon rectifier (SCR)

Miscellaneous

Single-Ended to Push-Pull, Mod-Kit for Jerrold ST-20 Equipment

Broadband Engineering, Inc., is offering modification kits for Jerrold ST-20 single-ended distribution equipment (SMM-S, SAM-S, SAS-S, SBM-S and SDH-S). The kits easily convert single-ended modules to push-pull operation with the use of an integrated circuit. The kits also permit the system operator to fully utilize the midband for such applications as pay TV.

Two types of transient protection are provided in the kits: lightning arrestors are installed at the input and output ports of the circuit board; and the I.C. chip is protected by a transzorb device. Reliability is further enhanced by operating the chip at 22V dc, thereby reducing heat and power.

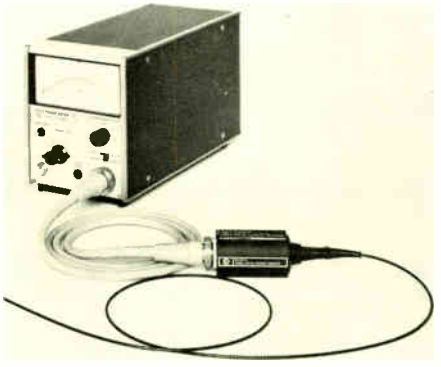
New Technique for Measuring Power for Fiber Optics

The first instrument for measuring absolute power transmitted in optical fibers has been developed by Hewlett-Packard Company.

The new HP 84801A thermistor sensor, when used with any HP 432 series power meter, measures optical power from 1 microwatt (-30 dBm) to 10 milliwatts (+10 dBm) over the wave length range of 600 to 1200 nanometers with an absolute measurement accuracy as low as seven percent.

Using an optical fiber as its input, the HP system is a high efficiency device designed specifically for single fiber power measurement. Absolute calibration is assured by the calibration factor adjustment on HP 432 series power meters.

The thermistor sensor technique is being adapted for the first time to measure light power and has several advantages over existing methods of measuring power in fiber optic systems. Present techniques include photodiodes, calorimeters and pyro-electric detectors. The new HP system introduces a combination of high accuracy, ease of use, ruggedness and low price to the field of fiber optics power measurement.



EARLY WARNING SYSTEM

By Joe Conroy, Warner Cable Corporation

Beginning in February, when Okaloosa County Civil Defense Director Tom Nichols wants to transmit severe weather warnings or emergency messages, he can do so at the touch of a finger.

Weather is an important economic factor in Okaloosa County. Fort Walton Beach, Florida and surrounding communities are the home of one of the largest commercial and recreational fishing fleets on the gulf coast and the summer season brings hundreds of thousands of tourists to the area.

Recognizing the need for an effective early warning system, Warner Cable of Fort Walton Beach has employed a staff meteorologist, and working with Civil Defense authorities, has planned an all channel, audio-video emergency over-ride to serve more than twenty-three thousand cable subscribers in Fort Walton Beach and surrounding communities.

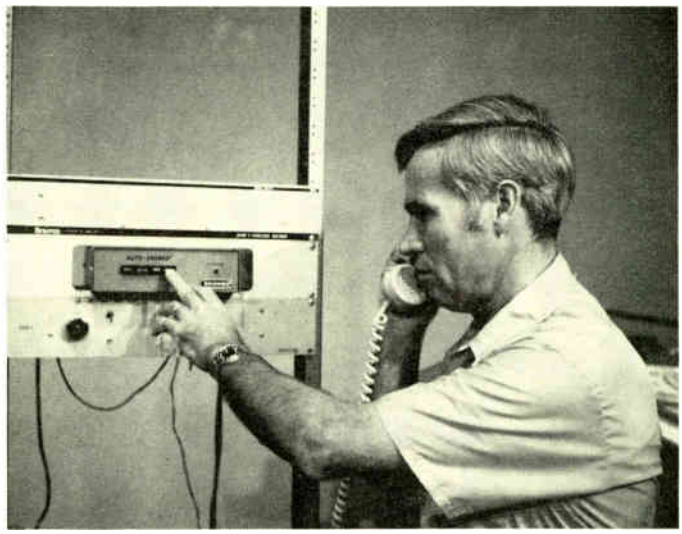
Nichols feels that the emergency over-ride will add dimension to the county's existing warning system. "We can reach the emergency response force and public safety people, along with the schools and hospitals in the county via our existing radio network. Because of the efforts of Warner Cable we will now be able to reach thousands in their homes, via cable TV and that will make our job a lot easier."

In the event of tornadoes or other civil emergencys, the over-ride will be activated directly from the Civil Defense Emergency Operating Center. At the descretion of Nichols, a code will be transmitted to Warner's headend building via touchtone telephone. That code, in turn, will activate a model MD435 Bramco decoder. Upon activation of the decoder all twelve channels of cable TV will be overridden with a digital video message which will appear on the TV screen identifying this as a "Warner Cable, Civil/Military Emergency Alert."

Audio for the emergency message will be provided via the incoming phone line. In effect, the voice of the Okaloosa County Civil Defense authorities will then advise area residents as to the nature of the emergency and what action should be taken.

Video source for the system is provided by a Knox K128 character generator, equipped with a non-destructable message, and the provision for additional video information as required. Phone line audio and the character generator are fed to a Jerrold Commander II modulator. Modulator output is at IF frequency, and is distributed through solid state relays to all twelve channel processors, resulting in transmission of an audio-video emergency message to all homes on Warner's system regardless of what channels are being viewed by the subscriber.

While the emergency over-ride is intended primarily to alert the population as to weather emergencies, access to the over-ride equipment will also be made available to the command posts of nearby Eglin Air Force Base and Hurlburt Field, to be used for military purposes at the decretion of the respective base commanders.



Technical supervisor Ed Ross runs a final check on Warner Cable's all channel audio-video emergency over-ride to be installed in Fort Walton Beach System.

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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.

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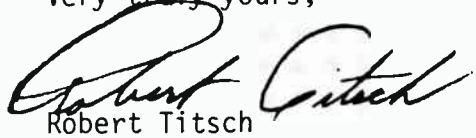


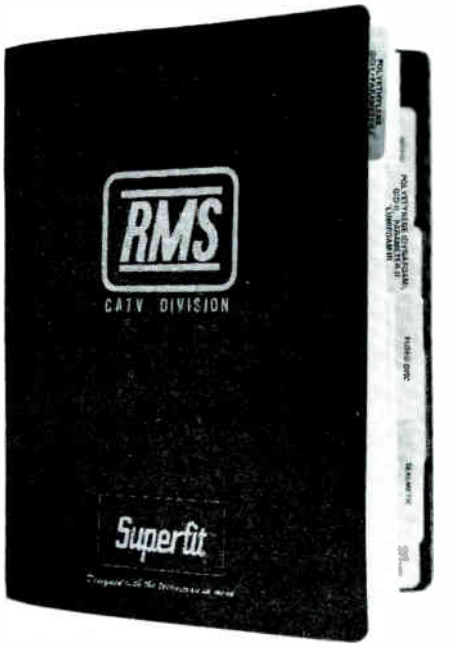
Robert Titsch
Publisher

New RMS Electronics' Power Passing Technical Report

RMS Electronics, Inc., has announced the availability of a new 20 page "UNIPOWER"™ series power passing line equipment technical report. The "UNIPOWER"™ series includes: 2-way and 3-way line splitters; 8, 12 and 16 dB power passing directional couplers and a power inserter.

"MICRO-CIRCUIT", a new RMS engineering concept, is a major feature of the line splitters and directional couplers. The "MICRO-CIRCUIT" is a potted "chip" (manufactured in the configuration of an integrated circuit), that basically performs the functions of a miniaturized hybrid network. This assures absolute electrical alignment stability against incorrect "in-field" adjustments, internal thermal contraction and expansion network changes, excessive line vibration, accidental dropping and other physical abuses.

For additional information, telephone collect 212-892-1000.



RMS power passing report

"Don't Put a Tiger Stripe in Your Cable" from Cerro Communications

A technical article that discusses bonded drop cable that uses a new kind of laminated tape shielding to virtually eliminate radial cracking, known as "tiger-striping" — and compares it with cable using ordinary foil shielding — is now available from Cerro Communication Products.

This article provides information about the need for bonded cables, compares the construction of the new laminated tape shielding with foil as far as breaking strength and elongation properties. It also outlines some of the field problems caused by "tiger-striping."

A table compares the three types of foil and braid cables now available as to foil push back, tiger-striping, slot antenna, moisture resistance and flex life.

For additional product information, contact Cerro Communication Products, Halls Mill Road, Freehold, New Jersey 07728.

Canadian Cable Use of Satellites

By Kenneth Hancock, Director of Engineering, CCTA

For once Canada was ahead of the United States in satellite matters, insomuch that it was the first country to have a domestic satellite system in orbit. Telesat Canada orbited it's first Anik A satellite from Cape Kennedy on November 9th, 1972. Almost concurrent with this, its network of five different types of earth stations came into operation. The first of these types—the telemetry—tracking and control earth station is located at Allan Park in Ontario in the Eastern part of Canada. At the same location is one of the two heavy route multi-purpose communications earth stations. These stations with a 98 foot antenna have an extremely high G/T of 37.5 dB/degrees k and are suitable for trans-continental traffic as well as any other domestic communications purpose. These are backed up by the network television earth stations (NTV) which are capable of receiving and transmitting full network quality TV. There are now six of these NTV stations located in association with the major cities in Newfoundland, Nova Scotia, Quebec, Manitoba, Saskatchewan and Alberta.

Of particular interest to Canadians is the fourth type of earth station, the Northern Telecommunications Stations (NTC). There were two of these in the far Canadian North, bringing modern telecommunications to the area for the first time with a complete voice message service as well as television reception. The fifth group of ground stations installed in 1972 were the remote TV receive only stations (RTV's). As these are very similar to the earth stations in use by cable systems in the United States they are of specific interest to Canadians. There are now some 24 of these stations spread throughout the Canadian North receiving the National network, and the Canadian Broadcasting Corporation. These use a 26 foot antenna and give a G/T of 26 dB/degrees k.

Since 1972 many other ground stations have been added, as have two further Anik A satellites, giving a total orbiting capability of 36 transponder channels, 6 of which are reserved for standby operation.

With this vast satellite capability, the question of "why aren't Canadian cable companies using the Anik satellites" is a very valid one. Up to this time the answer lies in Telesat's marketing policies, which to some extent have been prescribed by its Charter. First, Telesat's policy has been to only allow the lease of a full transponder channel for a period of five years. This, coupled with a comparatively high price of three million dollars per year per transponder channel has had the effect of keeping all potential customers, with the exception of the common carriers and the CBC, out of market. These restrictions have also made use of the satellite for cable companies less attractive. In addition, over the last five years, more and more cable companies have been leasing long-haul terrestrial microwave channels under long leases. Thus, for the carriage of off-air channels, the number of potential subscribers that could be served by the satellite becomes fewer and fewer. One of the major catalysts for the use of satellite distribution in the United States has of course been pay-TV. At this time pay-TV is not permitted in Canada so this further restricts the possible applications of the Anik A satellites.

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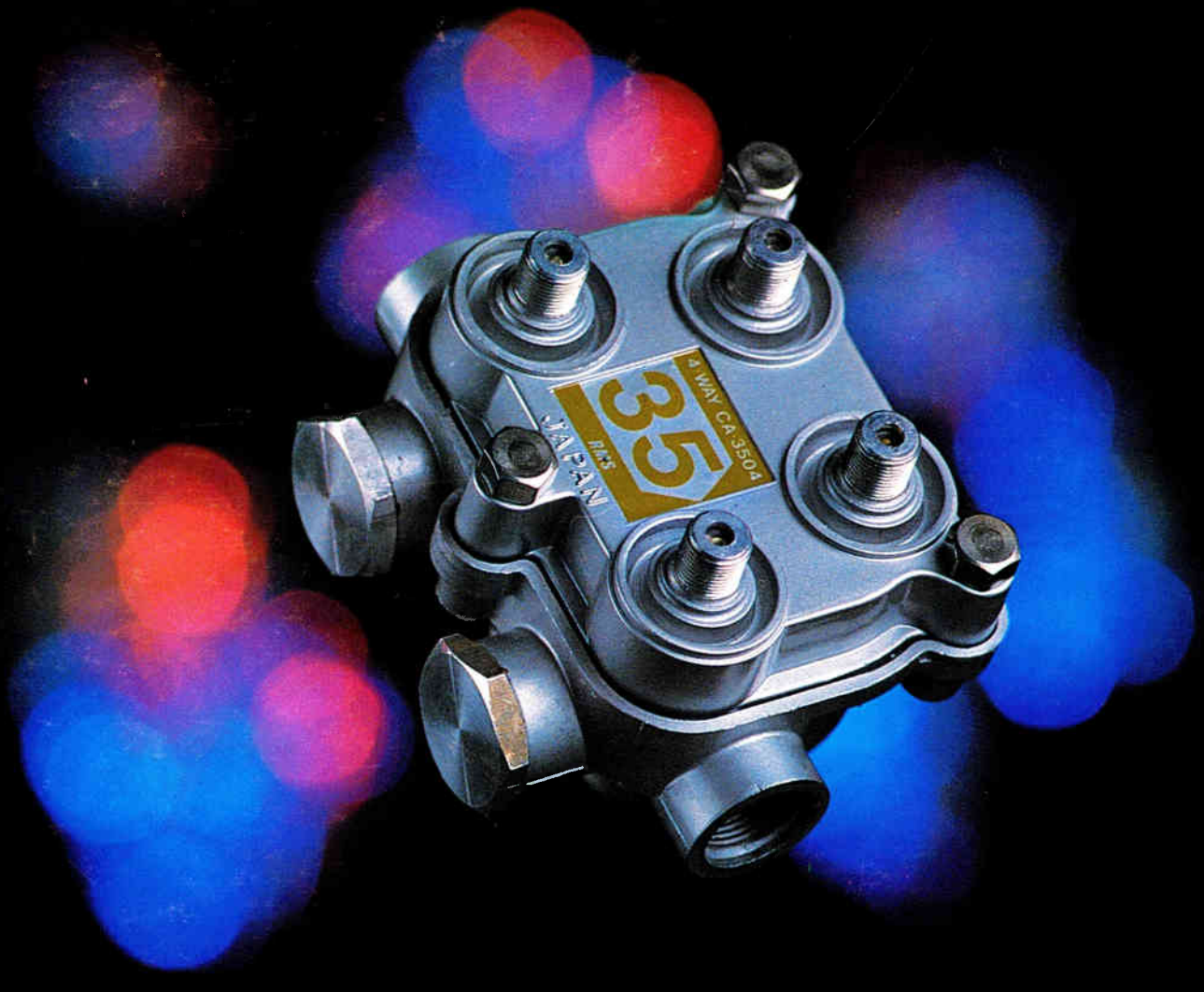

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