C-ED

Western Show Issue

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Communications-Engineering Digest
Reporting the Technologies of Broadband Engineering

December 1979
Volume 5, No. 12

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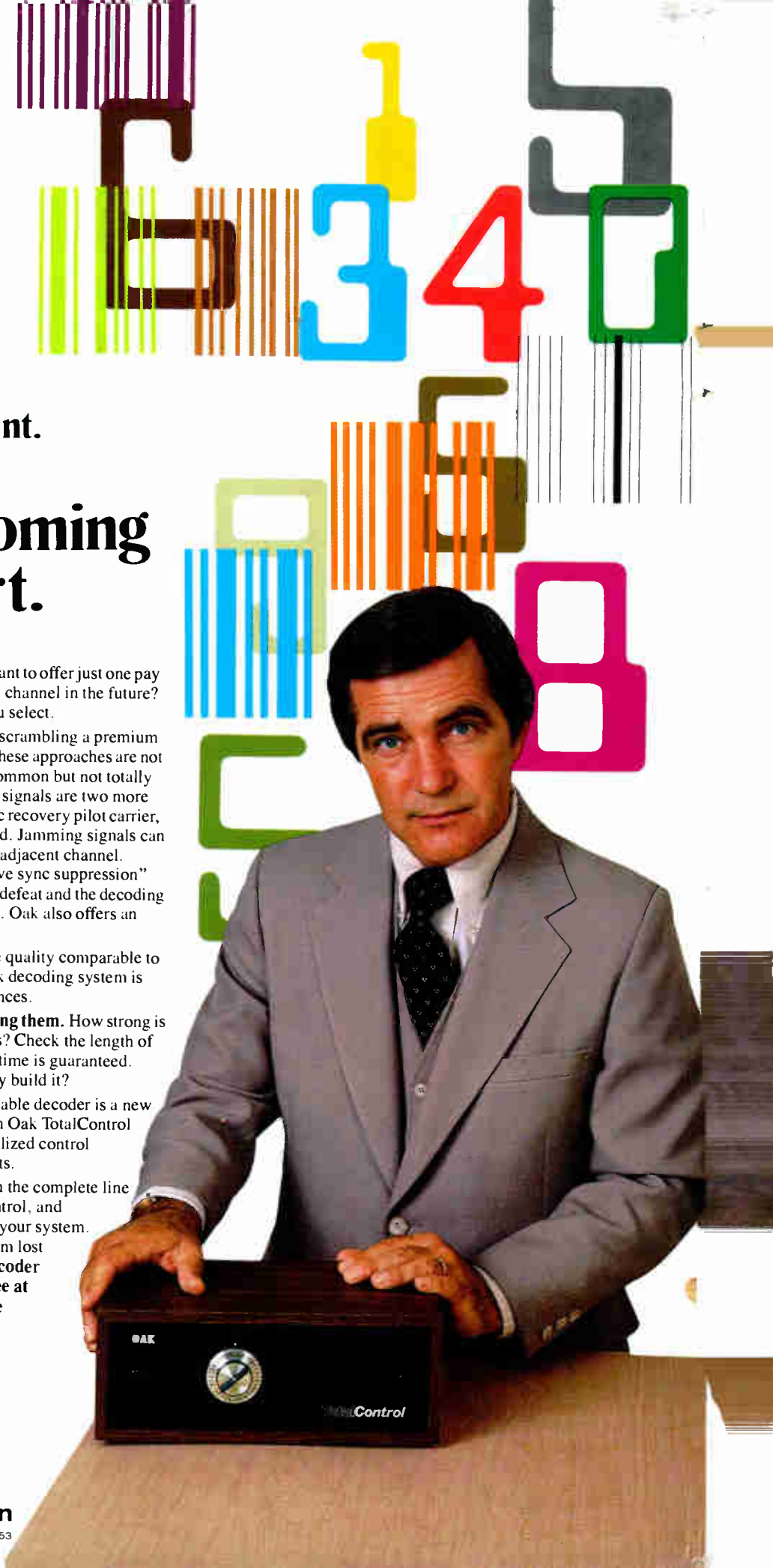

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C-ED News at a Glance

WASHINGTON, D.C.—**House Communications Subcommittee Chairman Lionel Van Deerlin and staff** grow impatient as they **await the findings of a study by the Congressional Research Service (CRS)** they had hoped to have by Thanksgiving, The study reportedly suggests that the Federal Communications Commission does not have the authority to impose retransmission consent requirements on cable television. In addition to the commission soliciting public comments on retransmission consent as part of its notices of proposed rulemakings on deregulating signal carriage and syndicated exclusivity, the House subcommittee had also included retransmission consent in its Communications Act rewrite bill which failed to get by the first two days of mark-up last summer. It is hoped that the CRS study will shed some independent light on the debate prompted by NTIA's petition asking the commission to require cable operators to obtain permission from broadcasters or program rights holders for the distant, non-network programming they carry.

WASHINGTON, D.C.—**The Federal Communications Commission (FCC) appeared to be getting good marks** from most members of the House Communications Subcommittee during oversight hearings **last month,** as most pressed on only what would have to be described as pet issues.

In fact, Subcommittee Chairman Lionel Van Deerlin (D-CA) actually had considerable praise for what the FCC had accomplished in recent months in regard to reorganization and what he called "taking a fresh look" at cable, STV and earth stations. "It is unusual for a regulatory agency to deregulate anything," Van Deerlin commented. "Yet, where the costs of regulation cannot be justified, you seem to agree that the public is best served by deregulation. Hand in hand with deregulation, of course, must come a commitment to the development of technologies that can increase the communications outlets available to consumers.

"I only hope," Van Deerlin told the Commissioners, "that when your deregulatory proceedings are completed, we will see both an end to much of the intrusive and unnecessary regulation practiced in the past, and the beginning of a true communications marketplace."

Perhaps the sharpest discussion came early in the hearing as Carlos Moorhead (R-CA) pressed the commissioners as to their intentions regarding deregulation of signal carriage and syndicated exclusivity, particularly the latter. Moorhead continually expressed his concern that without the exclusivity rules the Copyright Act would be meaningless. FCC Chairman Charles D. Ferris stuck to his premise that the commission in no way would do something which would result in a deterioration of program availability and quality. Ferris acknowledged, however, that there may be a problem with compensation.

In other cable television related discussions, Commissioner Abbot Washburn pushed to have the subcommittee consider limiting the number of cable systems which can be owned by a single entity. "Diversity of viewpoints is essential to a democracy," Washburn stated. "To that end it has been, and is, the government's policy to foster ownership. It is obviously inconsistent to limit ownership of conventional TV stations to seven, while permitting the ownership to several hundred cable TV systems," remarked Washburn.

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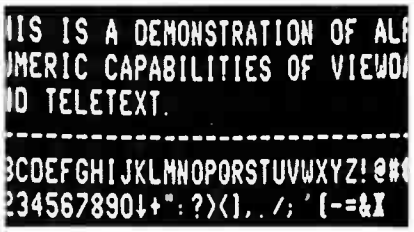

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OPINION

Cover: An example of an interactive Playcable basketball game is shown in the cover photograph, courtesy of Jerrold Electronic Corporation.

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Editor's Letter

Everyone's talking these days about the Federal Commission's "deregulation" of earth-receive stations. (See the November issue of *C-ED* for details.) Initially hailed as a positive step for the industry, its bask in the sun, has undergone more careful scrutiny in recent weeks.

We asked Bob Cooper for his impressions of the commission decision. As always, Coop went right to the point. ". . . In short, you can do about anything you want with your new TVRO installation," Coop notes, ". . . and that's one of the dangers of the FCC's decision. There is no longer anyone telling you that you must design and build a system that maintains certain minimum performance standards." There's a lot more from Bob Cooper in this special C-ED feature, and you can find it starting on page 22.

Elsewhere in this issue there is an update on the World Administrative Radio Conference meeting in Geneva. Our readers may recall that last September *C-ED* had a special feature on the WARC conference which was then about to convene. We've been following this extraordinary session courtesy of the Department of State. So catch up with WARC beginning on page 32.

Finally, we are delighted to announce the appointment of Gary Witt as Executive Editor of *C-ED*. In addition to his high interest in technology, Gary is an attorney and in undergraduate school majored in Economics and English. Gary will be at the Western Show along with the rest of the staff. Next issue we will have another very important personnel announcement. This person, together with Gary Witt and others will further our efforts to bring the best of *C-ED* to our readers.

Paul A. FitzPatrick

The Programmable Calculator as a Valuable Tool

By Jerry O. Bybee
North Central Regional Engineer
American TV &
Communications Corporation

Many of you can remember the good old days when we used the slip-stick and calibrated eyeball to make most of the calculations that we used in the engineering area. This is not to say that there were not good calculators on the market, but for many of us the price was out of sight. Then a few years later we were able to buy these wonders, and the things it could do were almost staggering, not to mention the amount of time it saved us. It was of course not long before this electronic slide rule had become a standard that none of us could be caught without.

It's been a few years now since our old friend has been re-introduced with yet another remarkable feature and this is, of course, the ability to be programmed. I'm not sure when I first started thinking about getting one. I do remember reading an article in 1977 by Bill Marshall from Waynoka, Oklahoma, about how he used a calculator in feeder line design, and as the old saying goes, "it seemed like a good idea at this time." I remember the first few weeks after I purchased mine I was like a kid with a new toy. I studied the manual and then proceeded to try one standard program after another, including the games. It was not only a handy tool, it was fun. And then the day came, of course, to try my hand at writing a program. I'm sure this was easier for many others than it was for me, but after many modifications to my so-called program, I was able to get this remarkable machine to do what I wanted.

Not long after this I found that others within the company had also purchased the identical calculator that I had. It's needless to say that we started to exchange some of our programs. I was amazed at some of the programs that others had written compared to my first humble attempts.

One of the engineers in our microwave division, Bob Schumacher, who is a whiz at this sort of thing, wrote a number of programs to calculate such things as Earth Station Elevation and Azimuth, Great Circle Intercept Points, 0.6 Fresnel +1, and Distance between points on the Great Circle.

Not long ago it was necessary in two of the smaller systems to start looking at a partial rebuild. We would be replacing a number of the active devices on a continuing program to be spaced over some predetermined period of time. One of the problems would be system powering. The new amplifiers to be used had a somewhat higher power requirement than those in operation. This was also complicated by the fact that the system was already hurting from the indiscriminate addition of a line extender here and a bridger there that was so common when these systems had been built.

At this point the old trusty programmable calculator was again pressed into action, and a simple program was developed to calculate voltage losses, and availability, on the trunk and distribution system. With two systems to handle what amounted to about 30 power supply areas, I cannot tell you the number of hours saved over the previous conventional methods. I can say that I would not be caught without my little jewel, and it has certainly saved me more time and money than it had cost. The programmable calculator is certainly not the end result. Other more sophisticated and versatile machines which are fantastic have hit the market. Unfortunately the price is still a little out of my reach. Someday I'm sure we will all have one but until then my programmable calculator will continue to be a magnificent workhorse for me.

I would be interested in trading programs with anyone out there in CATV Land or in passing on whatever programs I have to anyone interested. The present programs I have can be adapted to other calculators with little trouble. The programmable calculator for me has been one very valuable tool.

SCTE
Change of Address

Effective December 1, the SCTE offices will be located at 1900 L Street, N.W., Suite 614, Washington, D.C. 20036. The new telephone number will be (202) 293-7841.

SCTE 1980
Meetings and Conferences

For attending SCTE conferences, there are all sorts of benefits. For example, the University of Alabama continues to award continuing education units (CEUs) for participation. SCTE issues handsome certificates of completion. And, the IRS allows a tax deduction for educational expenses incurred in connection with employment. Listed below are the 1980 SCTE meetings and conferences.

January 14-15: CATV Test Equipment: Who Needs It?, technical meeting and workshop, Tallahassee Hilton, Tallahassee, Florida.

February 5-6, Spring Engineering Conference and Annual Membership Meeting, Adams Hotel, Phoenix, Arizona.

March 24-25, CARS Microwave and Satellite to Cable, technical meeting and workshop, Hyatt House, Richmond Virginia.

April 28-29, Effective Communications: Putting Your Best Foot Forward, Sheraton Inn—Memphis Airport, Memphis, Tennessee.

June 5-6, Preventive Maintenance (in cooperation with the New York State Commission on Cable Television, the State University of New York, and the New York State Cable Television Association), Empire State Plaza Convention Center, Albany, New York.

July 14-15, Coaxial Cable or Fiber Optics? Which Do I Need Now?, technical meeting and workshop, Wichita Hilton Inn, Wichita, Kansas.

October 15-16, Emerging Technologies: Teletext and Data, Playboy Resort and Country Club, Great Gorge, New Jersey.

November 17-18, What's New in New Services for CATV?, technical meeting and workshop, Hyatt Hotel, Phoenix, Arizona.

Contact SCTE, 1900 L Street, N.W., Suite 614, Washington, D.C. 20036, (202) 293-7841, for further details.

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Western Show Technical Seminars

ANAHEIM, CALIFORNIA—Technical seminars will be conducted on December 13 at the 1979 Western Show, sponsored by the California Community Television Association. Seminars will be held in the Magnolia C Room at the Disneyland Hotel, Anaheim, California.

Topics include Underground Construction—A New Era, moderator: William Hargan, Feather River Systems Corporation, at 9:15 a.m.; Complex World of Satellite Receivers, moderator: James Vaughn, Showtime Entertainment, at 10:40 a.m.; Fulfilling the Technical Needs for the '80s, moderator: Joseph Van Loan, Viacom International, Inc. at 2 p.m.; and Expanded Bandwidth for the Future, moderator: David Randolph, Storer Cable TV, Inc. at 3:30 p.m.

For further information, contact Fran Ferriter, convention coordinator, 3636 Castro Valley Blvd., No. 10, Castro Valley, California 94546, (415) 881-0211.

Zimmerman Appointed NTIA Deputy Assistant Secretary

WASHINGTON, D.C.—Edward K. Zimmerman, formerly special assistant to the director of the Office of Administration, Executive Office of the President, has been selected to be deputy assistant secretary of commerce for communications and information and deputy administrator of the National Telecommunications and Information Administration (NTIA).

Zimmerman was appointed to his new position by Assistant Secretary Henry Geller, who is NTIA administrator. In announcing the appointment, Geller said that "Ed Zimmerman brings to NTIA an impressive background in all aspects of information management. We believe he will greatly strengthen our policy development role, especially in the fields of computer communications and, more generally in information policy."

Zimmerman joined the White House office of administration in 1977. In fact, he helped create that office, which has become the primary agency for information management in the executive office of the president. As such, the office responds to needs for information for policymaking in both the White House and in the Congress.

Prior to joining the White House staff, Zimmerman spent nearly 20 years working with information management and communications in private industry and government, both in the United States and overseas.

Kahn Urges Competition

WASHINGTON, D.C.—Tracking with the Administration's position that technology has invalidated the old assumption that "all aspects of telecommunications service are natural monopolies," White House inflation fighter Alfred Kahn told members of the House Communications Subcommittee that government was still attempting to apply an anachronistic regulatory structure.

"Competition is here to stay," Kahn stated. "It's a good thing because it is a far more reliable means of probing the potential of communications." Kahn noted that technological developments have rendered certain distinctions obsolete and mentioned cable television and telephone service as a specific example.

Last month, the White House issued a statement by President Carter urging the House and Senate communications subcommittees to press forward with legislation to revise the statutory framework, which the President said has remained unchanged. Focusing for the most part on telephone issues, Carter stressed that competition should be encouraged, and fully competitive markets should be deregulated while at the same time, universal availability of basic telephone service at affordable rates should be maintained.

NTIA's Dale Hatfield (left) and White House inflation fighter Alfred Kahn participating in "informal briefings" before the House Communications Subcommittee.

The President's message also stated that rural telephone companies should be encouraged to help extend to rural Americans the benefits of all the new communications technologies, and that "the current rules that restrict rural telephone companies from offering cable TV service should be removed."

Kahn, who gained considerable experience with many of the issues while serving on the New York Public Utilities Commission, participated in that White House briefing along with Administration advisors Stuart Eizenstat and Rick Newstadt. The session before the House Communications Subcommittee was one of a new series described as "informal briefings" but, are beginning to take on the aura of full-scale hearings according to one member of the staff.

Congressman Alan Swift (D-WA), asked that the briefings be held in the wake of the Communications Act rewrite since many of the subjects which came under review were beyond the immediate grasp of some members of the subcommittee and their staffs. At one point during the briefing by Kahn, Swift made note of the phenomenon that people nod their heads in affirmation even though they do not really understand what is being said.

Kahn outlined for the Congressmen (there were only one or two present for most of the time because of business on the House floor) how the Administration arrived at its position. The details of the White House recommendations will be divulged later this month when National Telecommunications and Information Administration director Henry Geller unveils its legislative proposals.

"The only real question, I suppose, is will competition work or not?" Kahn asked. "There will still be a need for devising safeguards to see that competition is fair. But, even when there is

some uncertainty, let's try to leave it to the competitive environment." He expressed hope that Congress would make such a finding and tell the FCC to "stop regulating these things," adding that Congress has an opportunity to stop endless litigation and remove barriers to entry. "The consent decree is outmoded and denying us the creativity of the Bell system," Kahn stated.

Kahn stressed that Congress should make a declaration of reliance on competition; that all assumptions should be made on the side of competition; that in some areas certain stipulations must be made as to conditions which must be met; that jurisdictional boundaries between Federal and State governments must be redefined; and a switch must be made to access charges in order to bring hidden subsidies out in the open. Kahn was flanked by government experts in the field, including Dale Hatfield of NTIA and chief of the FCC's Plans and Policies, Nina Cornell who explained that she had come prepared to engage in debate. However, she said she believed that the Commission would be in agreement with most of the Administration's policy.

Bob Ross, executive vice president of the National Cable Television Association (NCTA), commented that he believes the impetus for eliminating the consent decree is coming from the interface of telecommunications and computer sciences. "If remedies are required for that," Ross noted, "the door should not be opened for AT&T to enter into every other field of endeavor, particularly the media."

Ross said NCTA is in agreement with NTIA proposals which have been circulated and include language which would preclude a monopoly like AT&T from providing both the conduit and the content.

Comsat Gains Share in Inmarsat

WASHINGTON, D.C.—Comsat has a 23.5-percent ownership interest in Inmarsat, the International Maritime Satellite Organization, as a result of action by the Inmarsat council, which concluded its second session on November 6 in London.

Comsat is the sole U.S. representative in Inmarsat. Inmarsat is expected to begin providing maritime satellite communications service in the early 1980s in a transition from the present Marisat system, developed and managed by Comsat General Corporation, Comsat's wholly owned subsidiary.

Once the Inmarsat system becomes operational, the investment shares of all members will be adjusted periodically to reflect each country's use of the global system.

Twenty-nine countries now belong to Inmarsat, and 26 of these are represented on the council. The council, the governing body of Inmarsat, first met in July after Inmarsat officially came into being. During the second session, held from October 30 to November 6, the council, in addition to the decision on investment shares, took the following other actions:

- It elected Olof Lundberg of Sweden as director general, the executive head of the entire Inmarsat organization.
- Concerning the space segment, it decided to discuss with the Marisat consortium—Comsat General, RCA Globcom, Western Union International and ITT Worldcom—appropriate transitional arrangements from the Marisat system to the Inmarsat system, and to seek a lease proposal from the Marisat consortium for Marisat satellites. Discussions will be held with Intelsat and the European Space Agency concerning their space segment offers. The Inmarsat technical advisory committee will develop technical and operational requirements of the Inmarsat system which could be used in possible request for proposals for satellite capacity.
- It elected Luis Perrone of Brazil as council vice chairman. A.R.K. AlGhunaim of Kuwait assumed the chairmanship after being elected at the first session.
- It admitted France and the Federal Republic of Germany as members of the council. The two countries joined Inmarsat in mid-October.
- It admitted Algeria, Argentina, Bulgaria and China as members of the council elected by the Inmarsat Assembly.
- It accepted Comsat's offer to host the Council's fourth session in Washington, May 7 through 14, 1980. The next session, the third, will be held in London, February 6 through 13, 1980.
- It set January 9 to 16 in London for the next meeting of the council's advisory committee on financial and marketing matters, and January 17 to

(Cont'd on page 18)

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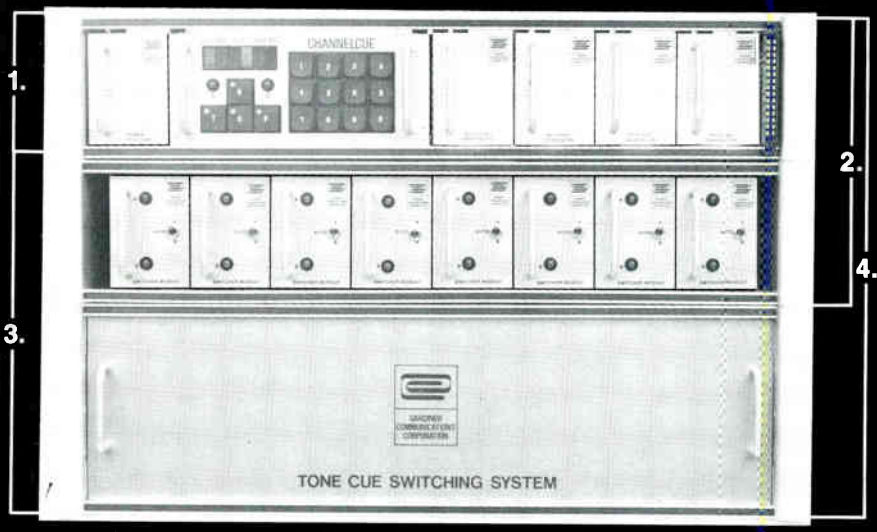

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(Cont'd from page 12)
25 in London for its advisory committee on technical and operational matters.

Datacomm Calls for Papers

CHICAGO, ILLINOIS—The International Microcomputers Minicomputers Microprocessors/Datacomm '80 Conference to be held June 17 to 19, 1980 has issued a call for papers. The conference will be held at the Palais des Expositions in Geneva, Switzerland.

The subject matter for requested papers includes satellite communications; packet switching networks; communications protocols; network control and measurement systems; management; local networks—corporation communications; distributed processing systems; corporation communications—manager level considerations; the human/computer interface; status of European commercial networks; planning and implementing a data communications system; the impact of high level languages on micro/minicomputer system; advances in low-cost peripherals in micro/minicomputers; software development—tools and techniques; 16 versus 8 bit devices; VLSI/bubble/CCD memories; microcomputers in industrial automation; parallet/multiprocessing; troubleshooting, tests, debugging of microcomputer systems.

In addition, review papers of an instructive nature aimed at the business community are invited. The abstract due date is February 15, 1980. Announcement of selected papers will be made on or about March 15, 1980, and proceedings will be published. Abstracts should be sent to Dr. Fred Morritz, Industrial & Scientific Conference Management, Inc., 222 West Adams Street, Chicago, Illinois 60606.

Hughes Subsidiary Formed; Two Birds Planned for Orbit

DENVER, COLORADO—*C-ED* has learned just prior to presstime that Hughes Aircraft has formed a subsidiary called Hughes Communications. The new subsidiary has filed documents with the Federal Communications Commission requesting common carrier status. Hughes Communications plans to launch two satellites for both video and data transmission purposes. No launch date is known at this time.

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.750"	.77	.80
1.00 "	.63	.65

FUSED DISC III establishes the standard for low-loss CATV Systems. FUSED DISC III cable provides an average loss improvement of 12% over other cables.

The superior electrical performance of FUSED DISC III provides you with these economic advantages:

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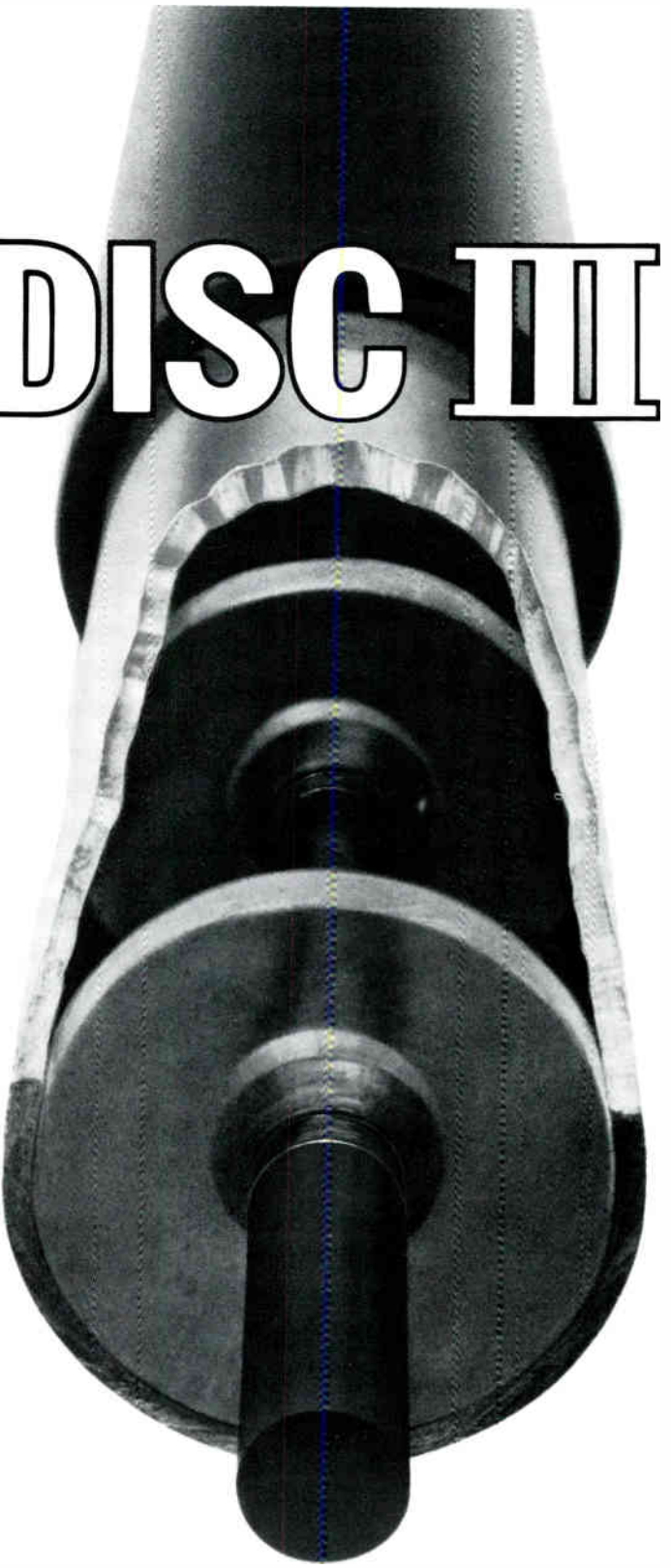
More and more systems are being built, re-built and expanded with our cable. For an information package on this high-performance cable, write: General Cable Company, CATV Division, P.O. Box 700, Woodbridge, N.J. 07095, or call toll free: 800-526-4241, if calling from New Jersey, please dial: 201-636-5500.



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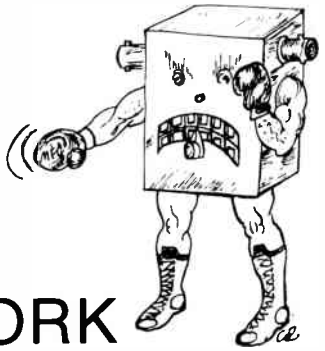

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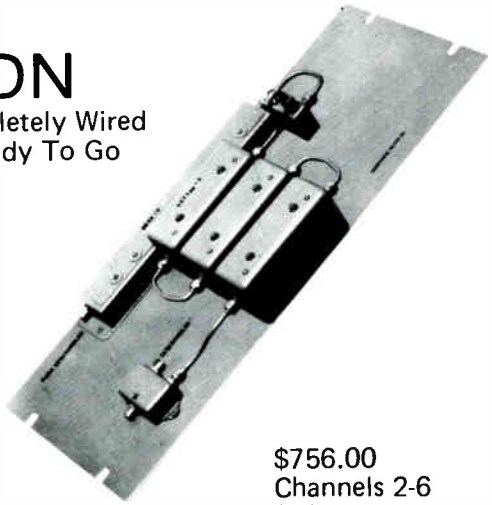

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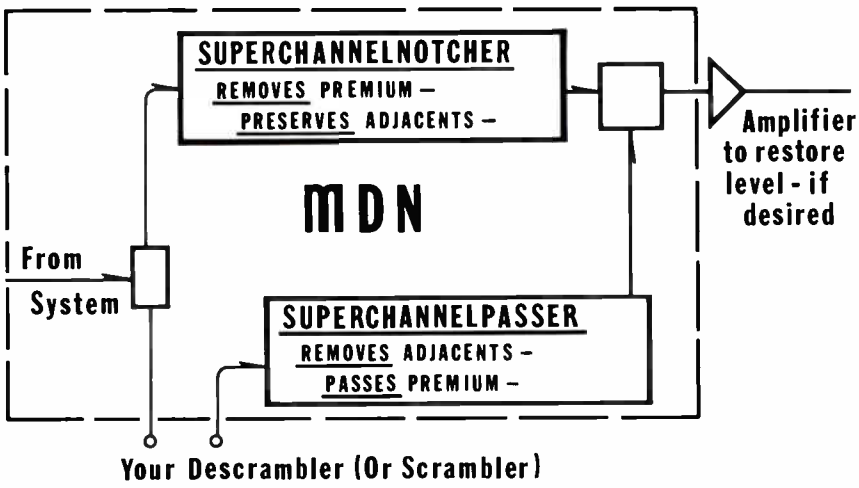

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MDN pulls the scrambled channel off the line, cleans the main line of premium channel spectrum and REINSERTS the CLEANED-UP, DESCRAMBLED premium - at the SAME level as all other channels on the line.

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Special *C-ED* Feature

On the Fully Addressable Converter

by Frank Leiter, Wometco Communications, Inc.

Anything that's being designed today has to be designed for a minimum of five years and I would go as far as to say for ten or fifteen years. We're in a mode of operation now where we're changing out equipoment almost every other year, because the technological changes and the programming changes we're going through are so quick.

I think everybody, looking at the programming end, says, 'Gee, this will work.' We can now offer a maxi and a mini and we can offer two maxis and a mini which is all fine and good but I think those of us who are in management and not so technically inclined tend to overlook the fact that there's a poor ole engineer out there that's got to make that thing work, and he doesn't have much to work with.

What I see coming in the future or what I would like to see coming (and everything that you talk about is fine except that it all boils down to cost to the customer and when I say customer, I mean operator)—I would like to see a fully addressable converter that could be controlled from the headend by address on a per channel basis so that I can go into the headend or go into my business office and say '25 Maple Street has disconnected the first level maxi service and they called up and requested a disconnect.' So I put that order into my headend operator and he addresses that box and turns off the first level maxi. If I'm selling a group of signals, which we plan on doing now—let's say four or five channels as a second tier, not pay service, but as a second tier basic service—rather than giving the subscriber a new converter or changing that multi-channel trap out there, I could program into my computer again and give this person these five channels, because he's now likely to pay us four or five dollars more a month on a second-tier basis.

So there are some addressable taps working already but that's not quite it when they're talking about turning on or off a group of given channels. I think what we need, and again at a reasonable cost, is a fully addressable converter with its own individual address so that you don't need a two-way cable system to operate. If a person calls me and says disconnect my service, I can program it down the system and turn off the service in that home without even going to it.

I think we're reaching the point that if I have to go to an individual home and change that person's service several times the first year just because he can't really make up his mind, I do two things: (1) I create extra service work for myself which may require additional people which I can't really afford and (2) I'm charging him a heck of a lot of installation fees. Every time I change a service, I may charge him 10 or 20 dollars a shot. I might not have to do that if I had control.

We need to take a hard look at where we are today. We've run into a number of problems not only on availability which is kind of a terrible problem for us today. We've expanded into pay so rapidly that we've tasked the manufacturing capability of all supplies. And we've used equipment in the last year or two that we know we're going to change out next year or even the year after—and that is not a good way to do business. Now we have enough systems in our network that we can place this equipment somewhere else and utilize it, but what about the poor ole independent operator who only has one child—and he wants to expand to second or third level tier. You're talking about a real expense.

What TVRO Antenna Deregulation Means

By Bob Cooper, Jr.
Satellite Television Technology

Well, the Commission did it. It decided that anyone who wishes to construct an earth-located satellite receive terminal may do so without its blessing. Or its CP or its license. Just go ahead and do it.

That means you don't have to engage a frequency coordination firm anymore to run a series of computer studies on your proposed site; you don't have to use a certain size antenna or any specific grade of LNA or any specific receiver threshold. You do not have to maintain the fabled 2.97-dB *excess signal margin* on paper or in practice. In short, you can do about anything you want with your new TVRO installation, which includes building it so badly that people subscribing to your cable system will wish you would return to that 140-mile distant third NBC station which you pulled off for the new satellite channel.

And that's one of the dangers of the FCC's decision. There is no longer anyone telling you that you must design and build a system that maintains certain minimum performance standards. Since October 18, you have had the option of being as big a fool as you want.

Of course nobody in CATV land is going to build a substandard TVRO receiving terminal. Right? Well, let's see where this is headed and how alert you will have to stay to keep from being a fool.

The commission said . . .

Effective October 18, TVRO (and ARO) licensing is no longer mandatory. It is optional. You can still go through frequency coordination, site studies and laborious calculations and take that data to the FCC as part of a formal license application, as we have been doing for many years. If you freely elect to follow this licensed-terminal path, the FCC will issue a license. What does a license buy you? Protection. By licensing your terminal, you ascertain at the beginning that nothing then in operation or planned for operation will cause you interference and that, after you are licensed, nothing new which might someday cause you interference, will be allowed to begin terrestrial operation. A license is an insurance policy; and it is not a bad one when you consider what your cash-flow involvement might be over the years with your off-satellite signals.

Did the commission's action do anything for the to-be-licensed folks? Yes, it did. For example:

(1) You can now begin construction and operation of your to-be-licensed terminal anytime—even before you receive your CP/license. However, you have no protection against interference until your license is granted. After it is granted, you do.

(2) Effective immediately all earth station licenses (both receive-only and transmit-receive) will be granted for five-year terms. (They have been three-year-term licenses).

(3) You no longer need to obtain a modification of your TVRO license if you elect to cost-share (on a nonprofit basis) your (or somebody else's) TVRO terminal. Just hook up the other cable system.

(4) When your present TVRO license expires, you will have the option of renewing it or dropping it. In other words, you can convert from a protected status to an unprotected status at renewal time. There is more. For many, this will be the best news.

(5) Effective immediately, applicants for TVRO licenses will no longer be asked to provide a financial or economic showing (which has included articles of incorporation, balance sheets, and FCC forms 403 which deal with

character qualifications).

This matter arose about one year ago. The commission, under Chairman Ferris, has been moving steadily toward deregulation of burdensome, nonessential areas. The chairman, in his statement accompanying the decision, noted, "It is often more costly to undertake FCC licensing and frequency coordination than to relocate an occasional earth station if the need arises." The bottom line at the commission these days is to shift more of the burden for orderly development of new technology to the users of that technology and away from the hallowed halls of the FCC bureaucracy.

If you elect not to . . .

The commission feels that most cable TV systems *will* get a license. It believes that you do not want your premium movie service channel torn up sometime by a new terrestrial microwave system. Even if moving the terminal is not difficult, you could have several anxious weeks while you were selecting a spot to which to move it, making tests to determine that the new spot is interference free, etc. You could lose more in revenue during those anxious weeks than you might have spent initially to become licensed. For most of us, nonlicensing does not make much sense. The commission has some down-the-road thoughts on this; it is considering ways to revise the present licensing system so that you can become licensed with little hassle. One of its proposals (and it is strictly an internal proposal for now) will enable you to conduct your own frequency coordination, to perform your own engineering, and then to send the commission a brief summary of your calculations and tests. In effect, you would not, under this proposal, have to submit volumes of detailed and often repetitious data. You would perform the work and analysis, and you would submit that, based upon your analysis, your site was clear, and the commission would so certify you and your site. You would have your license with the protection that accompanies it. This is a possible next phase for TVRO licensing, and it is one well worth supporting.

For now, if you elect not to be licensed, the commission wants you to know that "you will have no right to complain about interference to signal reception." If you build a terminal and if you find you have interference, don't complain to the commission. You are on your own; you assume full responsibility.

There are the basic facts of the deregulation. If you elect to obtain a license, you can take the interim step of installing your terminal, and turning it on, and starting service (assuming you have program contracts with the common carriers; we'll talk about that shortly) *while* your license is being processed. Or you can put in the terminal, turn it on, start service (again with the agreement of the common carriers involved), and take your chances that new terrestrial four-GHz systems won't wipe you out later.

Which leaves us . . .

This decision establishes a freedom to act with fewer restrictions. Implicit with the deregulation is an abandonment of the 2.97-dB (call it three-) excess signal margin. Every terminal installed until October 18 had to meet the commission's requirement that the combination of the antenna, the LNA, the receiver threshold plus the TVRO receiver IF bandwidth would equal at least three-dB more carrier than the threshold point on your receiver system. This three-dB has sometimes been expensive overkill. For example, when a 10-foot antenna would provide a marginal above-threshold signal, the FCC three-dB excess requirement increased you to a 15- or 16-foot antenna. For those who have not priced the difference between 10 feet of surface and 15 feet of surface, it is a whopping 100 percent or more. You can find many 10-foot surfaces in the $1,800 to $3,000 price region with as few or as many frills as you desire. But, the 10-foot dish may be as dangerous to your health as a 16-footer is to your pocketbook.

Let's face facts. There are now thousands of homebrew (or private) terminals out there. Most deliver trashy looking pictures which only their creators can admire. A few work well, but with all these 8-, 10-, and 12-footers popping up in backyards from coast to coast, has come a lesson we should observe. Even in the center of the 35/36/37 dBw footprint regions, a 10-foot is very close to the *sparklie* level. It is so close that you can actually see picture degradation as a function of time of day or nasty weather. We now know that except in unusual cases the downlink signal never varies more than 0.7-dB (downward). So, if you start to see sparklie noise with a *fade* of less than 0.7-dB, you don't have even a dB of margin. So, it is not surprising that at least for now the next larger antenna size from the 10-foot, or the 12- to 13-foot intermediate step, starts to make excellent economic sense to the cable system that is (1) looking to shave dollars off the initial expenditure for a terminal, but (2) not willing to get so close to the receiver threshold that customers complain about intermittent sparklies.

Numerous 12- and 13-foot antennas have appeared on the market; more will be available shortly. Not all of these smaller-sized antennas are coming from known cable suppliers. Some may be excellent bargains; some may not. For example there is a company in the south central U.S. that is popping fiberglass antennas off a mold that originated on a surplus Bell telephone dish. The 10-foot version is selling in the under-$1,000 range. When the total R and D cost is the time it takes to drive a flatbed truck to a local Bell salvage yard and load the discarded antenna, you can certainly shave dollars off the product.

This may be a good antenna; not having tested it, I have no way of knowing whether or not it is good. But more important than the antenna itself is the example it makes as the onrush of the private (as in backyard) market brings new antennas (and ultimately receivers and LNAs) out of boat hull shops and TV fix-it shops from coast to coast.

The message is simple enough; *caveat emptor,* which means buyer beware. You are purchasing equipment that will be utilized by hundreds or thousands of homes. You are selling a quality, premium service. Read the fine print in your high-dollar (premium) service contract; it probably tells what your minimum TVRO signal baseband signal to noise shall be before you plug into your trunk line. You may not be able to proceed with less than a three-dB excess carrier-to-noise ratio without violating one of the paragraphs in your premium service agreement.

Most systems manage with a margin between 1.5- and two-dB. Most 12- to 13-foot antennas (if they are quality antennas) can give that range of excess or extra carrier above what a 10-foot will deliver. As a result, for the system

on a tight budget, the new deregulation is granting the freedom to drop from a 15- or 16-footer to a 12- or 13-footer, while leaving enough margin to satisfy most safety factors.

If you elect to install an antenna smaller than 4.5 meters, be aware that it is easier to move (and perhaps re-move) a smaller dish than a larger dish. For most 12- to 13-foot antennas, three people can pick it up and carry it around (as well as off). With that ease of installation, a temporary tripod type mount can be fashioned and the antenna can be moved on the property until location is found where terrain or buildings provide shielding from terrestrial signals.

The Onrush of Technology

The commission's ruling opens the floodgates for private terminals, which until this point largely operated outside the law. A whole new industry is rapidly developing in this area and with it are coming hardware innovations which ultimately may affect the way cable systems select equipment. Antennas are only part of this hardware equation.

The prospect that 10- to 12-foot antennas will deliver reasonably good quality (or excellent quality) satellite TV signals from the present four-GHz Domsat birds is bringing a new group of suppliers into the fray. A major portion of the cost in a 15-foot or larger antenna has always been the mounting system and the support structure for the parabolic surface. There is a cross-over point in the 12- to 13-foot region at which antenna mounts can be considerably simplified and the support structure lightened. These factors contribute more to the sudden drop in antenna pricing below 15 feet than any others. The fact that mounts can be simpler (and lighter) introduces a new breed of antenna manufacturer. The manufacturing equipment and expertise required to produce a lower cost, i.e., smaller antenna system suddenly broaden the field at this 12- to 13-foot level. For this reason machine shops in the midwest and fiberglass fabricators in Arkansas can become substantial competitors for the antenna portion of the market and turn out fair quality products in the process. Several dozen such suppliers now exist, although most are selling on a local or regional basis. The same ease of manufacture also presents another group: firms capable of large-quantity production using mass production techniques.

Ultimately it will be this latter group which will make the headlines and have the greatest impact on the private marketplace. When, by mid-1980, antennas begin popping off assembly lines at ten-minute intervals, the character of the private market will alter dramatically.

In the lower-cost electronics area, several substantial developments have already appeared. The traditional CATV installation utilizes a separately packaged 40- to 60-dB gain LNA mounted at the antenna feed driving the four-GHz signal through some reasonable length of one-half or seven-eighth inch air dielectric line. The latest designs in the private terminal area use one or two stages of GaAs-FET LNA (only), married to what is known as an "active" GaAs-FET signal mixer that is housed in the feed portion container. The mixer is driven by both the four-GHz input signal and a voltage-tuned local oscillator that is remotely controlled from the viewing position. What comes out of the antenna feed box is a 70 MHz IF that is then coupled to the balance of the receiver (located inside) through a length of low-cost coaxial cable, such as RG-59/U with which you now run house drops. This results in complete LNA+ receiver packages that have a parts plus burdened labor cost of between $400 and $500 at the present time—pricing that is bound to divide by two before the end of 1980 as volume production increases in this area. An available detailed construction manual describes such a system; it provides excellent insight into how the low cost receivers are developing or offers more than sufficient information to duplicate such a receiver yourself (*Coleman TVRO Terminal Manual*, available from Satellite Television Technology, P.O. Box G, Arcadia, Oklahoma 73007 at $30).

While this single conversion, remotely tuned receiver system may become the format for private terminals of the future, most private terminals today follow standard CATV double conversion techniques with a first conversion from four-GHz down to the 1.2-GHz region followed by a second conversion to 70 MHz. Thousands of these receivers have been duplicated from a design conceived by a Stanford University professor, Taylor Howard, and in fact the Howard terminal design is now found in several commercial receivers intended for the private marketplace. This standard approach (still requiring a separate LNA) occurs in the $2,000 price range, 24-channel tunable receivers.

Private Goes Commercial

Of all the hardware developments found in the private terminal area, the one apt to become the most visible in the cable field in the near term is the Spherical TVRO Antenna developed by cable entrepreneur Oliver Swan of Bisbee, Arizona. Swan, well known in cable circles for his large off-air VHF and UHF arrays, completed design work this summer

Oliver Swan at his spherical antenna farm near Bisbee, Arizona, has developed a full family of spherical antennas from 10 foot to 20 foot. Located in the 33-34 dBw contour region, even ten foot produces noise-free pictures.

(Cont'd on page 29)

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If your system uses encoders, scramblers, decoders or descramblers, please be aware of the following information. Tanner Electronic Systems Technology Inc. as owners of United States Letters Patent #4,074,311 entitled "Television Security System" has recently filed suit in the Federal Courts charging Eagle Comtronics Inc. with infringement of this patent. Tanner Electronics Systems Technology, Inc. manufactures and sells encoders and decoders under the trade name of T.E.S.T. to operators of Pay TV systems. Tanner has also licensed Tocom Inc. and Pico Inc. to manufacture and sell Pay TV equipment under Tanner's patent.

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In testimony whereof *I have hereunto set my hand and caused the seal of the* **Patent and Trademark Office** *to be affixed at the City of Washington this* fourteenth *day of* February *in the year of our Lord one thousand nine hundred and* seventy-eight, *and of the Independence of the United States of America the two hundredth and* second.

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Today, when radiation from drop cable has become a serious concern to many people, Times has taken action to alleviate the problem significantly.

To begin with, we've developed an instrument called the Radiometer which, for the first time, measures radiation definitively. Until now it was anyone's guess. Radiation characteristics were based on relative ratings and not always accurate. But the Radiometer measures capacitive coupling and transfer impedance. The characteristics of the test sample and the test chambers are measured separately. So now we have radiation data that's absolute, accurate and dependable.

Number two and more important, we've used the Radiometer in Research and Development to bring you improved drop cable. How good is the cable? Thanks to the Radiometer, you can see for yourself in the comparative tests shown on the right.

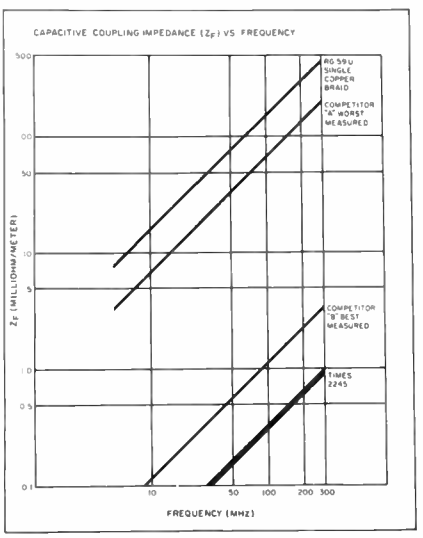
Times 2245, with its sealed foil/double braid construction, is proven to be far superior to every other cable on the market. The best competitive cable (a sealed foil type) was higher in transfer impedance and capacitive coupling. The worst competitive sample we tested was a dry foil construction. And just as a point of reference, we included standard MIL SPEC RG59U, the original CATV drop cable.

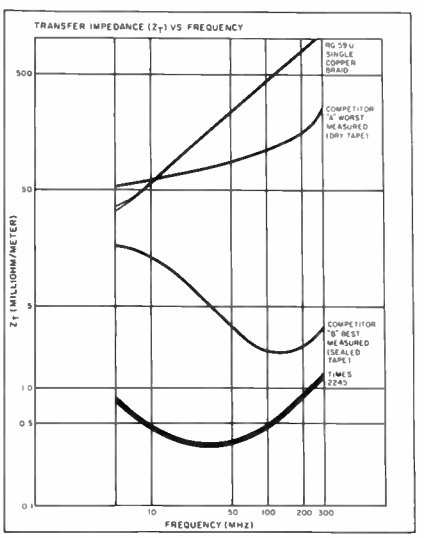
Not shown but also vital is data taken after flexure testing. After many hours of being subjected to simulated severe wind conditions the radiation from one competitor's cable increased by a factor of 40. But the tough construction of Times 2245 kept it from degrading one iota. What's more, we've improved all of our drop cables. Times can offer you cable with the lowest radiation in every price range construction. And this is no idle boast. Radiometer tests prove it.

The Radiometer, however, isn't limited to duty at the manufacturing level alone. CATV operators can utilizes its unique ability to check quality of every reel of drop cable purchased. That's why Times is making the Radiometer Model TNX-247 on a production basis. Selling price: $975.00 including three different size test chambers to cover all RG-59, RG-6 and RG-11 cable.

So now that radiation is such an important issue, there's never been a better time for Times—our Radiometer and our drop cable.

Times Wire & Cable, 358 Hall Avenue, Wallingford, Ct., 06492. 800-243-6904.





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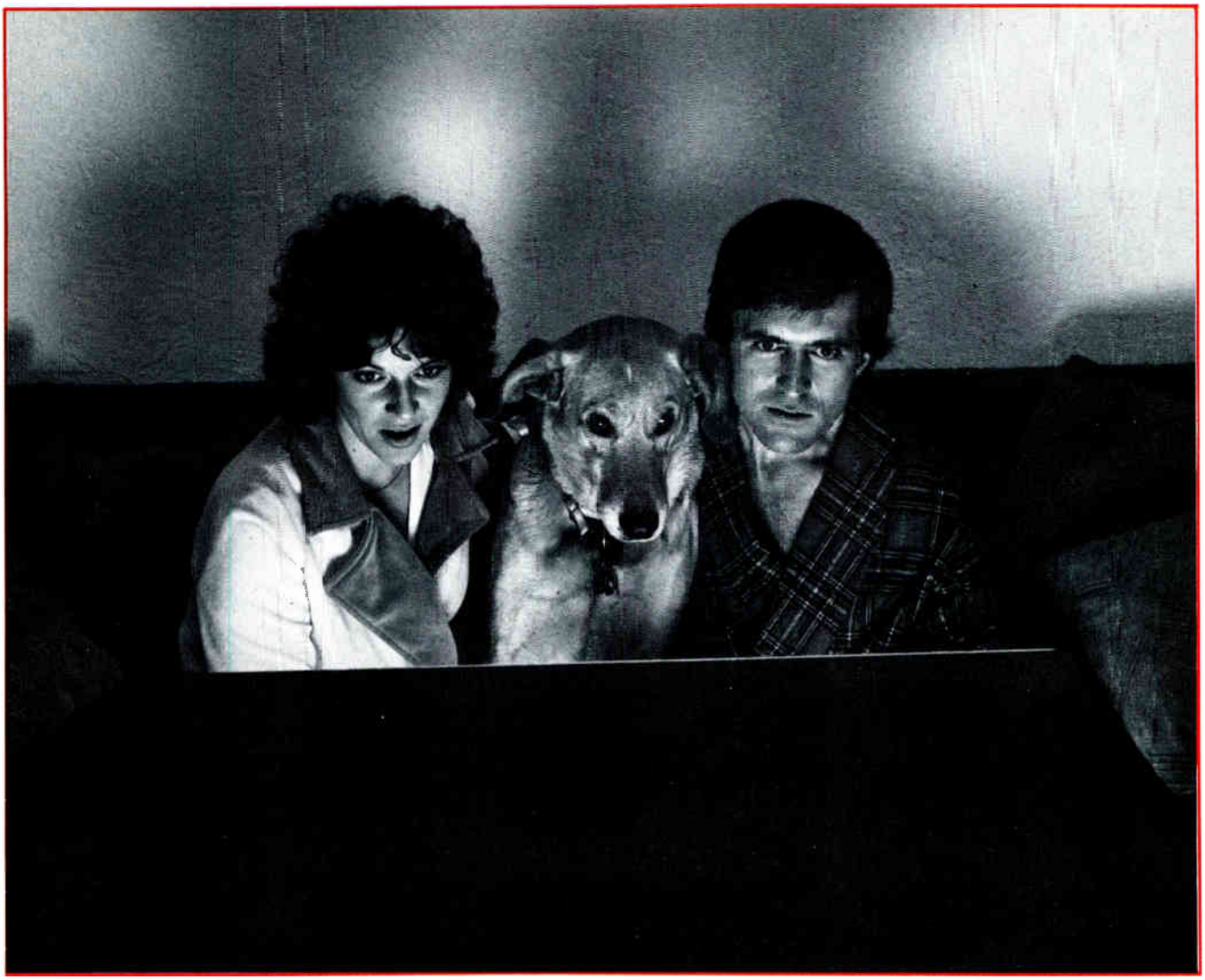

A lot of people are losing sleep over WOR

It's hard to say goodnight to WOR.

In fact, it's hard to turn WOR off anytime with 24-hour programming like this! Over 35 award-winning movies to choose from each week...that's full length films. Just think, over 63 hours of movies. Over 3,000 films, including the classic RKO motion picture favorites. That's why from Alaska to Florida, Vermont to Hawaii, people everywhere are happily losing sleep over WOR.

Why let other stations leave your subscribers in the dark?

WOR's 24-hour programming or our special Movie Package will captivate your customers night after night. The faces of Bing Crosby, Katharine Hepburn, Fred Astaire, and Barbara Stanwyck will light up the late night TV screen from dusk 'til dawn.

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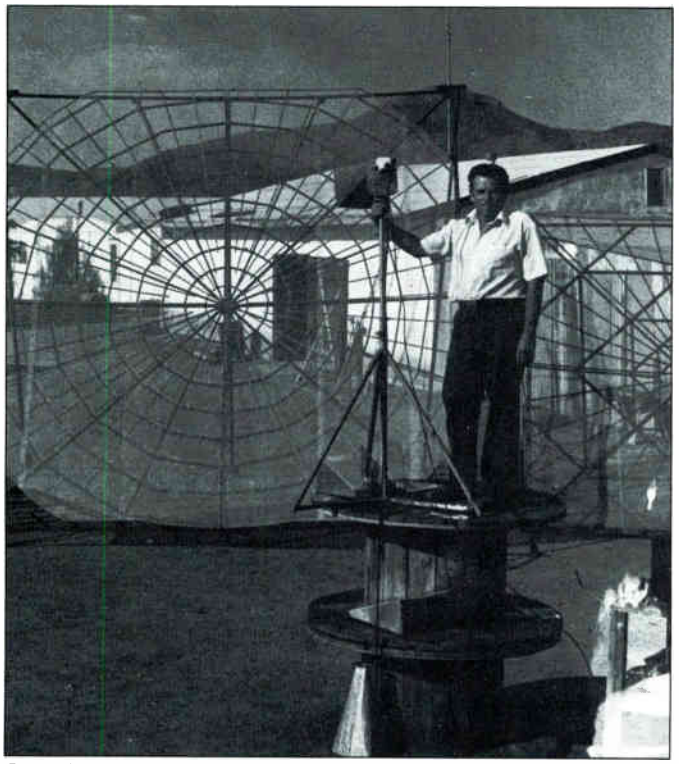
3 Northern Concourse PO Box 4872 Syracuse, NY 13221

(Cont'd from page 24)
on a rather unusual receiving antenna that has the ability to simultaneously *see* up to 40 degrees of orbit belt azimuth at a time. With a single Swan spherical reflector boresighted on the center of the desired orbit belt, two or more separate feed antennas can be placed in front of the spherical so that the receiving system can select transponders from different satellites at the same time. With the expected switch of all present cable traffic from RCA SATCOM FI to the new FIII satellite, and with the reloading of FI with additional cable services, the prospect that cable systems will require two separate parabolic antennas is not a pleasant one. The spherical antenna resolves that nicely—one reflector, as many as nine or even ten separate satellites with separate feeds for each. A commercial or cable version of this antenna is to be manufactured by Gardiner Communications



Standing atop empty cable reels for support, spherical developer Oliver Swan with his unique feed horn developed for illuminating the spherical series antennas.

Corporation under a licensing agreement with Oliver Swan, and Clifton Gardiner feels that ultimately the spherical design may become the standard for any system that requires simultaneous multisatellite visibility for both receive and transmit applications. This antenna was initially developed for the private marketplace but its quick adaptation to the commercial field suggests that the technology can go both ways with ease.

Getting It Together

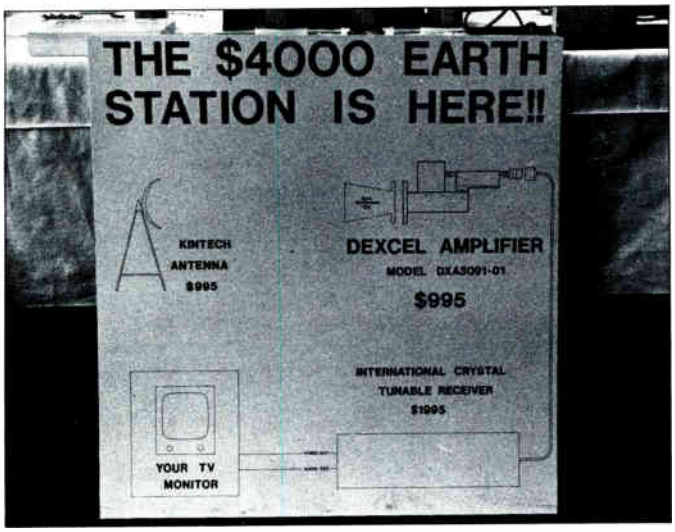
Although the FCC did remove the licensing restriction from satellite receive-only terminals, this in no way paves the way for unrestricted or wholesale direct home viewing of the dozens of satellite TV signals available. To the contrary, the user of satellite signals must have the permission or authority of the program source before tuning in. Most

The Feed for Spherical antenna developed by Swan is approximately 23 inches long. By placing multiple feeds in front of the antenna, simultaneous reception from several satellites is possible.

private terminal sellers are providing prospective viewers with a list of programmers and their viewing charges. To date, four transponders grant viewing permission without a fee attached; CBN, PTL, Trinity and SPN fall into this group. ESPN makes a one-time charge to private viewers as they do for cable viewers; it is in the $1.40 for lifetime viewing rights range. All of the indie signals (WTBS, KTVU, WGN, WOR) have FCC-filed tariffs in the $60 per year range (their minimum charge for cable systems as well). The premium service suppliers are mixed as far as home viewers because of severe complications arising from the suppliers' own agreements with entertainment program suppliers. HBO's position has been one of simply not selling their service to private viewers while Warner's Star Channel and Showtime have established annual viewing rates in the $95 to $135 region.

A number of cable system operators are examining the developments in lower-cost home terminals as a possible means to expand their own cash flow bases. Others view the development with alarm. The recent agreement by TCI to purchase $5,000,000 in Scientific-Atlantic Homestat terminals for resale or lease in the mountainous regions of the west is an indication of the thinking of some cable firms.

Marketing of home terminals is developing as its own industry—separate from cable, however. During August the first Satellite Private Terminal Seminar (SPTS '79) attracted more than 500 potential equipment users and distributors from more than 40 states and a dozen countries. The next SPTS is scheduled for February 5, 6, and 7 in Miami, Florida, and an attendance of more than 1,000 is expected for the three-day seminar. Information about the SPTS '80/Miami gathering is available from: SPTS '80, P.O. Box G, Arcadia, Oklahoma 73007.



During the SPTS '79 gathering in Oklahoma in mid-August, several suppliers proclaimed that the $4,000 private terminal was practical. The price excludes installation and does not include the RF remodulator to allow reception to be received on standard NTSC receiver.

Gardiner Communications' Starscan Division at SPTS '79 did an active business signing up several hundred prospective direct-home viewers.

Six separate 10- to 13-foot antennas were operational during SPTS '79, most priced in the $1,500 to $2,500 range. Every reflector surface from screening to fiberglass and metal was evident.

Synopsis

The FCC's decision to deregulate domestic satellite receive-only terminals (Docket 78-374) may prove to be a cornerstone for an even more rapidly expanding satellite delivery service. Not only are cable TV systems (present and future), as well as the legally approved private terminals, affected but numerous other potential satellite users are equally affected. Several radio broadcasting networks (such as Mutual, ABC, NPR) already had plans underway to create national multi-audio-channel radio links via satellite. The dismissal of the complicated, mandatory licensing requirements and the minimum technical standards can only lead to an even greater proliferation of satellite receive-only systems and hardware. On that basis, the result is positive. For with a greatly expanded market comes volume production and ever lower prices. The future in satellite terminals is now. **C-ED**

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RCA

Special Report: An Update On WARC

The first world radio conference in 20 years, WARC, is considering all uses of the radio frequency spectrum as well as related technical questions and management procedures. Below is an update on WARC proceedings provided by the U.S. Department of State.

Summary Report 1
September 24-October 6

This report covers the period September 24 through October 6. It is planned that subsequent reports will be issued on a weekly basis.

On September 27 the World Administrative Radio Conference (WARC) held its first plenary session, thereby officially opening the conference. The opening had been delayed since September 24 due to the lack of a consensus regarding selection of the conference chairman. Nine conference committees were approved by the opening plenary.

The majority of comments by participants during the opening plenary were directed toward items on the WARC agenda. Three countries, however, digressed to flavor the session with political commentaries. Comments of the three countries, Columbia, Costa Rica, and Afghanistan, are summarized below.

As expected, Columbia made its claim regarding sovereignty over the geostationary orbit. They pointed out that the WARC is not competent to allocate positions on the geostationary orbit to individual countries, and that the U.N. Committee on the Peaceful Uses of Outer Space is dealing with the legal aspects of this matter. In general, they noted that communications has gained political importance and that ITU conferences no longer have mere technical implications. Columbia stated that politics is increasing in the ITU and that this trend cannot be avoided.

Costa Rica commented about the injustice of the present communications system and the distribution of frequencies among nations. They spoke of the control and exploitation of the geostationary orbit by a few nations (not identified) at the expense of the developing nations. While briefly stating that the conference does indeed have a technical base, Costa Rica declared that the distribution of frequencies and the regulatory structure is obviously political. They said that social, economic and political factors must now set the priorities for the WARC.

Most of the speech by the Afghanistan delegate was devoted to praise for his new government. Mention was made, however, of Afghanistan's underdeveloped condition and the need for the conference to give it special concessions in the HF and VHF bands.

The committees had their initial meetings on September 28 and 29. The meetings were organizational in nature.

The first full week of conference activity, October 1-6, moved at a slow pace, often as a result of minor points being debated in both full committee and working group levels.

Two problem areas have arisen at the working group level in committee 4. First, in band 2.5 to 2.655 GHz, the United Kingdom wants to lower the PFD by 7 dB and the United States wants to raise it by 10 dB. Secondly, comments reflect strong opposition to the United States sharing proposals at 7/8 GHz between mobile satellite and fixed services.

In general, except as noted above, U.S. objectives are being met in all committees on the relatively few issues that have been considered. These are generally minor issues except for 1215

For a history of WARC and details of the U.S. preparation for it, see the September '79 issue of *C-ED*.

to 40 GHz where U.S. proposals for the GPS satellite navigation system were approved at the working group level.

Summary Report 2 October 8-13

There was an increase in activity during the third week of the Conference, although consideration of specific proposals was often painfully slow. Four simultaneous meetings of committees and/or working groups were held each morning and afternoon, as well as on Saturday morning. No plenary sessions were held, and at the present time none are scheduled until the sixth week.

Committee 4 (Technical). Three working groups have been established, i.e., 4A (Definitions), 4B (Space Coordination and Space-Terrestrial Sharing) and 4C (Miscellaneous). There is general agreement on matters of substance, consistent with U.S. objectives, with regard to procedure for determination of the coordination area around an earth station in frequency bands between 1 and 40 GHz shared between space and terrestrial radiocommunication services and the method of calculation to evaluate the degree of interference between geostationary satellite networks sharing the same frequency bands.

Committee 5 (Allocations). Five working groups have been established: 5A (Definitions), 5B (below 27.5 MHz), 5C (27.5 to 960 MHz), 5D (960 MHz to 40 GHz, 5E (above 40 GHz, Working group 5A has developed, and committee 5 has approved, a set of standard texts for footnotes to the allocation table that should be used to the maximum extent possible. Most work in 5B has been below 285 kHz. Minor activity has started above 4 MHz, with preliminary discussions of the bands 4000 to 4063 kHz and 25 to 27.5 MHz. In 5C, the U.S. proposals on VHF allocations for domestic services remained intact. Our objective of maximum flexibility, however, was not maintained in all bands, as a majority preferred separate allocations for fixed, mobile, and broadcasting services as opposed to co-equal primary status. The UHF bands (470 to 890 MHz) have not yet been considered. In 5D, the U.S. proposal for an aeronautical radio-navigation satellite in the 960 to 1300 MHz band was rejected. The USSR has proposed extension of the GPS radio-navigation satellite band to include 1240 to 1260 MHz. The U.S. is attempting to meet this request while satisfying other requirements in the 1215 to 1300 MHz band. The language of the U.S. footnote in regard to a solar power satellite has met strong resistance, primarily due to environmental concerns; a compromise text is being developed. On the topic of mobile service satellites, the U.S. proposal at 7/8 GHz continues to encounter considerable opposition, while the proposals at 20/30 GHz are gaining a more favorable reaction. Discussions of increased allocations for the fixed-satellite service have been deferred pending the results of an ad hoc group that has been tasked to analyze and present all such proposals in a convenient form for discussion. The U.S. proposals at 12 GHz have not yet been discussed; in the meantime, U.S./Canada discussions are continuing in an effort to resolve differences.

Committee 6 (Regulatory). Consideration of the existing regulatory provisions is proceeding in a slow, methodical fashion. There has been only a minor discussion of principles concerning planning of the fixed-satellite service, with nothing contrary to U.S. objectives to date. There have been only behind-the-scene discussions of the Algerian proposal that the HF fixed-service bands be split on a 70-30 basis in favor of the developing countries; the Algerians may be studying the shortcomings of their proposal as pointed out by the U.S. and others.

Committee 7 (Administrative). The medical transport topic is being treated to the satisfaction of U.S. objectives.

Committee 8 (Reorganization of the Radio Regulations). The work is nearing completion. U.S. objectives are being met.

The latest count shows 150 countries now represented at the WARC. Approximately 1,600 delegates and observers are physically present. Over 14,000 individual proposals have been submitted by 91 countries.

Summary Report 3 October 15-20

Activity during the fourth week of the conference was maintained at a moderate pace. The level of activity will have to increase if all items on the agenda are to be fully covered within the allotted period of time for the conference.

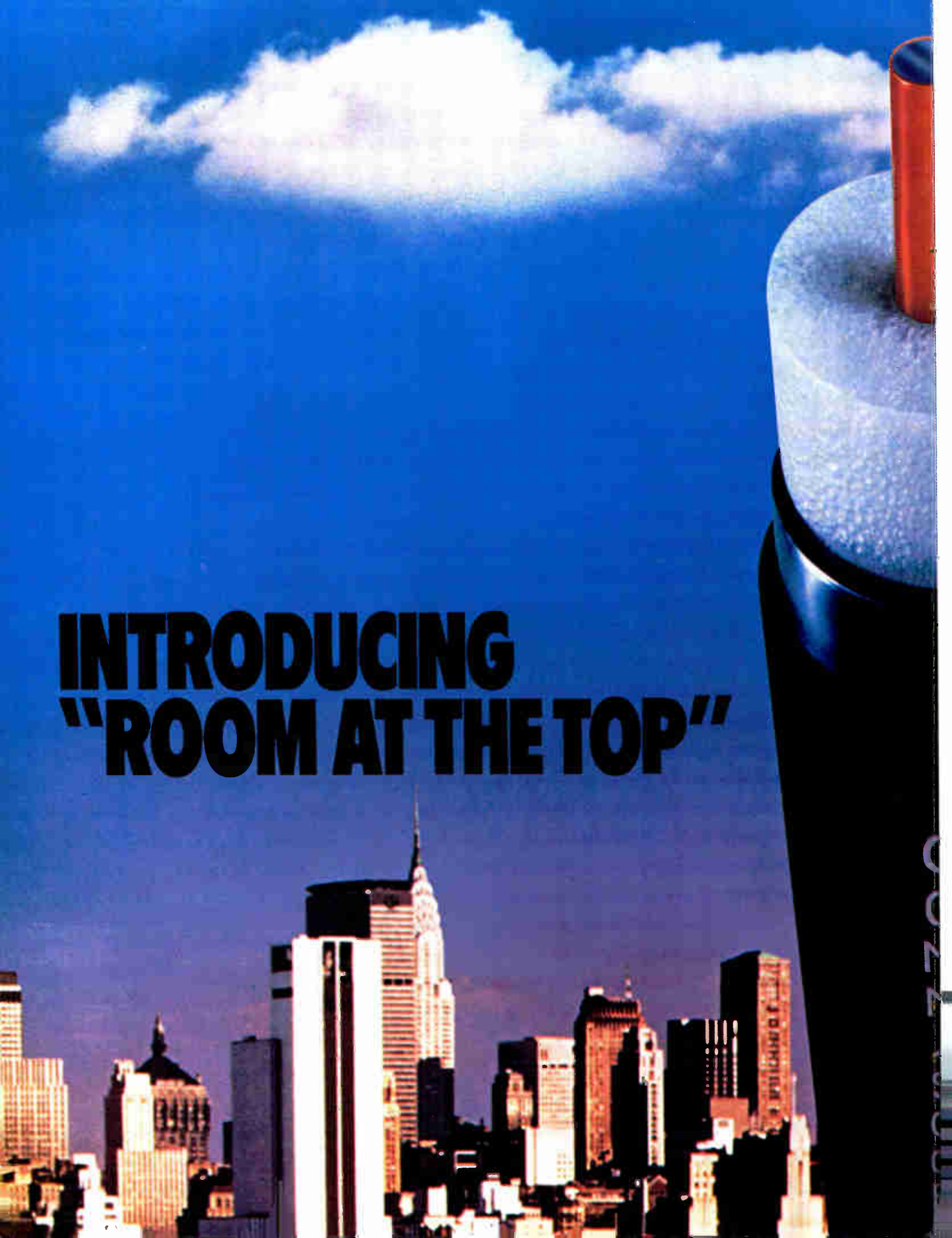
Committee 4 (Technical). Work on appendices 28 and 29 continues to be compatible the U.S. objectives. In the area of definitions, agreement has been reached on some technical definitions (e.g., radiation, emission, harmful interference, etc.) while some problems have arisen in the consideration of definitions for permissible and acceptable interference.

Committee 5 (Allocations). An ad hoc group has been set up to examine all proposals related to high frequency (HF) broadcasting (excluding proposals for frequency allocations) in the context of an HF broadcasting conference. The terms of reference include the approaches to and the possiblities of planning the HF bands allocated to broadcasting, and the preparatory work necessary to organize such a conference including the development of principles and technical basis for planning. The U.S. supported the idea of a future HF broadcasting conference but stressed, along with Sweden, that a meaningful conference would depend on a substantial increase in HF allocations for broadcasting.

In 5B, the U.S. is attempting to resolve differences with Canada and Mexico regarding the expansion of broadcasting and protection of radiolocation in the 1605 to 2000 kHz band. The U.S. seeks protection of radiolocation in the lower half of the band, while Canada and Mexico want an exclusive allocation for broadcasting from 1605 to 1705 kHz. The U.S. proposal for broadcasting in the 1800 to 1860 kHz band has no support in region 2.

In 5C, concerning 470 to 890 MHz, most region 2 administrations oppose the U.S. concept of shared allocations below 806 MHz. U.S. domestic allocations, however, are not in jeopardy. As with the VHF area, the preference in region 2 is for discrete allocations in the VHF bands for the mobile, broadcasting and fixed services.

In 5D, at 7 and 8 GHz the exclusive bands for the fixed-satellite service were eliminated by virtue of the inclusion of the terrestrial fixed and mobile services. The U.S. was successful in its compromise objectives, i.e., footnote recognition of the mobile-satellite service in the 7250 to 7375 and 7900 to 8025 MHz bands, and, a yet unknown number of European and Asian countries are joining in a footnote which indicates that the terrestrial fixed and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mobile allocations would be on a secondary basis in their respective countries. At 12 GHz, the U.S. delegation had discussions with Brazil and Canada and is attempting to satisfy the Canadian desire to allow at least limited broadcasting-satellite access to the lower band (11.7 to 12.2 GHz) and limited fixed-satellite access to the upper band (12.2 to 12.7 GHz), while still maintaining separate frequency allocations for the two services.

Committee 6 (Regulatory). The U.S. has presented the concept for a geostationary orbit access procedure (GOAP). Canada has an almost identical concept which has been submitted as a formal proposal. The U.S. delegation believes that the introduction of improved procedures may alleviate some concerns of the developing countries.

Committee 7 (Administrative). Provisions in regard to medical transports have been approved for submission to the plenary. U.S. objectives have been met.

Committee 8 (Reorganization of the Radio Regulations). Virtually all U.S. proposals have been accepted. The additional radio regulations have been deleted.

Summary Report 4 October 22-29

The following are highlights of the fifth week (updated through October 29, 1979).

Committee 4 (Technical). In working group 4A, the table on nomenclature of the frequency and wavelength bands was expanded to 3000 THz. Definitions agreed by the working group include: frequency tolerance, reference frequency, characteristic frequency, acceptable interference, effective radiated power, radio frequency channel, and definitions of various expressions of power (e.g., peak, mean and carrier).

In 4B, the draft revision of appendix 28 is virtually complete and generally acceptable to the U.S. Appendix 3 (Table of Frequency Tolerances) has been completed and all U.S. objectives have been met. Appendix 4 (Table of Permitted Levels of Spurious Emissions) is under review and is very contentious. A new Appendix 5 has been developed for classification of emissions and determination of necessary bandwidths.

Committee 5 (Allocations). In 5B, the treatment of HF allocations is proceeding slowly. The amateur service is retained at 7000 to 7300 kHz in region 2. A small increase for broadcasting was agreed (by a narrow margin) in 7300 to 7400 kHz. There is strong opposition to the expansion of allocations for HF broadcasting.

In 5D, the delegation expects that U.S. objectives at 1535 to 1600 MHz will be met.

Several proposals to accommodate the fixed-satellite service (FSS) are controversial and unresolved. Three bands are at the center of the controversy: 3400 to 3600 MHz, 4400 to 4490 MHz, and 14.5 to 15.35 GHz. The band 3400 to 3600 MHz is already allocated for FSS but on a shared basis with radiolocation in regions 2 and 3; the working group agreed, over strong U.S. objections, to reduce radiolocation to a secondary status, and the U.S. is now seeking restoration of the primary status. In the 4400 to 4490 MHz band there is a move by the LDCs to allocate some or all of the band for the FSS downlink; the U.S. and NATO are opposed. At 14.5 to 15.35 GHz there is a strong effort by LDCs to add either the FSS or a feeder link for the broadcasting-satellite service; the U.S. is opposed and has suggested alternative bands (10/11 GHz, 12/13 GHz and 17/18 GHz). In each case the strength of support for the U.S. position is uncertain and the ultimate outcome is not predictable.

For passive remote sensing, it appears that the U.S. proposal at 10.6 GHz will be accepted, but there is strong opposition to our proposal at 18.6 GHz by countries having conflicting terrestrial services.

The 12-GHz problem has been kept out of 5D while the U.S. delegation continues to have discussions with Canada and Brazil.

Committee 6 (Regulatory). There were nonconclusive discussions of the procedures relative to replacement satellites. India raised the matter of FSS planning and wants it taken up in committee 5, while the U.S. and several other delegations want it kept in committee 6 on the basis that planning is a regulatory question. Progress was made toward a compromise of the Algerian 70-30 proposal; the compromise would involve a combination of procedural matters and assistance by the IFRB in the satisfaction of the LDCs specific requirements.

Summary Report 5 October 29-November 2

Enough work has been completed to justify a plenary session which is scheduled for November 8. Many major issues, however, remain to be discussed at committee or working group levels.

Committee 4 (Technical). In working group 4A, considerable progress was made on technical definitions, and many we approved for consideration by the full committee.

In 4B, appendices 28 and 29 remained under discussion, but U.S. objectives were still maintained. A U.S.-proposed section on mobile earth stations was accepted for inclusion in appendix 28. A coordination area for mobile earth stations was approved. A draft resolution on the transfer of CCIR propagation data into the radio regulations by future WARCs was approved.

Working group 4C continued to debate the matter of permitted levels of spurious emissions. Agreement was reached on values up to 960 MHz, but no agreements were possible above that point. A new subgroup was formed to focus on spurious levels above 1 GHz.

Committee 5 (Allocations). In 5B, the ad hoc group on HF broadcasting has agreed to the scheduling of a HF broadcasting conference as soon as possible after the next CCIR Plenary Assembly (1982). The conference would consist of two sessions. The first session would establish technical parameters for planning and principles concerning use of the HF bands (e.g., power, number of frequencies per program, specifications for a single side band system, etc.) The second session would do the planning. The U.S. again stressed that the success of such a conference would be dependent on an adequate increase in allocations for HF broadcasting. HF broadcasting had no support at 6 MHz, but there was support for 100 kHz at 7 MHz, 100 kHz at 9 MHz, 125 kHz at 11 MHz, and 200 kHz at 13 MHz. There was stronger support for expansion by 150 kHz at 15 MHz, 100 kHz at 17 MHz, and 100 kHz at 21 MHz. An allocation for the amateur service at 10 MHz was not supported, while 100 kHz for amateurs at 18 MHz was tentatively agreed.

In 5C most of the U.S. objectives have been met in bands 174 to 235, 235 to 335 and 335 to 401 MHz. 5C agreed

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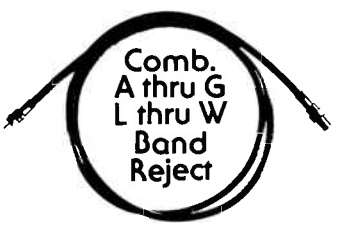

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to a region 2 allocation in the band 220 to 225 MHz for the amateurs, fixed and mobile service on a primary co-equal basis with radiolocation secondary. The U.S. introduced a footnote to reduce the amateur service to a secondary basis in the U.S. Their arguments against terrestrial fixed and mobile services sharing with meteorological aids in band 401 to 406 MHz were not accepted by a majority of the group. 5C opposed consideration of sound broadcasting via satellite below 1 GHz.

In 5D a new ad hoc group was formed to deal with the problem at 3400 to 3600 MHz. The group appears favorable to a compromise proposal by the U.S. that radars be restored to primary status by a footnote which would also urge, but not mandate that administrations cease using radars in this band after 1985; and that after 1985, administrations shall take all practicable steps to protect the fixed-satellite service. Allocations consistent with the U.S. proposals were agreed in the 2400 to 2655 MHz band. Footnotes related to power flux densities are awaiting consideration by committee 4. 5D agreed to develop a resolution tasking the CCIR with studying the feasibility of sound broadcasting via satellite between 500 MHz and 2.5 GHz. The U.S. delegation welcomed this action because a number of administrations had proposed an allocation for sound broadcasting satellites in the 1429 to 1525 MHz band which would have seriously impacted upon U.S. operational interests in other services. On the 12 GHz FSS/BSS issue, the U.S. and Canada reached an apparent compromise which is supported by a few other administrations in region 2. It will be difficult to gain full support from region 2, as the majority of countries seem to prefer deferring a decision until the 1983 regional conference on the broadcasting-satellite service.

5E examined proposals for above 275 GHz. The conclusion was to leave frequencies above 275 GHz unallocated but with footnote recognition of both active and passive services.

Committe 6 (Regulatory). The matter of FSS planning and access to the geostationary orbit has been assigned to an ad hoc group. There is strong support for a future conference to consider FSS planning. A major debate is expected. Progress continued toward a compromise of the Algerian 70-30 proposal. **C-ED**

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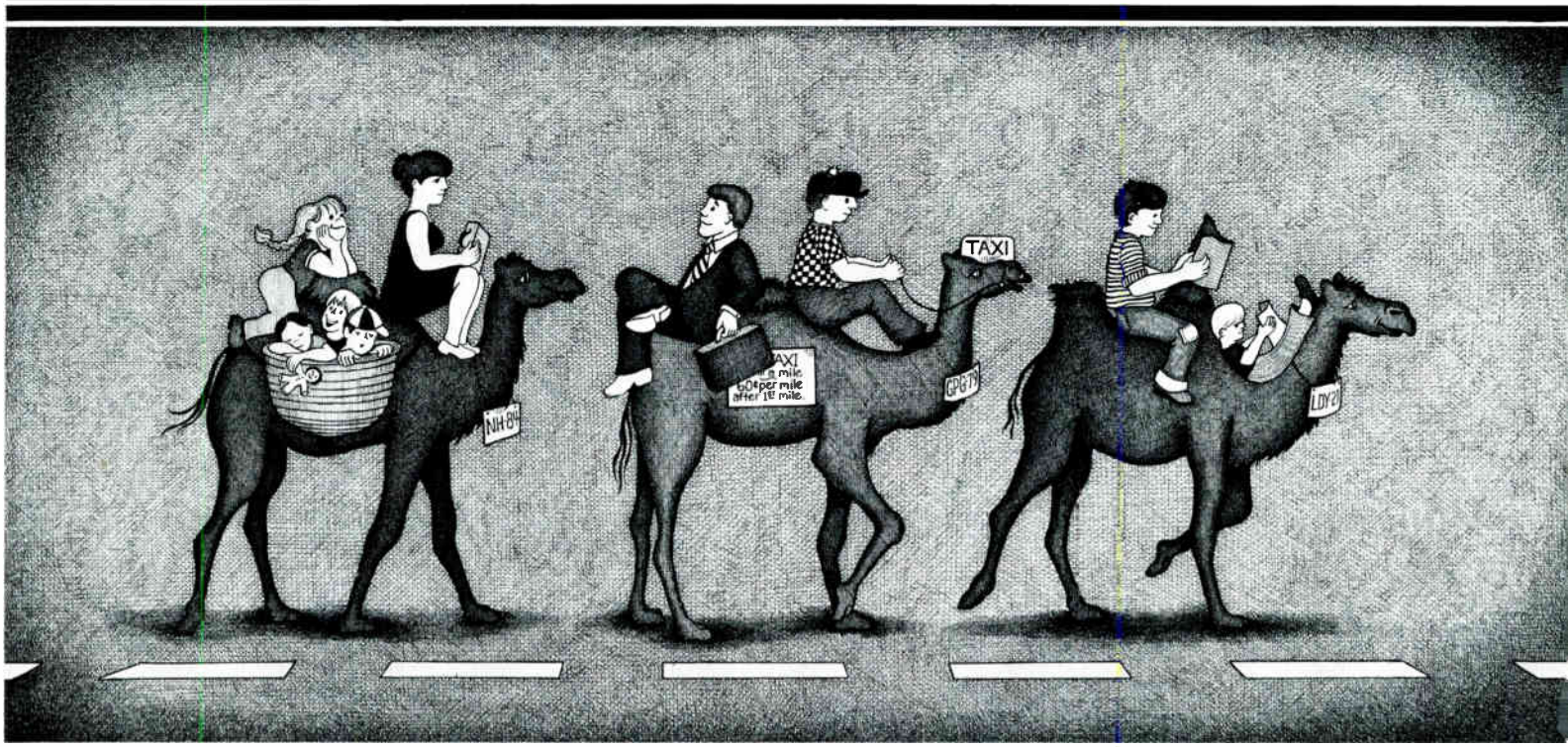

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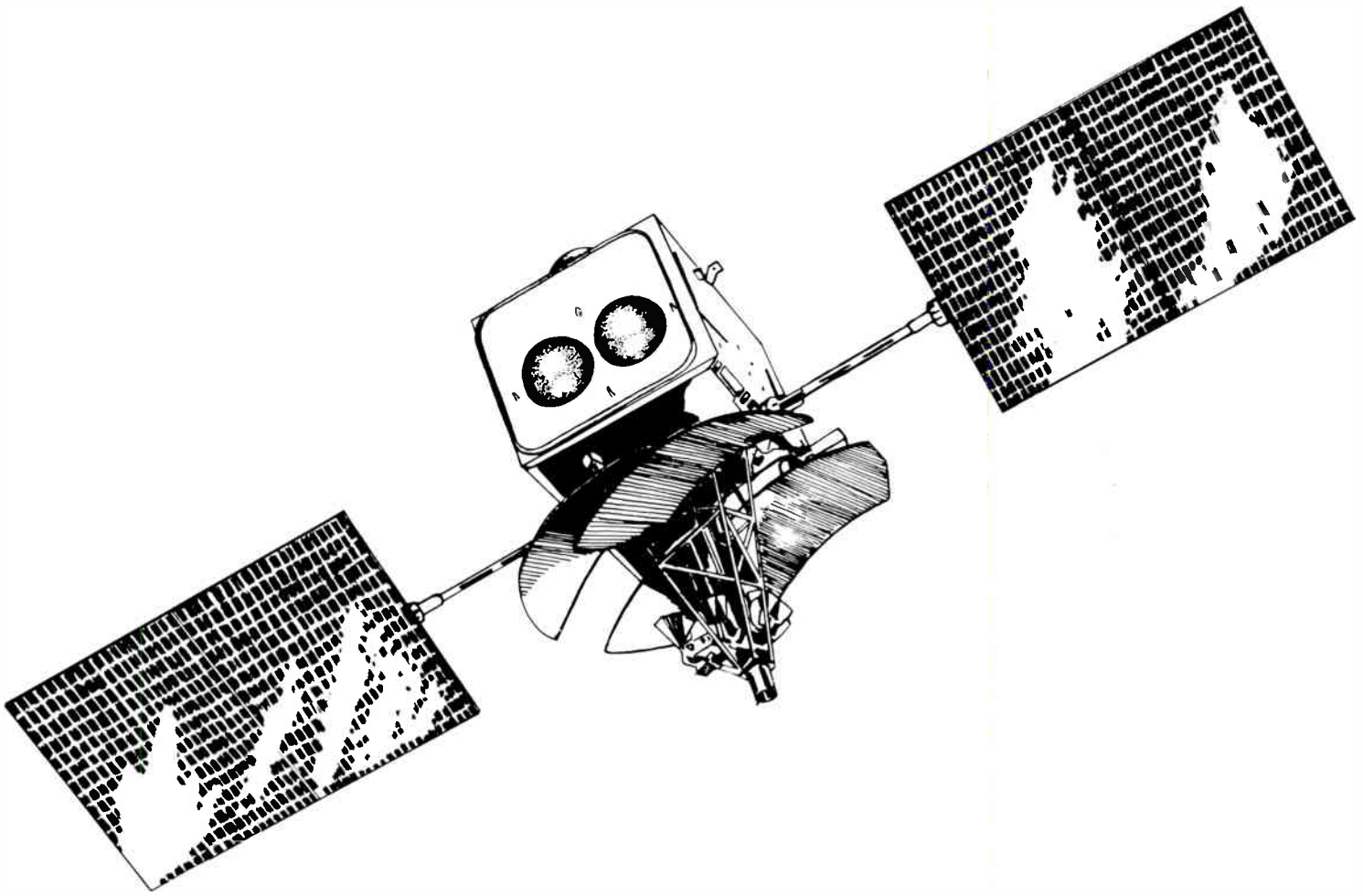
A Radio Station Proof-of-Performance Test Via Satellite



By Jim Trecek
Associated Communications, Inc.

Audio proof-of-performance tests are conducted annually at radio stations. Normally, this is a routine procedure, taking place at an obscure hour when few listeners, if any, are likely to be tuned in. A couple of engineers with a variety of test equipment normally perform the measurements between a radio station's studio and transmitter.

But, at midnight October 29, the first known radio station proof-of-performance test via satellite was done from Chicago to Tulsa, Oklahoma, via RCA's Satcom I satellite. The radio station was WFMT-FM in Chicago. Its signal was picked off air near Chicago, microwaved to the RCA satellite uplink in Lake Geneva, Wisconsin, beamed to Satcom I, and received on a ten-meter earth station at Tulsa Cable Television, a total of 45,000 transmission miles. The test results were recorded in a cable television headend.

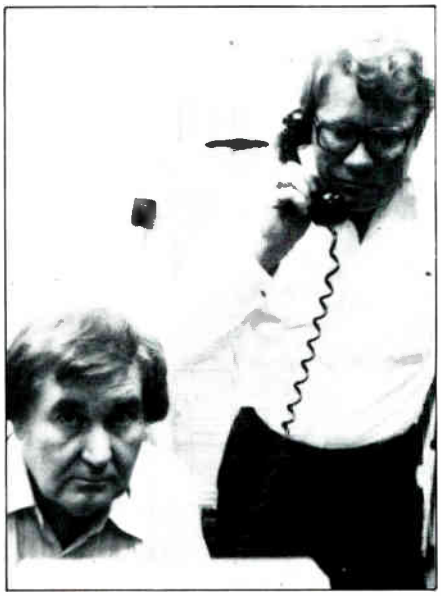
WFMT-FM, a fine arts 24-hour radio station, is being marketed to cable television systems nationwide through United Video, Inc., on transponder 3. United also uses the transponder to provide the programming of independent television station WGN from Chicago. WGN has been on satellite for more than a year and has 1.5 million full- and part-time subscribers.

"The results of the midnight test met, if not exceeded, all our performance expectations," stated Tom Keenze, vice president of engineering for United Video. He, with independent broadcast technical consultant William E. Davis, monitored and recorded the results of the one-and-a-half hour test. Davis said, "The signal-to-noise we are seeing here is better than many of the local broadcast stations I've tested."

United Video management decided in December 1978 that providing WFMT on satellite with its WGN signals, utilizing an FM subcarrier above the video signal, could be a commercially profitable operation if a unique stereo signal could be provided to the cable systems. United had carried WFMT on its terrestrial microwave systems in Illinois for several years, so management was familiar with the station and had already investigated several techniques for providing the service with a quality that would satisfy listeners.

Equipment manufactured by several different companies was investigated. Engineering's primary considerations in equipment selection were economics and spectrum usage on the transponder. The first consideration was to keep the cost of customer-owned equipment at the receive sites as low as possible. The second consideration was that United wanted to transmit the signal on a single subcarrier over the satellite in order to save room for other new services.

Previous terrestial experience with delivering WFMT had proved that any audible degradation of the signal transmitted would be unacceptable to



Independent broadcast technical consultant, William E. Davis (left) and United Video's vice president of engineering, Tom Keenze (right).

cable company customers purchasing FM service. United chose the Leaming transmission system because it met all criteria. The equipment allows high-quality transmission on a single subcarrier with low-cost upconverters. The system transmits the signal over the satellite in a composite stereo format. This allows accurate reproduction of the WFMT signals without necessitating regeneration of the 19-kHz pilot signal. That factor cuts the cost of the equipment at the receive end. The equipment used at a customer receive site is the Leaming FMU-201C.

Leaming also employs a technique called *deviation enhancement*, which increases the frequency deviation of the subcarrier from the standard 75 kHz to 300 kHz. This is coupled with a special filter for removing unwanted intermod products and a unique pre- and de-emphasis curve to improve signal-to-noise in the upper portion of the base band. The result of these design techniques was a signal-to-noise improvement of approximately 14 dB over a standard 75-kHz transmission system.

The original design concept did not include the pre- and de-emphasis network, and when the equipment was originally tested on May 14, a slight background hiss could be heard. After engineers studied the problem and possible solutions, the pre-and de-

emphasis networks were added. This resulted in the removal of the unwanted background noise. After modifications to the units in service, a period of experimental transmission tests were completed, and the method of transmission for WFMT was finally decided with the performance testing in cooperation with the WFMT engineers in Chicago. Because WFMT is pushing the state-of the-art in FM broadcasting, it expressed an interest in what the transmission system was doing to its signals.

Although WFMT had no choice in the matter of being selected for satellite transmission by United Video, as a leader in the field of of FM broadcasting techniques, it wanted to be assured that the transmission facilities were not degrading the broadcast signal. WFMT has worked to assure listeners of high audio quality, to the extent of designing and building much of its own equipment. In particular WFMT engineers discovered that while measuring the performance of the sophisticated systems installed using FCC accepted techniques, they were measuring the performance of the test equipment rather than the performance of their own transmission system. Therefore, a new test procedure was developed and accepted by the FCC so WFMT could use more sophis-

Tom Keenze and William Davis monitored test equipment and checked the results.

ticated test equipment while running its annual performance tests. Specifically, this involved the use of an audio spectrum analyzer rather than the normal technique of using an FCC-type accepted FM modulation monitor.

WFMT engineer Jim Addie made arrangements to generate test signals in Chicago, which were measured at the output at Tulsa Cable by Davis. Figure 1 illustrates the testing process.

WFMT's signal-to-noise registered 67 dB. According to Keenze, calculabuilt into their satellite receivers will tions revealed that the figure would be about 70 dB, so the results were satisfactory. Stereo separation was measured at 35.5 dB, allowing good distinction between left-and right-channel program material.

The audio response was essentially flat from 50 Hz to ten kHz, and at 15 kHz the response was down to 0.6 dB, well within FCC specifications. Distortion was within FCC limits ranging across the frequency band from one percent to two percent.

Keenze said he was pleased with the test results, and now has proof of performance for those customers who wanted to take the WFMT service from United, but who were skeptical about performance.

United Video's next step on the satellite will be to replace the present WGN audio subcarrier with a composite stereo audio channel at the same frequency location.

The plan involves electronically synthesizing stereo sound for WGN program audio and multiplexing that sound at 6.8 MHz in much the same way that WFMT is transmitted on satellite. Those WGN customers who have 6.8-MHz audio demoduiators

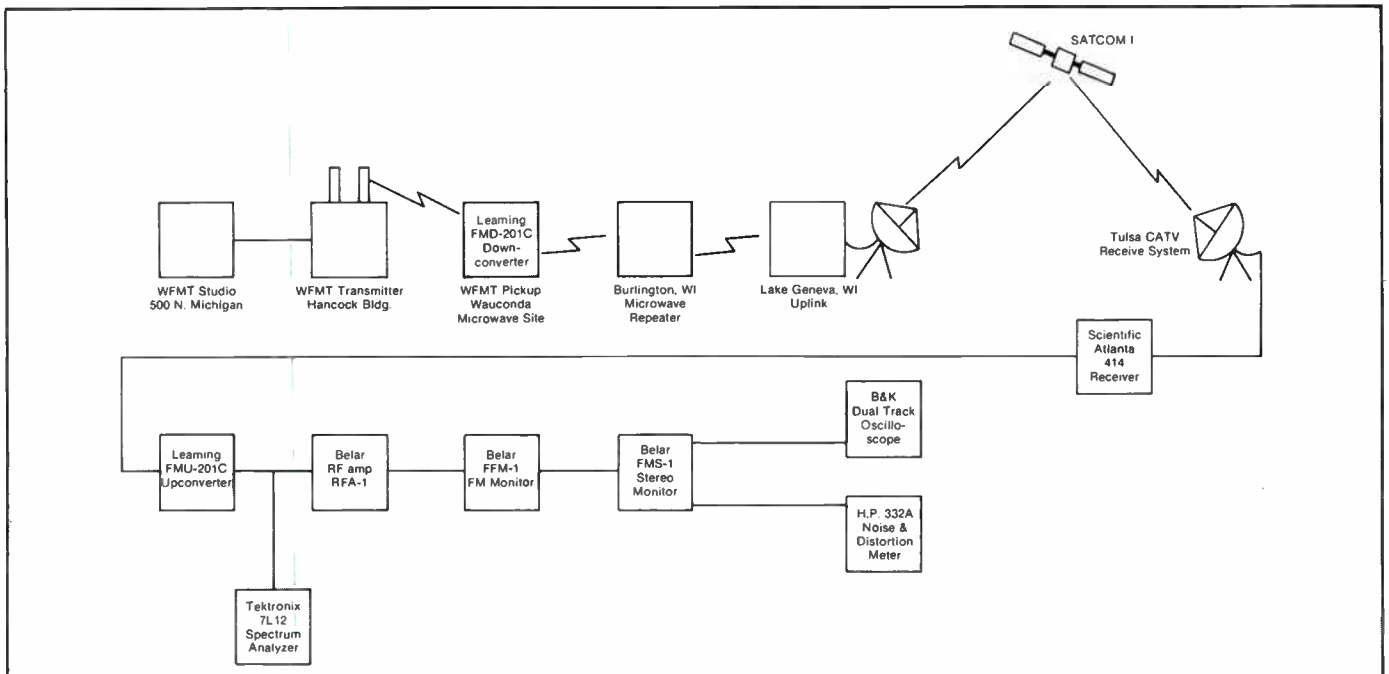


Figure 1. Test of signal generated from WFMT in Chicago.

not know the difference, but those cable systems that want to provide synthesized stereo sound for WGN-TV in the FM dial on cable, can provide listeners with quality program audio. Utilizing the service, a WGN viewer on a cable system could watch the picture on television and listen to synthesized stereo audio on his FM set. United Video will not charge for this service. However, the cable television companies wishing to use this service will have to purchase the necessary equipment.

The equipment to provide this service has been delivered to Lake Geneva and is awaiting installation by RCA. **C-ED**

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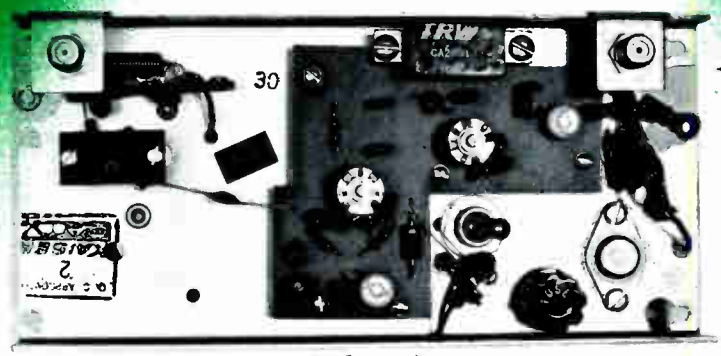

27 Ch. @ +45/40 dBmV

Xmod: - 68 dB
S.O.: - 74 dB
T.B.: - 86 dB

BMK 212 KCEC installed in Housing

8 to 18 dB Cable EQ. at 300 MHz

Fast Acting Transzorb Protects I.C. Chip

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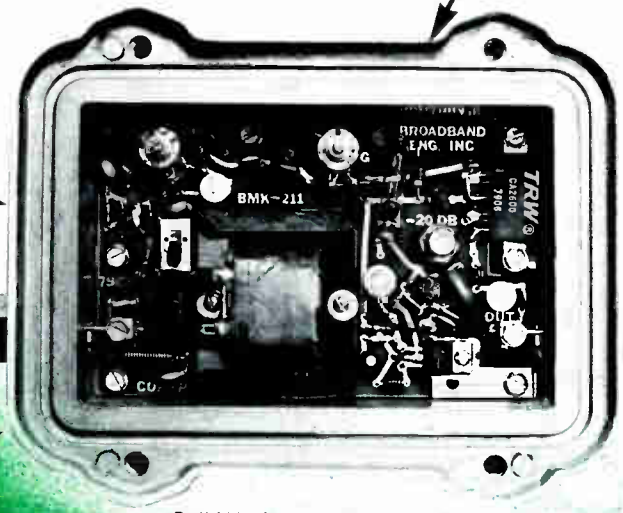

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Xmod: - 70 dB
S.O.: - 75 dB
T.B.: - 86 dB

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Digital Video and Cable TV: An Evolution in Technology

By Charles Dages, Manager, Subscriber Terminal Engineering and Thomas O'Brien, Senior Digital Project Engineer, Jerrold Electronic Corporation.

The effect of digital technology has increasingly touched our lives. From the calculator to the automobile, digital components and processing are replacing traditional mechanical and analog functions. Increased reliability, greater performance, and expanded capabilities all characterize implementation of microprocessors and large-scale integrated circuits (LSI) into consumer products.

Today, this same digital technology is poised to address the cable television communications market. Much has been written concerning converters, addressable descramblers, and security systems utilizing digital techniques compatible with traditional CATV distribution systems. However, an even more fundamental application of digital signal processing is emerging which could change the very nature of cable television—digital video transmission.

Teletext, Viewdata and PlayCable are but a few of the names given to systems which may usher in a new method of enhanced performance in TV signal distribution.

Digital Video Today

Digital electronics is challenging the traditional methods of information generation and distribution through improved performance and lower cost. Products currently available, such as Teletext and Viewdata, employ digital techniques in both the transmission and reception systems. The key to these advanced products is the availability of the large-scale integrated circuits. These devices are beginning to permeate the consumer electronics market by providing a low-cost

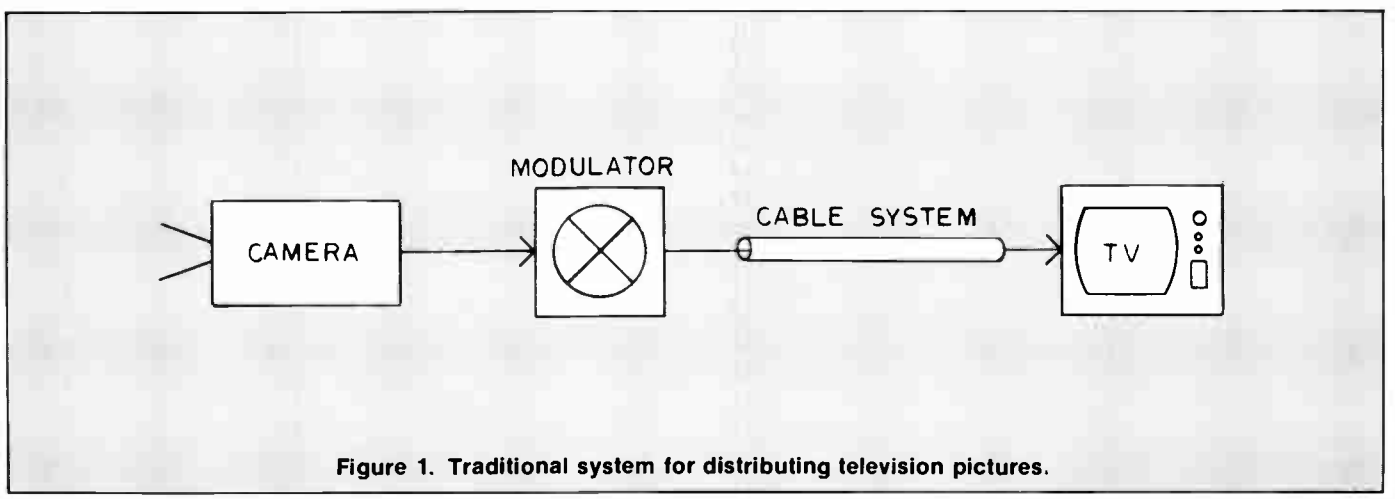

Figure 1. Traditional system for distributing television pictures.

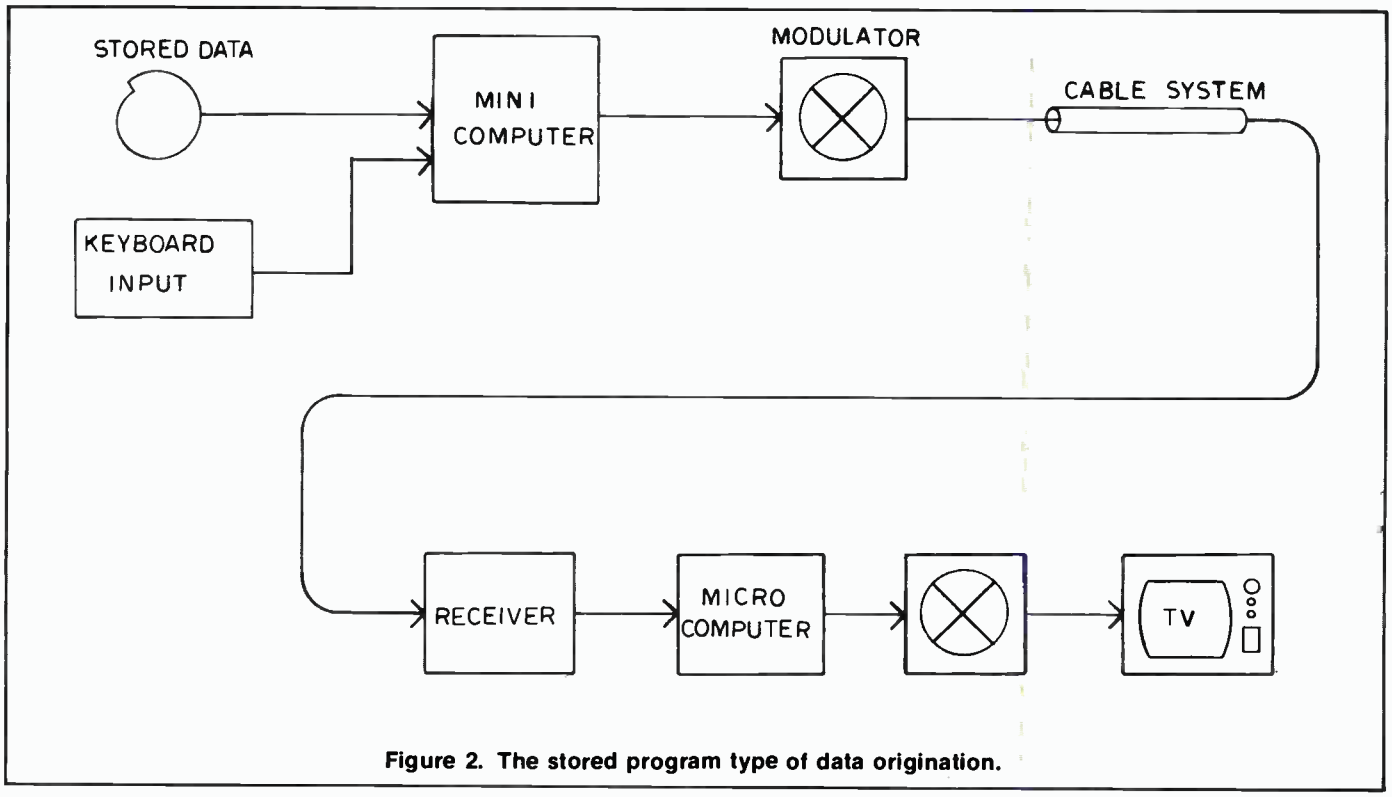

Figure 2. The stored program type of data origination.

solution to the problem of information processing and signal generation in the home.

The traditional system used for distributing information, either over the air or on cable, is the same as the one for TV pictures as shown in Figure 1. A TV camera picks up the video information directly from a visual board or other graphic display prepared by studio personnel. The information is then transmitted in real time over a standard TV channel occupying six-MHz bandwidth. The earliest enhancement of this system, and one still widely used today, is called a *character generator*. It consists of a small computer with a video keyboard terminal and special purpose signal generator. The keyboard is used by studio personnel to create a visual display, a replica of which is generated and transmitted over a standard TV channel. This is illustrated in Figure 2.

The character generator utilizes the stored program type of data origination which results in the elimination of the TV camera and display board and the added convenience to studio personnel; however, six-MHz bandwidth is still required for transmission.

The bandwidth required may be reduced through the use of additional equipment at the point of reception and by reducing the transmission to a digital data stream. In this case, a data receiver and special purpose signal generator are used to locally generate the displayed TV picture. The bandwidth of the data stream for an equivalent amount of data is less than ten kHz—a reduction of 600 to one. In simple terms, it may be inferred that 600 displayed images may be transmitted within the bandwidth of one TV channel.

Teletext

The Teletext system exploits the unused lines in a normal TV picture transmission to embed the digital data stream, thereby gaining an information channel at no apparent cost in bandwidth. A keyboard is provided so that the use can interact with the program to select the information to be displayed. The selected data are then decoded and stored in the microcomputer memory, which the signal generator continuously reads to form the shape, color and content of the displayed image.

Viewdata

The Viewdata system operates in the same manner as Teletext. However, the information is distributed over telephone lines requiring the added expense of a telephone interface modem. The following photograph is a simulation of the alpha-numeric graphic capabilities of a Teletext, Viewdata systems.

Simulation of the alpha-numeric graphic capability of a Teletext 1 viewdata system.

PlayCable

Another improvement, made possible through the use of a sophisticated type of signal generator at the point of

(Cont'd on page 52)


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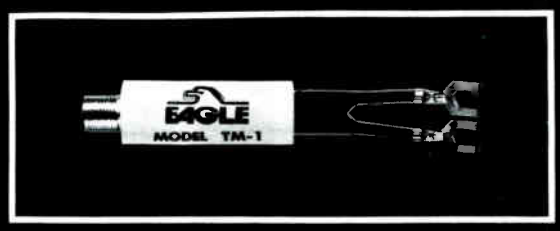
The Notch-Filter Trap For Pay TV Application is the formidable Eagle entry in the Video Scrambling field. The notch-filter and security shield are shock resistant, stable and durable due to the thick-wall brass housing and anti-corrosive nickel plating. Also our notch-filter traps 1) Are completely potted to halt moisture absorption and stabilize circuitry 2) Have machined and interlocked connectors that thread on to easily withstand up to 1000 pounds of pull! 3) Are accessible only with special tools to make installation and extraction both easy and secure within your system.



The Eagle Matching Transformer TM-1 features in its rugged unitized construction a twin lead crimped and soldered to lugs, three (3) capacitor isolation for 1000V surge protection and a band width of 50 — 300 MHZ in VHF and 470 — 850 MHZ in UHF. Superior balance characteristics also highlight Eagle's high-performance matching transformer.

The Outdoor And Indoor Audio And Video Descrambler For Pay TV Application is another easy-to-install, hard-to-damage Eagle Quality Product. The 2-DF-8 Descrambler has the same corrosion-resistant and tamper-proof qualities as The Eagle Notch-Filter Trap described above. Channels 2 to 7 inclusive mid-band are standard with other non-standard frequencies and multi-tiered service available on special order. Again, special tools for installation and removal plus the Model 2-IS Indoor Security Shield make the Outdoor and Indoor Descrambler a tough customer to tamper with.

The Three Channel Block Converter is compact, crystal-controlled and has power line filtering, separate R-F Barrier plus I.C. regulated power supply. All cast construction and all P.C. Board Construction complete this fine Eagle Quality Three Channel Converter.

The Pay TV Scrambler (Encoder), Model 1001-SG is the generator made to complement the Eagle Model 2-DF outdoor audio-video decoding filters. Besides being rugged, and quick to install, the rack-mounted 1001-AG features dual jamming carriers, RFI security and easy on-off front panel control of the jamming oscillator for previewing programming.

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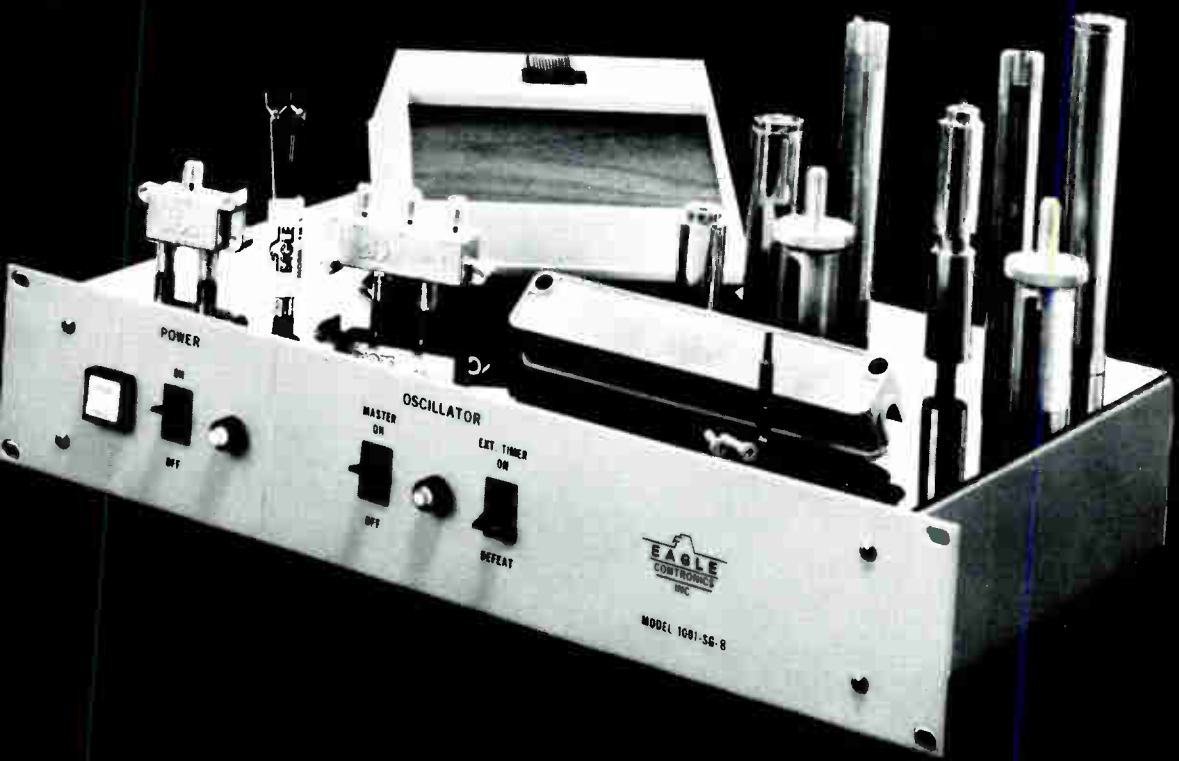

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(Cont'd from page 47)

reception, is called PlayCable. This system provides a wide variety of video games, information services and data processing in the home. A master computer at the point of origination, stores and transmits a library of programs over up to 30 200-kHz bandwidth data channels. The data is down-loaded into the PlayCable microcomputer memory where, under control of the user's keyboard, it is used to establish the shape and color of the background as well as the size, form, color and movement of the displayed animation and text. This capability in home terminal equipment allows a new level of sophistication in personal services programs, such as (1) education—reading, spelling, mathematics, languages; (2) personal maintenance—income taxes, stock analysis, record keeping; and (3) personal improvement—physical fitness, diet, and weight control.

With PlayCable, the concept of the home computer linked to a massive external data bank has become reality. An example of an interactive PlayCable basketball game is shown in the photograph that follows. The graphic presentation of the court is isometric, adding realism from a consumer viewpoint. The realistic appearance of the players is a result of increased graphic resolution capabilities.

Example of an interactive basketball game.

Digital Video

The state of the art in commercial video processing is also being advanced by digital circuits. The availability of large random access memories (RAMs) at low cost makes it possible to convert video information into its digital equivalent. Such information may then be stored for later use (delayed), or algorithmically modified by a computer to change its character or content. Equipment now available to digitize and store one TV picture frame is called a *frame synchronizer.* Its principal use at present is to delay several TV signals for common synchronization or *sync lock* so that all signals emanating from a specific source contain identical H and V sync. This is useful in CATV systems where premium signals are scrambled because descrambling equipment is less expensive. In addition, instantaneous signal loss can trigger the frame synchronizer to repeat the previous frame, resulting in no apparent loss in picture quality. As with the character generator, this technology initially became available only at the point of origination. Further cost reduction in components and some FCC rule changes will be necessary before such equipment can be made available for home use.

The complete digital video system is shown in Figure 3. The obvious benefit of this technique is maintenance of picture quality regardless of the number of repeaters and conversions. The digital signal may always be recovered exactly like the original, assuming the required signal-to-noise ratio is maintained at each processing step. The bandwidth required for this method, however, is too high to be practical over any reasonable distance.

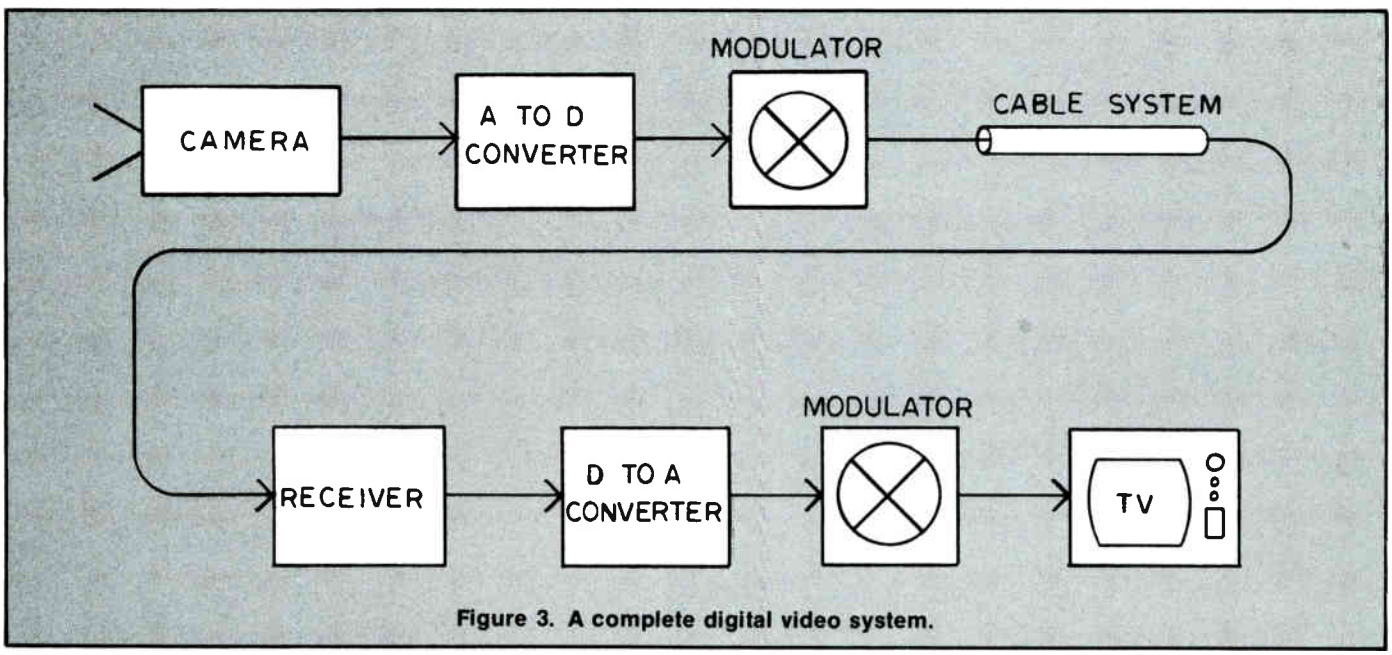

Figure 3. A complete digital video system.

Enhanced Digital Video

Television engineers studying this problem have proposed a solution which exploits the fact that the television signal is usually repetitive—the same information is transmitted over and over. This information could be transmitted less frequently and stored at the receiver then recalled as needed by the display. This solution results in a

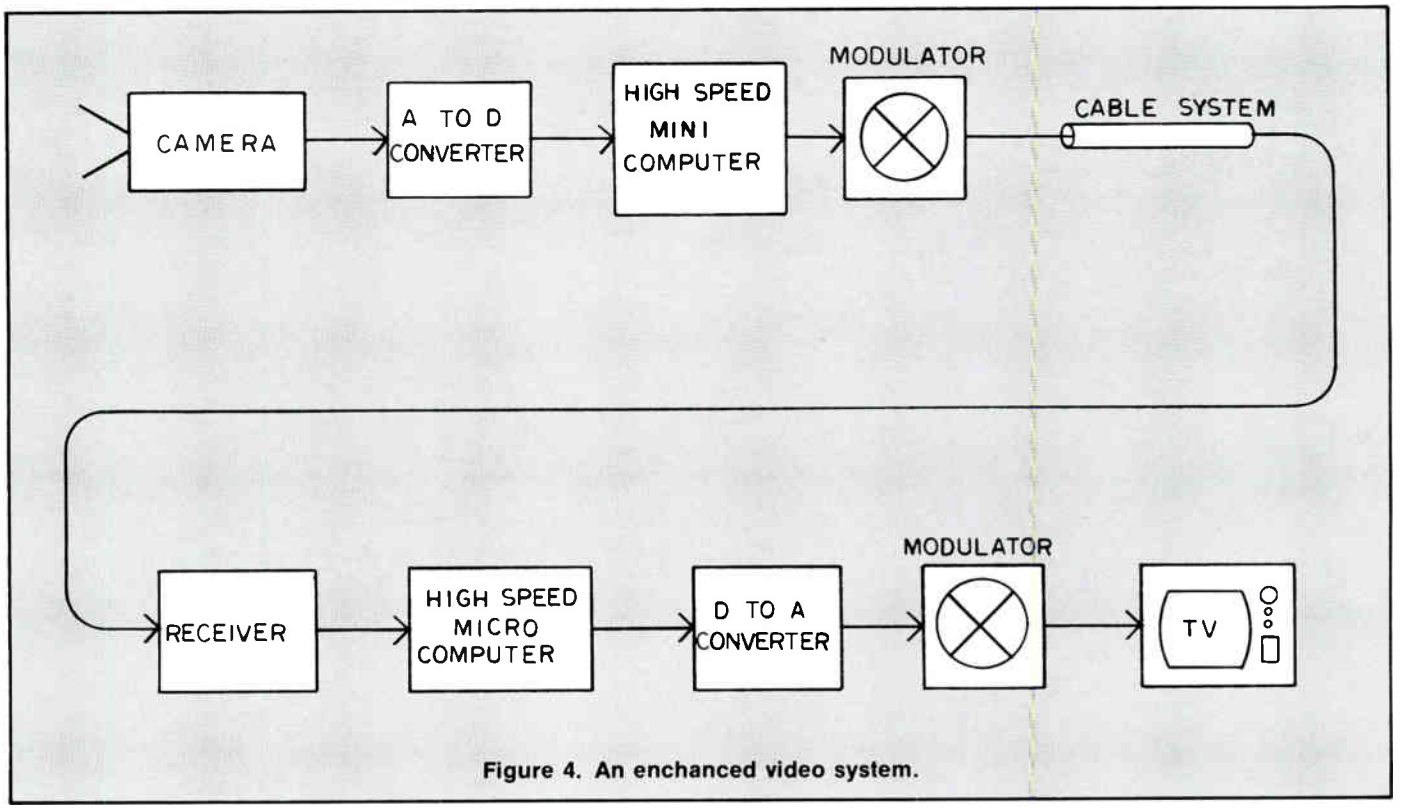

Figure 4. An enchanced video system.

much smaller increase in bandwidth; however, about 12 MHz would still be required for each channel. Figure 4 illustrates such an enhanced digital video system. The trade-off that exists then becomes whether or not the increased picture quality is worth twice the bandwidth. When wider bandwidth transmission systems become available—for example, fiber optics—bandwidth may not be so important.

Benefits

Sophisticated digital video processing and transmission techniques must justify themselves before wide-scale implementation can occur. As in earlier implementations of digital techniques (i.e., calculator, oven controls, etc.), the justification must take the form of enhanced features with competitive costs to the subscriber. The potential benefits from digitized video could be multifold.

(1) Conservation of spectrum

The stored program video technique (Figure 2) offers the potential of more video services to the subscriber with less required bandwidth.

The stored program approach to information distribution holds the greatest potential for near-term implementation. As the number of home computers and various cable data receivers increase, the potential exists to group all informational services on a single six-MHz NTSC channel. This approach would free full channels currently used for such services as comparison shopping, timetables, town meeting schedules, etc. The extra spectrum could then be used for services requiring standard video signals. Even by conservative estimates, hundreds of lines of text could be transmitted to the consumer within seconds.

(2) Enhanced Pictures

Digital data transmission and processing techniques are available which can tolerate much lower system signal-to-noise ratios than standard analog video. Recovery of digital signals in the order of approximately 20 dB S/N is possible with minimal errors.

Once the data has been received, the video quality of the RF signal is a function of the local modulator and TV set.

Until recently, nearly all fiberoptic transmission research has been concerned with digital communication. Electro-optic sources and detectors have proven to be relatively efficient in pulsed power applications. Digitized video, with its inherent quantized transmission, fits the requirements for optimum fiber transmission techniques available today.

Summary

Today, technologies are in place to implement digital video systems. However, as with most advanced technology, marketplace dynamics will determine which approaches succeed and which fail.

Digitally generated video systems, in the form of character generators, have found wide acceptance in both the broadcast and cable TV industries. The ease in generating professionally appearing alpha-numeric messages has found much usage. These systems have been relatively easy to implement.

The stored program and enhanced video techniques are still to be judged for their marketplace values. Stored program systems (i.e., Teletext) are under extensive field trial examination in both Europe and North America. Even if the technological problems are resolved, the questions pertaining to mass market acceptance of the programming services must be answered.

Frame synchronizers, the precursor of a truly digital video system, are just now reaching practical cost levels for specialized applications at TV studios and CATV headends.

Today, enhanced digital video systems are mainly a laboratory curiosity. The applications are mainly for military and space TV signal processing. When and if these systems will be implemented commercially is still unanswered. **C-ED**


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To carry this (no copyright) program on your system, call collect: (317) 783-3221, CATV Dept., Wavetek, Indiana, P.O. Box 190, 66 North First Ave., Beech Grove, IN 46107.

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Television Signal-To-Noise Measurements—A New Approach

By Richard N. Lawrence
Lenco, Inc.

The continuing trend in modern television broadcasting, cable TV, and closed-circuit operations is toward greater emphasis on technical quality. Signal distortions disturbing to the viewer, such as hue shift, saturation changes, group delay or quadrature distortion, and now incidental phase problems, have received attention from equipment manufacturers, standards committees, and television professional societies. As a result, it is now possible to switch from channel to channel without significant variations in colorimetry or other viewer distortions. The area that has had little attention is the simple and accurate measurement of noise.

Random noise is an insidious form of signal interference which characteristically accumulates in aging equipment or appears suddenly due to faulty components. It is easy to see ten degrees of phase shift on a color bar pattern or image with flesh tones, even though it represents only a three-percent error. Almost every television station or facility has at least one vectorscope that can be used to measure random noise. It is much more difficult to assess subjectively the difference between 40 dB and 46 dB of signal-to-noise ratio, notwithstanding the fact that this is a proportionally much larger defect. Yet, few broadcasters, cable companies, microwave users, or industrial system houses have equipped themselves to measure noise accurately. Until now, the accurate measurement of video signal-to-noise ratios has required expensive, nonportable equipment, that usually required the insertion of test signals at one end of the system, which required the system to be taken out of service, and/or required many mathematical calculations to determine the true value of the noise ratio. Noise measurements of television equipment have now entered the operations field as a standard "in-service" technique for accurately assessing this facet of signal quality. This has happened because new and simpler equipment has been developed for this purpose.

Present Methods

There are three methods that are presently used in the television industry: the TV noise meter, visual noise comparison, and in some cases, the spectrum analyzer. All of these techniques are now used in broadcasting but are limited to certain applications.

The most widely accepted instrument for measurement of noise in labs and network technical centers is a noise meter that is both reliable and precise but not very portable and not designed for in-service measurements. As a laboratory instrument mounted in a 19-inch rack and used for flat gray field tests, it has no equal and remains the device most used to calibrate other instruments. However, television studios, cable systems, and industrial users need noise measuring instruments that better suit their particular requirements for portability, ease of operation, accuracy, and cost.

Other recent entries into this field have been comparison techniques. They come closer than the noise meter to the needs of the general television industry engineering groups who operate and maintain equipment. However, they require a special line-selection oscilloscope as an accessory, cannot measure in the presence of chroma, are designed for rack mounting, and specify an accuracy of only +2 dB.

The spectrum analyzer technique is designed basically for RF carrier-to-noise measurements and is not applicable here except when carrier-to-noise measurements are specifically required.

A device has been introduced which utilizes a different principle of operation than other instruments. The Lenco model VNM-428 video noise meter was designed for the video signal-to-noise measurement requirements of TV studios, microwave systems, and cable television and industrial system users.

One of the features of the device is the in-service capability of making accurate, real time signal-to-noise measurements even on live off-the-air signals. The noise meter is small, stable, and has a built-in calibrator that maintains accuracy of ±0.5 dB throughout the range of 20 dB to 55 dB. The signal-to-noise ratio is shown on an LED display and calibrated to FCC/EIA standards. This is done with

any normal oscilloscope having a bandwidth of 5 MHz or more with any composite video signal with an input level from 0.5 V p-p to 1.5 V p-p.

Description of Measurement Process

The video noise meter employs the tangential noise measurement technique to circumvent problems associated with the oscilloscopic measurement of Gaussian noise in video waveforms.

During measurement, a variable and calibrated square wave is added to the waveform under test which results in the display appearing as two identical waveforms, one displaced vertically from the other by the distance equal to the amplitude of the square wave. When the amplitude of the square wave is large compared to the noise, corresponding portions of the two traces are separated by a dark interval. As the amplitude of the square wave is reduced, the width of the dark band decreases and finally disappears. At the point where the dark band just disappears, leaving a single trace with uniform brightness in its central region, the square wave amplitude is equal to twice the RMS noise voltage of the signal. Figure 1 demonstrates the procedures followed. The amplitude of the square wave is measured by the noise meter, converted to a logarithmic scale, referenced to the peak-to-peak signal, and displayed on the digital panel meter as the ratio of signal-to-noise in decibels. The meter can be calibrated to read directly in either the EIA or CCIR system M standards. Normal factory calibration is in the EIA/FCC system M standards. Under normal waveform conditions, no mathematical calculations or conversion factors are required; the system reads directly in system M standards.

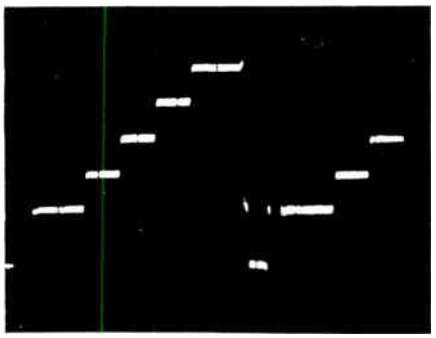

Figure 1a. Typical video waveform with SNR=approximately 39 dB.

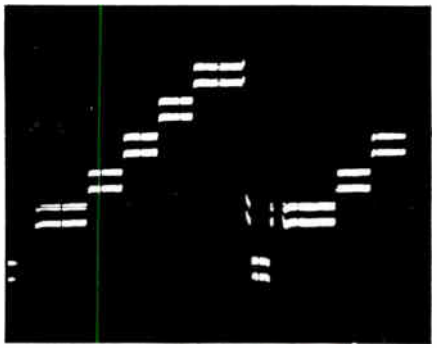

Figure 1b. Video waveform with added square wave greater than twice rms noise.

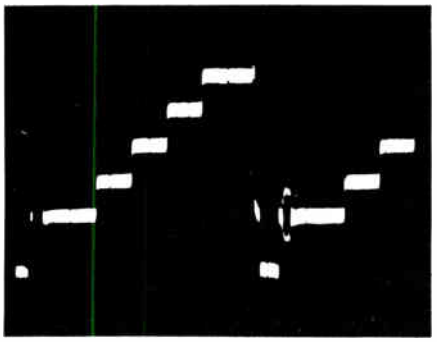

Figure 1c. Square wave amplitude just equal to twice rms noise.

Figure 1. The tangential noise measurement technique.

Theory of Operation

The mathematical evaluation of the tangential noise measuring method, including the relationship between trace separation and RMS noise, is explained with the following mathematical derivation.

If the probability distribution of amplitudes in random noise is Gaussian, then the distribution of brightness across the noise trace displayed on an oscilloscope will also, to a good approximation, be Gaussian. This relationship may be seen in the graphs of Figure 2 in which the axes are labeled interchangeably in terms of trace brightness and probability density. If two identical oscilloscope noise traces are separated by more than twice their RMS voltage, the result will be as shown in the graph of Figure 2a. The dip between the two peaks corresponds to the narrow dark band seen between the bright bands of the two separated traces. When the trace centers are separated by a voltage equal to exactly twice the RMS noise voltage of each, the dip (dark band) disappears as shown in Figure 2b.

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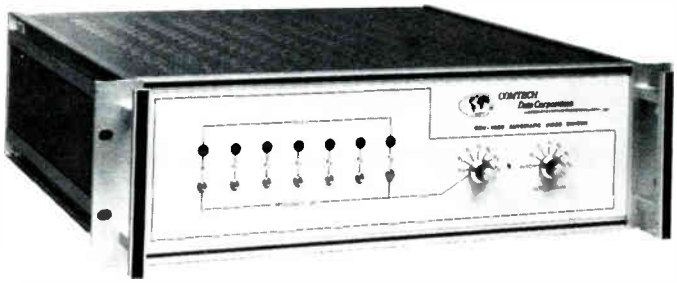

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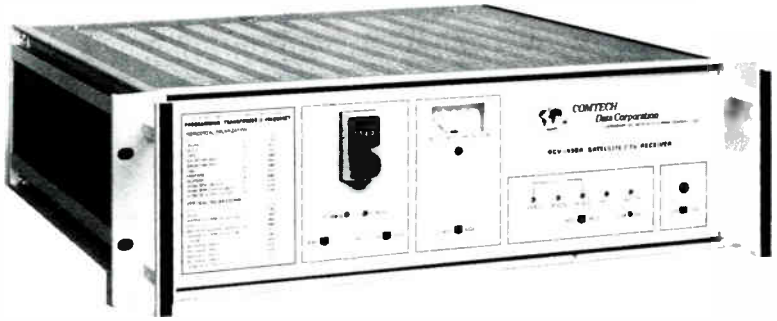

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The Comtech "Priority Protection Package" will accept up to six satellite receiver outputs. The switch will detect a video failure and substitute the agile receiver for the failed equipment. The agile receiver may be used simultaneously as an on-line receiver for some non-premium channels as long as there is no premium channel failure.

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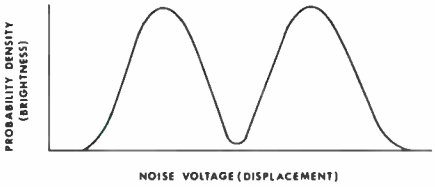

Figure 2a. Noise traces separated by more than twice their RMS levels.

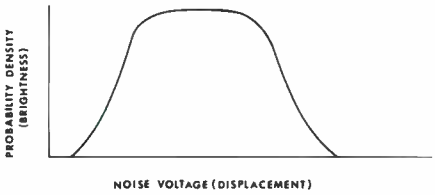

Figure 2b. Noise traces separated by twice their RMS levels.

Figure 2. Relationship between CRT brightness and noise distribution of two traces.

The Gaussian brightness distribution for each trace is

$$b(v) = \exp\left[\frac{-v^2}{2\sigma^2}\right]$$

where

b = brightness of the trace at a point displaced from the center of the trace by a voltage (v) and

σ = the RMS noise voltage.

Linear addition of the brightness of two identical traces separated by a square wave of amplitude (s) results in

$$B(v) = b(v) + b(v-s)$$

The value for (s) at which the dark band just disappears may be found by setting the second derivative of B (v) equal to 0 and (v) equal to s/2. At this point, the curvature at the center of the combined trace is just changing from concave (dip) to convex (traces too close together). Thus

$$\frac{dB(v,s)}{dv} = -\frac{v}{\sigma^2}\exp\left[-\frac{v^2}{2\sigma^2}\right] - \frac{(v-s)}{\sigma^2}\exp\left[-\frac{(v-s)^2}{2\sigma^2}\right]$$

$$\frac{d^2B(v,s)}{dv} = \frac{1}{\sigma^2}\left\{\left[\frac{v^2}{\sigma^2}-1\right]\exp\left[-\frac{v^2}{2\sigma^2}\right] + \left[\frac{(v-s)^2}{\sigma^2}-1\right]\exp\left[-\frac{(v-s)^2}{2\sigma^2}\right]\right\}$$

$$\frac{d^2B(v=\frac{s}{2},s)}{dv} = \frac{1}{\sigma^2}\left\{\left[\frac{s^2}{4\sigma^2}-1\right]\exp\left[-\frac{s^2}{8\sigma^2}\right] + \left[\frac{s^2}{4\sigma^2}-1\right]\exp\left[-\frac{s^2}{8\sigma^2}\right]\right\} = 0$$

$$= \frac{2}{\sigma^2}\left[\frac{s^2}{4\sigma^2}-1\right]\exp\left[-\frac{s^2}{8\sigma^2}\right] = 0$$

$$\left[\frac{s^2}{4\sigma^2}-1\right] = 0$$

$$s = 2\sigma$$

This result shows that the square wave amplitude is equal to twice the RMS amplitude of each trace when the dark band is made to just disappear.

Functional Operation

A functional block diagram of the noise meter is shown in Figure 3. Power is supplied to the instrument through a primary transformer, rectifier and filter system. The output of this primary supply is at approximately ±18 volts. Operating voltages are supplied to sections of the instrument by a tracking ±12-volt regulator and three +5-volt regulators.

Oscilloscope trigger pulses are generated from composite and vertical sync waveforms that have been separated from the signal being measured. In the Line Select mode, a delayed trigger pulse is generated which permits the oscilloscope display of selected video scanning lines. This same trigger pulse is also used in the Field operating mode of the meter.

The separated sync waveform also triggers a flip-flop which generates the square wave used in measurement. In the Line Select mode, the flip-flop is switched once each field, and in the Line operating mode, it is switched

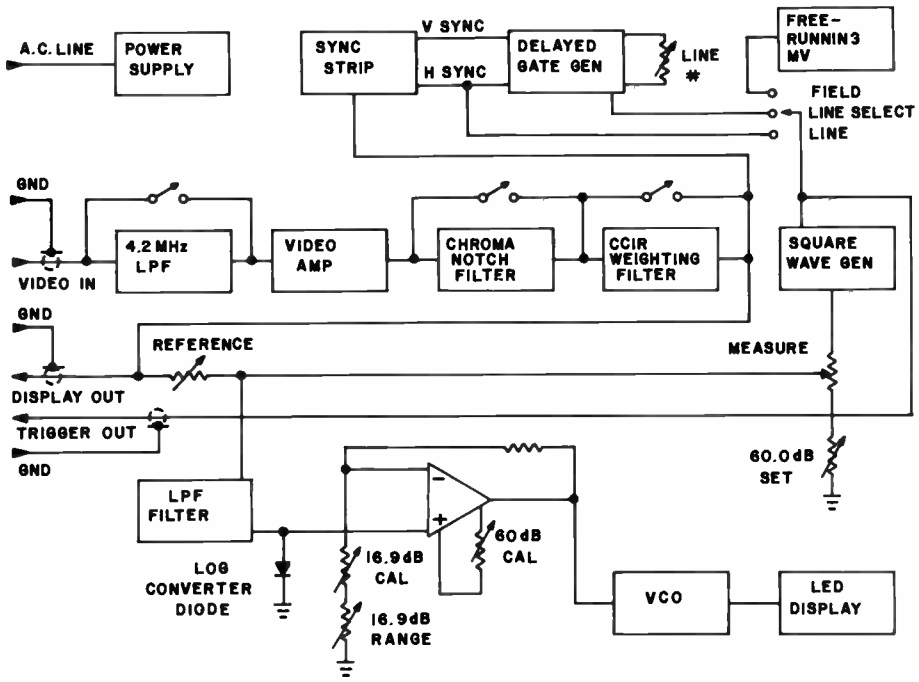

Figure 3. VNM-428 video noise meter functional block diagram.

once each line. In the Field trigger mode, the flip-flop is driven from a free-running multivibrator oscillating at a frequency of approximately 280 kHz. Square waves from this flip-flop are amplified and added to the output of the video amplifier to form the signal displayed for measurement. The amount of square wave added is controlled by the Measure control. The DC component of the added square wave is obtained by low pass filtering with subsequent application to a logarithmic converter, the output of which controls the frequency of a multivibrator. This multivibrator drives counters in the integrated circuit which drives the digital panel meter LED displays. A timer resets the counters to zero at the beginning of each period and transfers the contents of the counters to latches which control the displays. This cycle repeats each 0.5 second, continuously displaying the amplitude of the added square wave, and therefore, the signal-to-noise, in dB.

Filter Correction of Coherent Distortions

The VNM-428 measures random noise on any composite video waveform. Because other distortions that could affect accurate signal-to-noise measurements may be present in the waveform, three modes of operation are available. If line-rate disturbances such as tilt or ringing exceed approximately 50 percent of the peak-to-peak noise voltage, the measurement must be made in the Line or Line Select mode. Otherwise, line-rate disturbances could cause a misleading thickening of the waveform in the field rate display. This also holds true if serious field-rate disturbances such as hum or vertical tilt are present. Again a misleading thickening of the waveform in a line-rate display can occur. In this case the Field or Line Select mode should be used. If both line and field-rate disturbances are present, accurate signal-to-noise readings will be achieved in the Line Select operating mode.

Because discrete interfering signals such as intermodulation products, chrominance subcarriers, and cochannel RF interference can affect the accuracy of a noise measurement, the noise meter has three built-in switchable filters. They are a 4.2-MHz low pass filter, a chroma notch filter, and, for transmission of noise measurements, a noise weighting filter. If the interference is residual chrominance subcarrier, its effect can be eliminated by switching in the Chroma notch filter. If the frequency of the interference is higher than 4.2 MHz, its effect can be reduced with the low-pass filter. Any discrete interference having a frequency greater than about 500 Hz, less than 4.2 MHz, and outside the bank of the chroma notch filter must be separately reduced so that its peak-to-peak amplitude is less than the apparent noise peaks by at least a factor of ten to avoid contaminating the SNR measurement.

The noise weighting filter attenuates high-frequency noise in accordance with CCIR Rec. 421-2. This gives added *weight* to low-frequency noise, reflecting its greater visibility in a television picture. Experiments have shown that a given amount of low-frequency noise causes a greater loss in picture quality than does an equal amount of high-frequency noise. The weighting filter permits expressing the signal-to-noise ratio as a single number which is more closely related to picture quality than would be a simple power ratio.

The following general principles should be followed in selecting filters for a measurement: (1) if the measurement is being made in accordance with a particular standard such as EIA RS-250, select the filters appropriate to that standard, (2) use the 4.2 MHz low-pass filter except when a broader noise bandwidth is specifically desired, (3) use the chroma notch filter when measuring an encoded color signal, and (4) use the weighting filter only when noise weighting is specifically required to conform to a standard or, lacking a standard, when an indicator of subjective picture impairment is more useful than the actual ratio of signal to noise.

In any measurement, the following general procedure should be followed:

(1) Determine which portions of the waveform contain all noise generated within the system under test, and as little noise as possible generated outside that system.

(2) Determine which portions of the waveform are least disturbed by ringing, tilt, hum and other coherent disturbances.

(3) Select measurement mode and filters based on the above factors.

(4) If in doubt, measure using all three available modes. The most accurate result is the one showing the highest signal-to-noise ratio since this mode will have been the least affected by nonrandom disturbances.

Standards and Conversion Factors

Numerous techniques and standards have been established for the measurement of signal-to-noise ratio in video and television systems. The most widely used are those of the CCIR (Comite Consultatif International des Radiocommunications), EIA (Electronic Industries Association), NCTA (National Cable Television Association), TASO (Television Allocations Study Organization), and CTAC (Cable Television Advisory Committee, US-FCC). The CCIR and EIA standards relate to baseband video while the NCTA, TASO, and CTAC standards relate to radio frequency signals. The differences among standards in each category result from different definitions of signal amplitude, noise bandwidth, and noise weighting characteristics as shown in Figure 4 for

STANDARD	SIGNAL	RF NOISE BANDWIDTH	VIDEO NOISE BANDWIDTH	WHITE NOISE WEIGHTING FACTOR
EIA*	SYNC TIP TO PEAK WHITE	—	4.2MHz	4.0dB
CCIR	BLANKING TO PEAK WHITE	—	4.2MHz*	6.1dB*
NCTA*	RMS CARRIER DURING PEAK SYNC	4.0MHz*	NOT DEFINED	NONE
TASO*	RMS CARRIER DURING PEAK SYNC	6.0MHz	NOT DEFINED	NONE
CTAC*	RMS CARRIER DURING PEAK SYNC	3.33	NOT DEFINED	NONE

* FOR TELEVISION STANDARD SYSTEM M AS USED IN THE UNITED STATES
* MEASUREMENT MAY BE MADE WITH BANDWIOTH OTHER THAN 4MHz AND RESULT ADJUSTED MATHEMATICALLY

Figure 4. Relationships among SNR standards.

television standard M as used in the United States and Canada. Translation among standards within each class is largely a matter of accommodating different definitions. The VNM-428 is normally calibrated to measure video signal-to-noise according to the EIA standard definition, with automatic appropriate modification when the CCIR noise-weighting or chroma notch filter is used.

The only conversion factor required would be when the instrument is used in conjunction with a demodulator to measure carrier-to-noise ratios of a cable system or transmitter output. In order to relate post-detection signal-to-noise ratio to pre-detection carrier-to-noise ratio, the effective noise bandwidth of the demodulator must be determined. Most television demodulators must be determined. Most television demodulators of reasonable quality will have a noise bandwidth of approximately 3.5 MHz. Because the VNM-428 reads signal-to-noise directly in the EIA standards, converting signal-to-noise carrier-to-noise per the FCC/NCTA standard is

$$\left(\frac{CNR}{FCC}\right) = \left(\frac{SNR}{EIA} + 3.59\right) dB$$

The error introduced by the assumption of a demodulator having a 3.5-MHz noise bandwidth is not likely to be greater than ±0.3 dB.

There is another assumption used in this technique that could require a conversion factor to be considered. The noise meter will accept any video input level from 0.5 volts peak-to-peak to over 1.5 volts peak-to-peak because the reference control calibrates the instrument to reference to a 1.0 volt peak-to-peak signal. The technique described here assumes that the sync-to-video ratio is correct. If it is not correct, that is, if the signal to be measured has actually only 35 IRE units of sync, the conversion factor, F1, is as shown in Figure 5. In this example

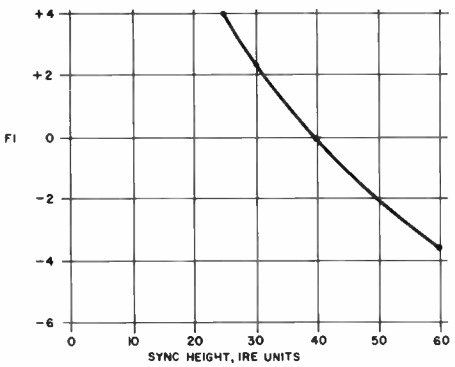

Figure 5. Factor F1 versus sync height.

you would add a +1.3 dB to the noise meter reading.

Applications

Nearly all video waveforms encountered while using the VNM-428 will have originated in either a television camera or a test signal generator, and many will have been subjected to downstream processing. This usually takes the form of regeneration of the synchronizing and blanking pulses and color reference burst. As a result, the picture portion will contain noise from all parts in the generation, recording, and transmission chain, while blanking and sync might only contain noise contributed by the last segment. Signals broadcast by stations of the major television networks may consist of as many as three or four identifiable portions, each regenerated or inserted at a different point in the chain, and each carrying a different mixture of noise representing the performance of a different part of the chain.

In many applications, it is desirable to measure the signal-to-noise ratio of only one aspect of the generation and transmission process. For example, measurements made at a CATV subscriber drop will likely be designed to show the noise performance of the CATV off-air pickup and distribution plant while avoiding noise introduced by cameras, video tape recorders, and microwave systems that preceded broadcast of the signal. Since most television broadcast stations regenerate sync, blanking, and burst immediately prior to transmission, these portions of the waveform will be the most noise-free at the time of transmission and will most accurately reflect the CATV system noise performance.

Routine checks can be made to measure variations in video tape recorder signal-to-noise ratio due to changes in head tip projection and wear, guide alignment, record head current, carrier frequency, tape formulation, tape wear, etc.

Measurements of the signal-to-noise ratio of a monochrome camera or of the Y channel or encoded output of a color camera may also be made. Measurements of noncomposite color camera R, G, and B channels may also be made if sync is added to the waveform. In all cases, the camera should be viewing a scene with large areas of uniform black, white, or gray, and minimum color.

When determining the signal-to-noise ratio of a camera, measurements made during blanking will not yield the information of interest, specifically the noise introduced by the pickup tube and pre-amplifiers. The connection of the VNM-428 for typical use is shown in Figure 6.

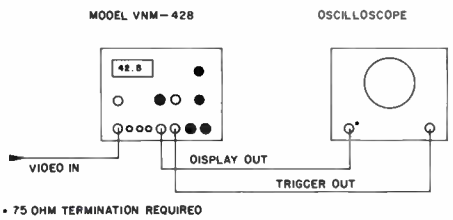

Figure 6. Connection of VNM-428 for typical use.

Any television operation that prides itself on the quality of its signal needs to make periodic checks of the noise characteristics of its system. There is now a technique that may make this job easier and simpler. C-ED

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Ad Hoc Committee Addresses Satellite Transmission Standards

by Pat Link, Managing Editor

On October 26, a meeting of an ad hoc satellite transmission standards committee was held under the auspices of the NCTA engineering committee at RCA headquarters in New York. NCTA engineering committee member, Ken Gunter, talked with *C-ED* about the meeting and its implications for improving satellite transmission standards. It was "an ad hoc committee representing several manufacturers of earth station equipment, several of the programmers of earth stations, several of the system operators or users of earth station services, and RCA Global Communications," Gunter said.

"The meeting was prompted when I realized (and at the suggestion of others in the industry) that there is really no guiding standard, technical standard, let's say, for satellite transmission to CATV systems. Everyone who now leases a transponder, such as Madison Square Garden, HBO, Showtime, Warner, or the independents, all seem to be kind of doing their own thing and adopting what's convenient for their transponder and their particular customers.

"For example, there is no standardization of subcarrier frequencies or deviation of subcarriers or insertion levels of subcarriers on the main carrier on a transponder. There is even some difference of opinion about the proper deviation for video modulation.

"Another question came up at the meeting that was really overlooked by all of us until we got there, and that was that there are several proposals for video multiplexing of more than one TV channel at a time on a single transponder, and that is an entirely different type of need for standardization. Certainly we don't want everyone using his own multiplexing technique to put two pictures on one channel at one time, because then everyone would have incompatible receiving equipment.

"We're moving as rapidly as we can to adopt standards for the industry because we want to make it easier for earth station manufacturers to build equipment which is common to all of our needs, which, of course, is going to be reflected in lower pricing and easier substitution of equipment and results in a reduction of spare modules of equipment. With the more standardization you build, the easier it is to produce in larger numbers and get that economy of scale and the manufacturing process so that the price is held down. Everything in this standardization effort is going to benefit all earth station users no matter who they are or what they are using.

"There will be, we hope, a final meeting held with a much broader group invited. We wanted to hold this group down to a small workable nucleus with maybe 12 representatives from the factions in the industry just described—so that we could first see if we were not pretty close to a consensus. And I think we are. It's not a matter of what's right or wrong; it's a matter of what are the practices that we are faced with at the moment and which would be the best compromise to adopt so that we're all in step. The main thing is not whether we are on the left or the right foot, it's that we're all marching in step now.

"The results will be reduced to minutes and suggested standards which will be circulated on a wide basis to all interested parties. There could be some things that jump out that require some study or clarification, but we don't think so at the moment. We're hoping that we can hit the new year with a new standard for everyone to follow so that all of our planning and engineering problems are simplified and so that we have complete compatibility of equipment as the new transponders that will be available next year in March proliferate further the number of channels available. We want everyone to be able to tune their existing equipment without having to re-adapt and buy this and buy that so they can receive what's of use for new programmers and transmitting. It's time to stop and do some housecleaning.

"We chose to pick three key representatives from each of those factions: manufacturers, programmers, users, and RCA. Everyone is going to get a crack at this; we want to at least come to a first draft that's very close to reality and that might need minor modifications at the behest of people that might not have been given a voice earlier. I figure we'll have a new standard by early 1980 that is publishable by the NCTA. Any interested parties who would like to receive copies of the minutes and the proposed standards that come out of these meetings should write the Engineering Department, NCTA. (That address is 918 16th Street, N.W., Washington, D.C. 20006.)"

Ken Gunter

Cable Programming for December

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
C-SPAN (times approx.)		12 pm-6 pm (Mon. & Tues.) 10 am-6 pm (Wed.-Fri.)	195°/#	F1, #9
Calliope		6:30 pm-7:30 pm (Mon., Tues., & Thurs.)	168°/#	F1, #9
CBN		24 hrs.	No	F1, #8
ESPN		7 pm-6 am (Fri.-Mon.) 6 pm-4 am (Mon.-Fri.)		F1, #7
Front Row		2:30 pm-2:30 am	481°/#	E,C F1, #12 P,M F1, #10
HBO	1	2:00 pm- 1:38 am	Program	F1, #24
	2	2:00 pm- 1:51 am	729°/#	F1, #22
	3	6:30 pm- 2:01 am	Scramble	F1, #23
	4	6:00 pm- 1:36 am	835°/#	F1, #20
	5	5:30 pm- 2:01 am	Duplication	
	6	6:00 pm- 1:50 am	940°/#	
	7	5:30 pm- 2:10 am	Take-2 E.	
	8	2:30 pm- 1:16 am	592°/#	
	9	2:00 pm- 2:08 am	Take 2 W.	
	10	6:00 pm- 2:18 am	681°/#	
	11	5:00 pm- 1:01 am		
	12	6:00 pm- 1:48 am		
	13	5:00 pm- 1:30 am		
	14	5:00 pm- 2:49 am		
	15	2:00 pm- 1:45 am		
	16	3:00 pm- 1:01 am		
	17	6:00 pm- 2:00 am		
	18	6:00 pm- 2:10 am		
	19	5:00 pm- 2:04 am		
	20	5:30 pm- 1:08 am		
	21	5:00 pm- 2:13 am		
	22	3:30 pm- 1:31 am		
	23	3:00 pm- 1:13 am		
	24	5:30 pm-12:58 am		
	25	3:30 pm- 1:13 am		
	26	5:00 pm- 2:18 am		
	27	5:30 pm- 2:04 am		
	28	5:30 pm- 1:03 am		
	29	2:30 pm- 1:43 am		
	30	3:00 pm- 2:31 am		
	31	3:00 pm- 4:21 am		
HTN		8 pm-10 (11) pm	207°/#	F1, #21
KPIX (time permitting)		2-4 hrs. per day	No	F1, #1
KTVU		7 am-1 am (weekdays) 7 am-4 am (weekends)	No	F1, #1
MSG Sports	1	7:30 pm- 9:30 pm	438°/#†	F1, #9
	2	11:00 pm-1:00 am		
	3	8:00 pm-10:30 pm		
	4	8:00 pm-10:00 pm		
	5	9:50 pm-12:30 am		
	6	9:50 pm-12:30 am		
	8	8:00 pm-12:00 am		
	10	8:00 pm-12:30 am		
	11	8:00 pm-12:00 am		
	12	8:30 pm- 1:00 am		
	13	7:50 pm- 1:00 am		
	14	8:00 pm-12:30 am		
	15	7:50 pm-11:30 pm		
	16	7:30 pm-10:00 pm		
	17	8:00 pm-10:30 pm		
	18	8:30 pm-11:00 pm		
	19	7:30 pm-10:00 pm		
	20	7:50 pm- 1:00 am		
	21	7:00 pm-11:00 pm		
	22	3:00 pm- 7:00 pm 11:00 pm- 1:00 am		
	23	11:00 am- 3:00 pm 7:30 pm-10:00 pm		
	24	8:00 pm-10:30 pm		
	26	7:00 pm-11:00 pm		
	27	7:50 pm- 1:00 am		
	28	7:00 pm- 1:00 am		
	29	9:00 pm- 1:00 am		
	31	8:00 pm-10:30 pm		

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
Modern Talking Pictures		12 pm-5 pm (weekdays) 7 am-12 pm (weekends)	048°/#	F1, #22
Newstime		24 hrs.	276°/#	F1, #6
Nickelodeon		10 am-11 pm (weekdays) 9 am-11 pm (weekends)	749°/#	F1, #11
PTL		24 hrs.	No	F1, #2
Reuters		Not in use yet.	No	will use F1, #18
SPN		10 pm-8 pm (Mon.-Sat.) 24 hrs. (Sun.)	429°/#	F1, #21
Showtime	1	3:00 pm- 2:19 am	576°/#††	E, C, F1, #12; P, M, F1,
	2	3:30 pm-12:36 am		
	3	6:00 pm-12:49 am		
	4	5:30 pm- 1:00 am		
	5	6:00 pm- 1:51 am		
	6	5:30 pm- 1:00 am		
	7	6:00 pm- 1:29 am		
	8	2:30 pm- 1:36 am		
	9	3:30 pm-12:31 am		
	10	6:00 pm- 1:51 am		
	11	5:30 pm- 1:52 am		
	12	6:30 pm-12:32 am		
	13	5:30 pm-12:46 am		
	14	6:30 pm- 2:03 am		
	15	3:00 pm- 1:32 am		
	16	3:30 pm-12:52 am		
	17	6:00 pm- 1:17 am		
	18	6:30 pm- 1:34 am		
	19	6:00 pm- 1:33 am		
	20	6:00 pm- 1:55 am		
	21	5:30 pm- 1:57 am		
	22	3:30 pm-12:57 am		
	23	3:30 pm-12:57 am		
	24	3:30 pm-12:22 am		
	25	3:00 pm- 1:32 am		
	16	6:30 pm- 1:46 am		
	27	6:00 pm- 1:02 am		
	28	6:30 pm- 1:41 am		
	29	3:00 pm- 1:32 am		
	30	2:30 pm- 1:32 am		
	31	6:30 pm- 1:25 am		
SIN		2:30 pm-1 am (weekdays) 4 pm-12 am (Sat.) 11 am-11:15 pm (Sun.)	No	Westar II, #7
Star Channel		9:30 am-2:20 am	311°/#E. 519°/#W.	F1, #5
Trinity (KTBN)		24 hrs.	No	F1, #14
WGN		5:42 am-3 (3:30) am (Mon.-Thurs.) 24 hrs. Sat. & Sun. Ends 3 am on Sun.	No	F1, #3
WOR		6:30 am-1:30 am		F1, #17
WTBS		24 hrs.	No	F1, #6

E = eastern
C = central
M = mountain
P = pacific

All program times are listed for the eastern time zone, unless otherwise noted.

† Commercial substitution 601°/#; Thurs. baseball 706°/#.
†† On-line 679°/#; off-line 753°/#; access 843°/#.

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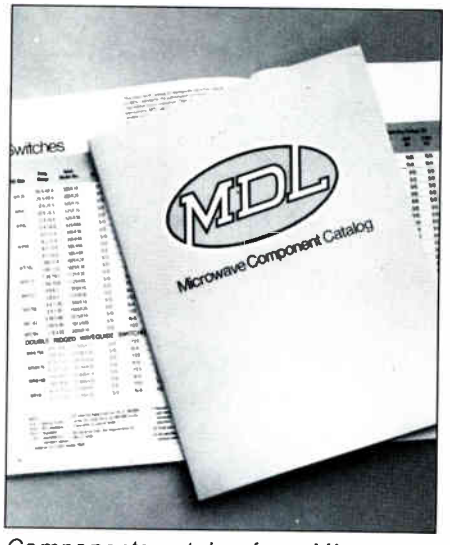
For more information, contact Microwave Development Laboratories, Inc., Ernest Bannister, Advertising Manager, 10 Michigan Avenue, Natick, MA 01760, (617) 655-0060.



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Test instrument catalog from Leader Instruments.

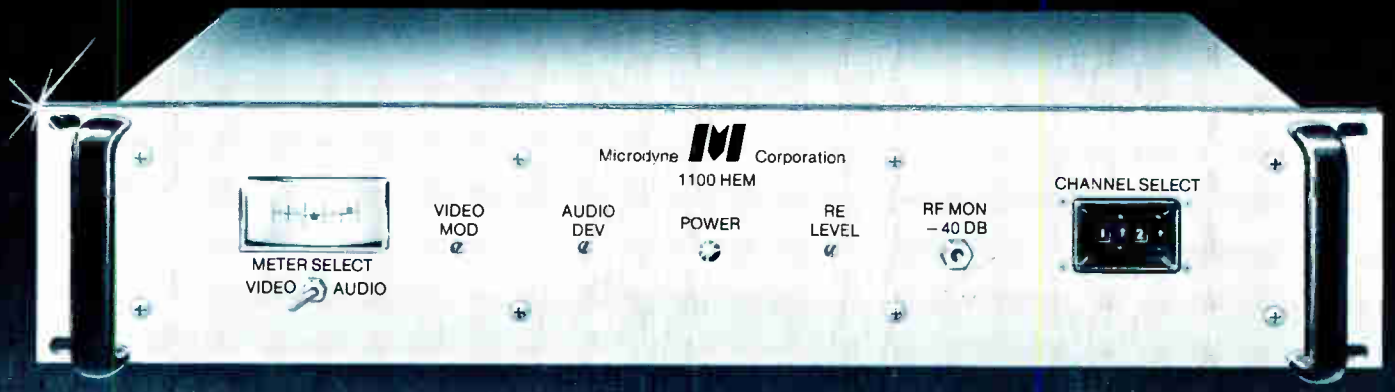
Brochure on Microwave Filters Superchannelnotcher

A four-page brochure from Microwave Filter Co., Inc. describes single-channel band suppression filter for VHF, mid-band, and super-band and describes the use in mass descrambling or in clearing a channel in closed circuit TV. Rejection is 50-dB minimum with a maximum of 3-dB impact on adjacent channels.

For more information, contact Microwave Filter Co.,Inc., 6743 Kinne Street, East Syracuse, New York 13057, (315) 437-3953.

Microwave Filter's brochure on the Superchannelnotcher.

The First



The first tunable Head End modulator...

Introducing the first fully tunable Head End Modulator (HEM). Once again, Microdyne will be the first to introduce a new product to the Cable TV Industry, The 1100 HEM is "State of the Art" technology and is fully tunable to include mid-band channels A through I.

The first low cost synthesized receiver...

Introducing Microdyne's new crystal-free Synthesized Receiver. Microdyne's 1100-FFC(X-1) (S) receiver does not require crystals for tuning. The new synthesized receiver will pull in all the channels you are used to receiving. Now, you no longer have to change crystals to change channels.

The first...

Microdyne Corporation is the first and foremost supplier of Satellite Communication Equipment in the Cable TV Industry.

We were the first to manufacture a "tunable" crystal receiver and first to introduce a 24 channel receiver with automatic polarity selection. We were also the first to develop a 360° antenna mount. Now, we are the first to market a Tunable Head End Modulator and low cost synthesized Receiver.

When you're interested in high quality equipment, look to the first and foremost manufacturer of Satellite Communication equipment . . . Microdyne. Call us today.

On exhibit during the western cable show!

Visit booth #12 during the show and discuss your requirements with our qualified application's engineers.

Be the first...

I would like to be one of the first to place a Tunable Head End Modulator or Synthesized Receiver in my system. I understand I am under no obligation and would like an application's engineer to contact me.

Name _____ Title _____

Company _____

Address _____

Telephone Number _____

Microdyne Corporation
Marketing Dept. 912G P.O. Box 7213
Ocala, FL 32672 (904) 687-4633

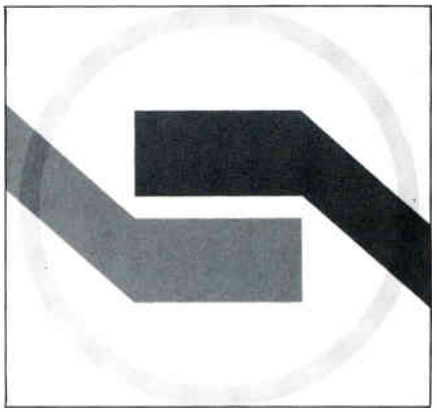
Microdyne Corporation
Marketing Dept. 912G P.O. Box 7213
Ocala, FL 32672 (904) 687-4633
TWX 810-858-0307
Kansas City, Missouri 64152
816-891-7030

High Voltage Relay Catalog From ITT Jennings

ITT Jennings, a division of International Telephone and Telegraph Corporation, has announced a 24-page catalog covering its line of vacuum relays. The catalog contains specifications and ordering information for vacuum relays with voltage ratings from 4-KV to 33-KV peak.

Catalogued relays cover over 40 vacuum types including applications in digitally tuned RF amplifiers, antenna tuners and couplers, radar pulse forming networks, and safety grounding. Also included are pressurized relays for use in medical defibrillator circuits and other types of capacitor discharge requirements. Application data, including electrical and mechanical considerations, are included in this catalog.

The catalog may be obtained by contacting the marketing department, ITT Jennings, 970 McLaughlin Avenue, San Jose, California 95122.



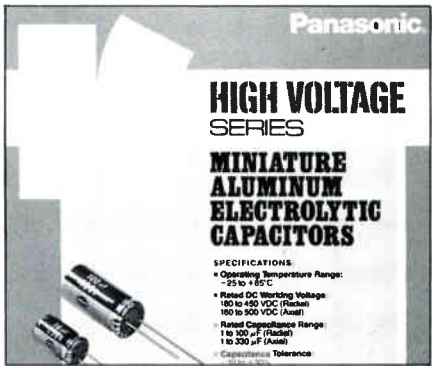
Catalog of vacuum and gas-filled relays from ITT Jennings.

Specifications on Solid Tantalum Electrolytic Capacitors Released by Panasonic

A six-page, fold-out bulletin on Panasonic's SQ Series solid tantalum electrolitic, resin-dipped capacitors is available from the electronic components division of Panasonic.

The bulletin presents specifications on the series of capacitors engineered to provide high stability, good humidity characteristics, and long life. Specifications include capacitance values, voltage ranges, detailed capacitor dimensions, temperature, load life and humidity curves, and mechanical specifications and other critical performance factors. The bulletin includes all information necessary to order the SQ series directly from the information given.

For a free copy of the bulletin, write or call Panasonic Company, One Panasonic Way, Secaucus, New Jersey 07094, (201) 348-7270.



Panasonic's high voltage series capacitors.

Valtec Communication Fiberoptics Catalog Covers Data, Voice, Video, Product Range

Valtec Corporation's Communication Fiberoptics Short Form Catalog gives specifications and application recommendations for a range of off-the-shelf data, voice, and video communications products.

Product lines, such as optical fibers and cables, fiberoptic modems and interfaces, and base-band video links, cover applications from computer/terminal connections to long-haul telephone and CATV trunking. There are components designed to perform in any installation environment—from a building's room temperature to direct underground burial at temperatures below freezing.

To obtain a copy of the catalog, write Valtec Corporation, Communication Fiberoptics, 99 Hartwell Street, West Boylston, Massachusetts 01583.

Communication fiberoptics short form catalog from Valtec Corporation.

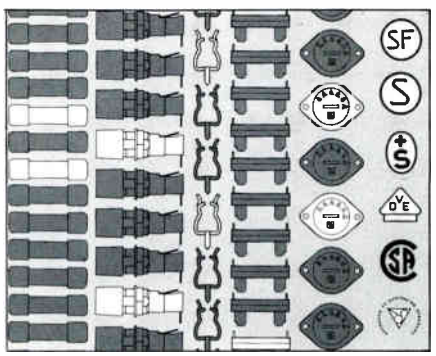
Schurter International Primary Circuit Components Catalog Available From Panel Components Corporation

Panel Components Corporation has recently released the 1979 Schurter International Primary Circuits Components catalog. The 16-page, illustrated catalog provides detailed information regarding Schurter fuses, fuseholders, voltage selectors, fuse blocks and clips designed to meet both North American and international safety requirements.

The two-color literature includes discussions of international product safety standards, testing and enforcement agencies, and the cost advantages of using internationally approved and adaptable primary circuit components. The catalog also provides sections covering fuseholder selection, fuse and voltage selector specification, technical data on fuseholders and a description of the Schurter international safety fuseholder, designed for use on electronic equipment made for North American and foreign markets.

Also included is a list of Schurter sales representatives and complete ordering information.

The free literature is available from Panel Components Corporation, P.O. Box 6626, Santa Rose, California 95406, (707) 523-0600.



Schurter International primary circuit components catalog.

This Is Our New Tap

The heart of our new tap is a plug-in module complete with the following mechanical features:

- Weather-tight, tin plated brass "F" connectors.
- High quality, long lasting O-ring permanently held in place in a recessed groove.
- Plastic protective cover
- Captive sealing bolts

And...of course, it plugs into a unique, pressure tested, weather-tight housing with a built-in "quick-change" conversion feature for either aerial or pedestal mounting.

Look at these specs

- Extremely Low Insertion Loss
- Maximum R.F.I. Integrity
- 7 Amp Power Passing
- 20 dB or Better Return Loss at Feeder Lines and Tap Ports
- -70 dB Hum Modulation at 7 Amps
- 5 to 300 MHz Bandwidth
- 30 dB Tap to Tap Isolation

NEW!

A MORE VERSATILE...MORE ECONOMICAL TAP.

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a division of Texscan corporation

Theta-Com CATV, a division of **Texscan Corporation**
2960 Grand Ave. P.O. Box 27548 Phx. Az. 85061
Phone: (602) 252-5021 Toll-free (800) 528-4066
TWX 910-951-1399

YOU'LL LIKE THE WAY WE TREAT YOU.

"See us at booth 68 at the Western Show"

Patent Pending

PT-1800 has 21dB gain. PT-1000 has 18dB gain.
Can be mounted vertically or horizontally.

Crystal-controlled down-converter.
No field adjustments.

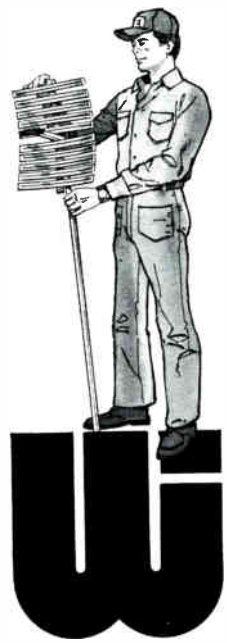
COMPLETE LOW-COST MDS RECEPTION PACKAGE FROM WINEGARD

Serving the over-the-air pay TV industry with ■ Antennas ■ Down-Converters ■ MATV Systems

WINEGARD INVITES COMPARISON!

▪ High Performance ▪ High Reliability ▪ More Installs Per Day ▪ Competitive Pricing ▪ Superior Technology ▪ Total System

Winegard Industries offers a truly cost-effective solution to outfitting MDS subscribers' homes with a complete receiving package. Our easy-to-install antennas and crystal-controlled down-converters give your customers maximum picture quality while keeping your installation costs down.



Many MDS "pay" operators have been able, by using Winegard equipment, to turn "no-go" locations into happy subscribers. Others have been able to provide satisfactory reception in fringe areas where competitive equipment simply couldn't do the job.
For specs and information on MDS systems and related equipment,

CALL OR WRITE:
John von Harz,
Winegard Industries
P.O. Box 832, Burlington, Iowa 52601,
(319) 752-3607

WINEGARD industries
A DIVISION OF CONIFER CORPORATION
sales offices: Burlington, Iowa

PROBLEM FREE !

with... PHILTEK

Only 16 inches wide

Only 14½ inches deep

Only 24 inches high

catv standby power supplies
polemount-pedestal-headend

720 VA. 12 amp @ 60 volt
Remote/local status indication
Easy to maintain/service
Short circuit protection
All electronics in one rugged, removable module
Low-voltage shut-down

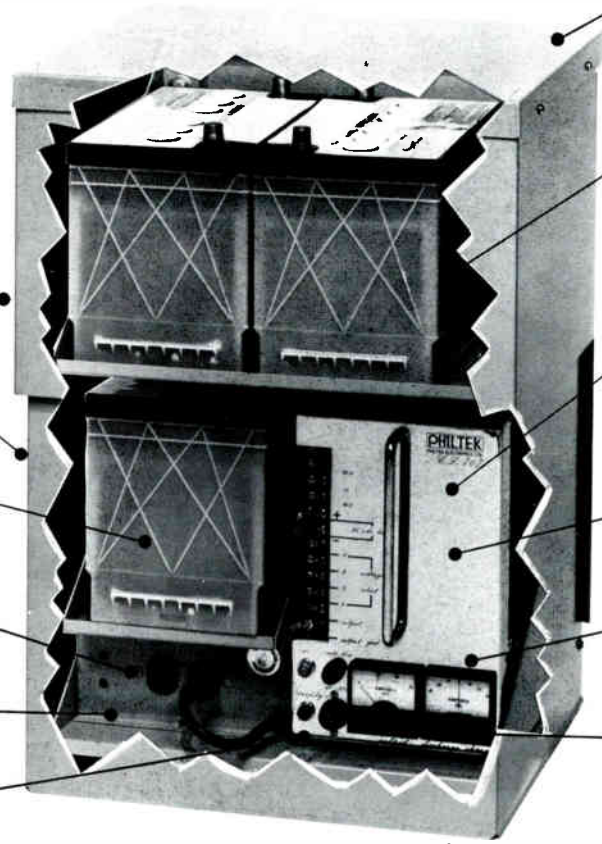
Epoxy-coated light-weight Aluminum cover for maximum corrosion resistance.

Battery swings out for easy installation/service

Utility outlets for easy installation & accessories

Externally accessible power circuit breaker

Externally visible status indicator lamps



Light-weight Aluminum cover Lift only to service batteries

Accepts three 24c (10 inch) or 27c (12 inch) batteries

Ferro-resonant controlled in both normal & standby operation

Control/logic card easily accessible. Remove to convert to non-standby unit.

Load current meter

Optional charge/ discharge ammeter

All electronics "fresh air" ventilated

Should you equip your system with standby power capability? Can you justify the cost? Why a ferro-resonant transformer? Do you need 2, 3 or 4 batteries? Can you operate units at their full rated load? Will they maintain output voltage even when battery volts are way down? If you need answers to these or other questions, call us, or see us AT BOOTH 510 and 511 at the WESTERN CABLE SHOW, ANAHEIM, CALIFORNIA – DEC. 12-14, 1979.

Kelcee **COMMUNICATIONS INC.**

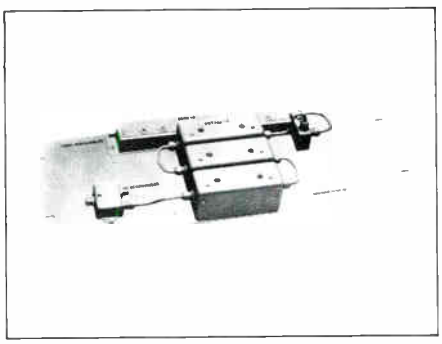
2431 FOREST AVE.
SAN JOSE, CA 95128

(416) 677-2232 or (403) 276-5755 FOR MORE INFORMATION

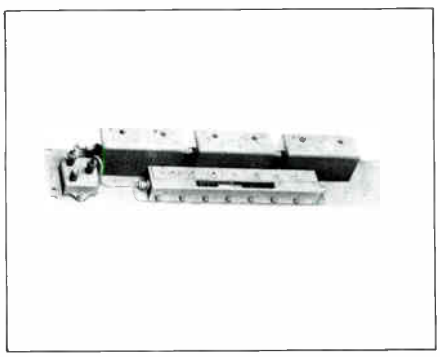
Video

Microwave Filter Offers MDN Devices

The Mass Descrambling Network (MDN) from Microwave Filter Company, Inc. allows descrambling of the premium channel at the point of cable entry to motels, hotels, and apartment buildings. It removes the premium channel from the cable, descrambles, bandpasses, and re-inserts it onto the cable at the same level as adjacent channels which are not affected. MDN is prewired and needs only the addition of a descrambler. It needs no power.



Microwave Filter also offers an MDN device for interfacing cable TV to an existing closed circuit TV system. The Coupler MDN (CCTV) suppresses a channel on the incoming cable system and inserts the local origination in its place. MDN (CCTV) is installed by patching it into the cable system at point of entry to the motel, hotel, hospital, or apartment building and connecting the local modulator to the built-in bandpass filter. The incorporated notch filter suppresses the channel to be vacated at least 50 dB. The built-in bandpass filter cleans the output of the local modulator to prevent interference to adjacents upon reinsertion.

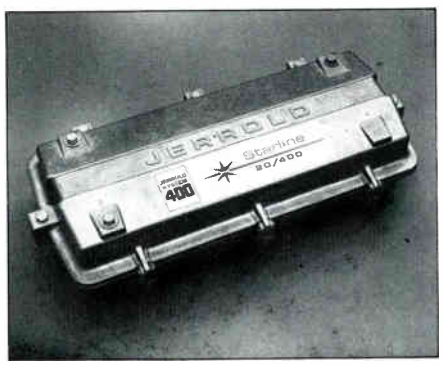


For further information on these products, contact Microwave Filter Company, Inc., 6743 Kinne Street, East Syracuse, New York 13057, (800) 448-1666.

General Instruments Introduces "System 400"

"System 400," a development in cable television providing 52-channel capability, was announced at a press conference by Frederick Shuh, senior vice president of General Instrument Corporation. System 400 takes its name from the 400-MHz radio frequency limit representing an expansion of the 300-MHz limit, which currently provides 35 channels.

Commenting on the announcement, Mr. Shuh said that the "system 400 has the added advantage of compatability with existing systems and with future cable TV system development and technology."



The system hardware will be available in early 1980 and will be on display for the first time at the Western Cable Television Association trade exhibit in Anaheim, California, during December. For further information, contact General Instrument Corporation, 1775 Broadway, New York, New York 10019, (212) 541-8200.

Earth Station

Scientific-Atlanta Introduces New TVRO Steel Pier Anchor Design

Scientific-Atlanta, Inc., has introduced a new steel pier anchor design which makes possible the installation of S-A's 4.6-meter earth station in one working day. Unlike conventional TVRO installations, which require a monolithic slab, S-A's new design utilizes three steel piers which are sunk in the ground and tied together with spreader angles. The dish is then mounted on the steel anchor frame. Concrete, which can be poured before, during, or after antenna erection, is used to reinforce the area around the steel piers. The design incorporates a single axis mount which allows for installation inaccuracies and enables realignment to be accomplished with one adjustment.

For more information, contact Scientific-Atlanta, Inc., 3845 Pleasantdale Road, Atlanta, Georgia 30340, (404) 449-2000.

Microwave Associates Introduces The VR-3X Saellite Receiver

Microwave Associates Communications has introduced the VR-3X satellite receiver. A screwdriver manually tunes the receiver across the entire band. Automatic frequency

control locks the receiver to the signal of the selected channel. Standard features include a threshold extension demodulator that produces a three-dB extension when compared to a 30-MHz IF bandwidth. An extra video output and composite baseband output allow flexibility of service. For example, the baseband output reproduces all subcarriers that may be present on the satellite including such information as news and music.

When the VR-3X satellite receiver is used to feed a microwave system, an optional 4.5-MHz subcarrier generator

IN GRAND PRAIRIE, TEXAS, FOLKS SUPPORT THE SHERIFF, THE COWBOYS, AND TWO PREMIUM PAY SERVICES.

It was a classic Texas showdown. When Storer Cable TV introduced Showtime and (dare we say it?) Home Box Office to a new build market just outside of Dallas last July, a lot of people in the industry were skeptical. After all, when the two big guns come to town, one of them has got to get out by sundown, right? Wrong.

As of October 25, 1979, the figures show that of all basic cable subscribers, 94% have opted for pay TV. And, of those, an astounding 65% have chosen both SHOWTIME and the other maxi service!

Why?

Because Storer presented a total entertainment package to Grand Prairie. And since most subscribers looked at cable as a way to maximize their viewing options, they took both pay services so they wouldn't "miss anything."

They were right.

Many of you think the two services offer the same programming. They don't.

For instance, Showtime offers a wide range of totally unique blockbuster specials. Superstars like Elton John, Willie Nelson, Tony Bennett, Crystal Gayle, and Juliet Prowse taped live in concerts from Moscow to Nashville. Dazzling Las Vegas reviews. Uncensored comedy from Chicago, New York, Houston, and San Francisco. Exclusive productions of Broadway and Off Broadway shows. And movies and mini series produced especially for us.

Packaging the two pay services together, Storer was able to give the Grand Prairie audience more options, more convenience, and better selection than ever before.

And Showtime is committed to working closely with the cable system to successfully package these dual service advantages to the consumer.

The teamwork paid off.

In a new build, dual market situation, both Showtime and the other major pay service experienced high penetration

numbers and overwhelming success. And the affiliate reaped the benefits of both!

By offering Showtime and another pay service, Storer's maxi pay revenue increased by a whopping 85%.

We'd like to do the same for you.

So why not call one of our regional representatives and let him help you build a package for your market? When you do, you'll find out what we've been saying all along.

For everybody concerned, Showtime *is* television worth paying for.

SHOWTIME

Television Worth Paying For™

1211 Avenue of the Americas, New York, NY 10036 (212) 880-6641. Call toll-free (800) 223-0646; 0647 Telex, 710 581 5520.
Regional Sales Offices: Northeastern (212) 880-6611, Art Gusow Southern (404) 923-9933, Bob Mason
North Central (312) 346-4526, Patrick Grotto South Central (817) 267-3125, Carroll Wood Western (415) 820-1046, Curt Bennett

module provides a composite output with one audio subcarrier at 4.5 MHz.

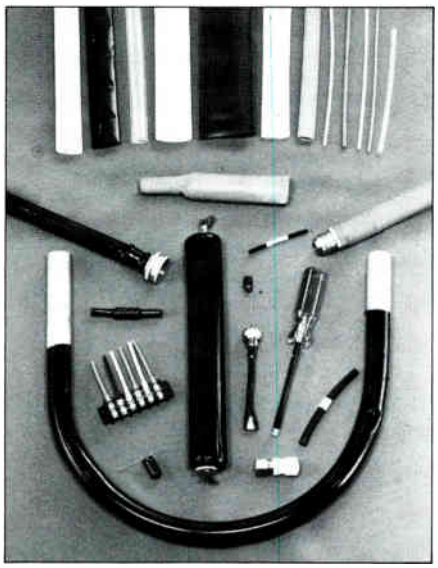
The VR-3X satellite receiver may also feed a cable system directly when the optional cable modulator module is employed. This option eliminates the need for an external cable modulator and also provides a 4.5-MHz subcarrier composite signal so that the system may simultaneously feed a microwave transmitter as well as the cable.

For further information, write or call Microwave Associates Communications, 63 Third Avenue, Burlington, Massachusetts 01803, (617) 272-3100.

Cable

Shrink-Loc Tubing Offered by Sinclair & Rush

Sinclair & Rush, Inc. recently announced the introduction of its line of



Shrink-Loc heat shrinkable tubing.

Available in a variety of materials, sizes, and colors, Shrink-Loc tubings can be used as insulators, stress relief sleeves, color codes, CB antenna covers, corrosion protectors, tool covers, lawn mower handle covers, and in many other industral and consumer applications.

The application of heat to the tubing results in a 50-percent inside diameter reduction, allowing it to conform to many types of irregular shapes. The use of Shrink-Loc tubing can result in cost, weight, and size savings along with improved performance.

For free samples and information, contact Sinclair & Rush, Inc., 6916 South Broadway, St. Louis, Missouri 63111, (314) 481-2450.

Power Supplies

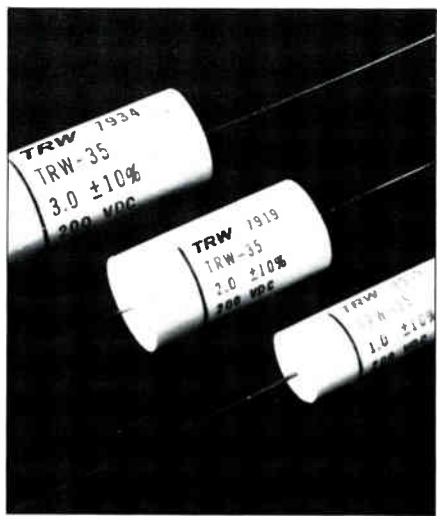
TRW Introduces the TRW-35 Capacitor

TRW Capacitors manufactures, as a standard line, a series of high-frequency, metallized polypropylene capacitors designed for switching power supplies. The device, designated the TRW-35, was available previously only on special order.

According to TRW Capacitors, the TRW-35 is superior to comparable electrolytics in impedance characteristics and has the advantages of smaller size and lower weight. These features make the TRW-35 suitable for high-current applications, including high-current, high-frequency transformer DC blocking, and EMI low-frequency filtering.

The TRW-35 operates at 20 KHz and can handle current up to 9A RMS. Three voltage ratings—100, 200 and 400V DC—are offered in capacitance ranges from 1.0 mfd through 30.0 mfd. In lots of 100s, the TRW-35 is a 1.0 mfd 400 V DC +20-percent device.

A data sheet and other information are available from TRW Capacitors, 301 West "O" Street, Ogallala, Nebraska 69153, (308) 284-3611.

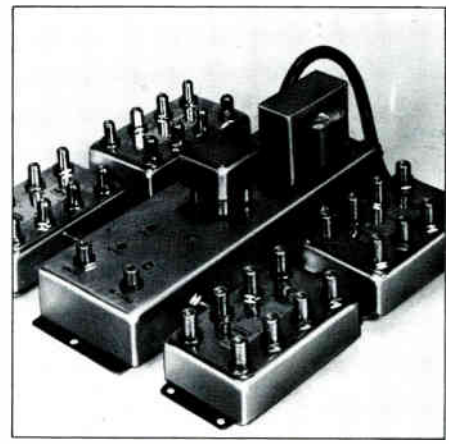


Miscellaneous

Cerro Introduces Distribution Center

Cerro Communication Products has introduced a multi-output distribution center with a modular amplifier to handle up to 32 subscribers from a single feed. It has the flexibility to connect nearby and remote units and has threaded connectors to ensure electrical integrity and simplify adding splitters without jumper cables. Cerro IDCs, which can also be mounted side by side with separate feeds to handle more than 32 subscribers, are designed for single drop as well as for systems which are wired in series. All components are packaged together for single point connect/disconnect. Both a 30 dB gain and a 40 dB gain model are available for a closer match of gain to distribution requirements. Other features include a solid state amplifier; push-pull circuitry (40-300 MHz response); 10 dB gain/tilt control; 30/60V switchable cable powered or 117 V AC powered. A lockable metal equipment housing with mounting board is available, in which pay TV trapping can also be done.

For additional information, contact Cerro Communication Products, Member of The Marmon Group, Halls Mill Road, Freehold, New Jersey 07728, (201) 462-8700.



TV Cable Identifier From Vista III Concepts

Vista III Concepts has recently introduced a digital instrument designed to simplify the identification of TV cables in apartment buildings and condominiums. This identifier is designed to make it possible for one technician, working alone, to identify cables with a savings in time. The TCI-4 is a DC ohmeter that responds on a GO/NO-GO basis to eight resistive terminations (supplied). Each termination is color coded, and when properly connected, causes the instrument to respond with a corresponding number. The instrument is 1 in. x 2 in. x 4 in.

For more information, contact Vista III Concepts, Box 1333, Frisco, Colorado 80443.

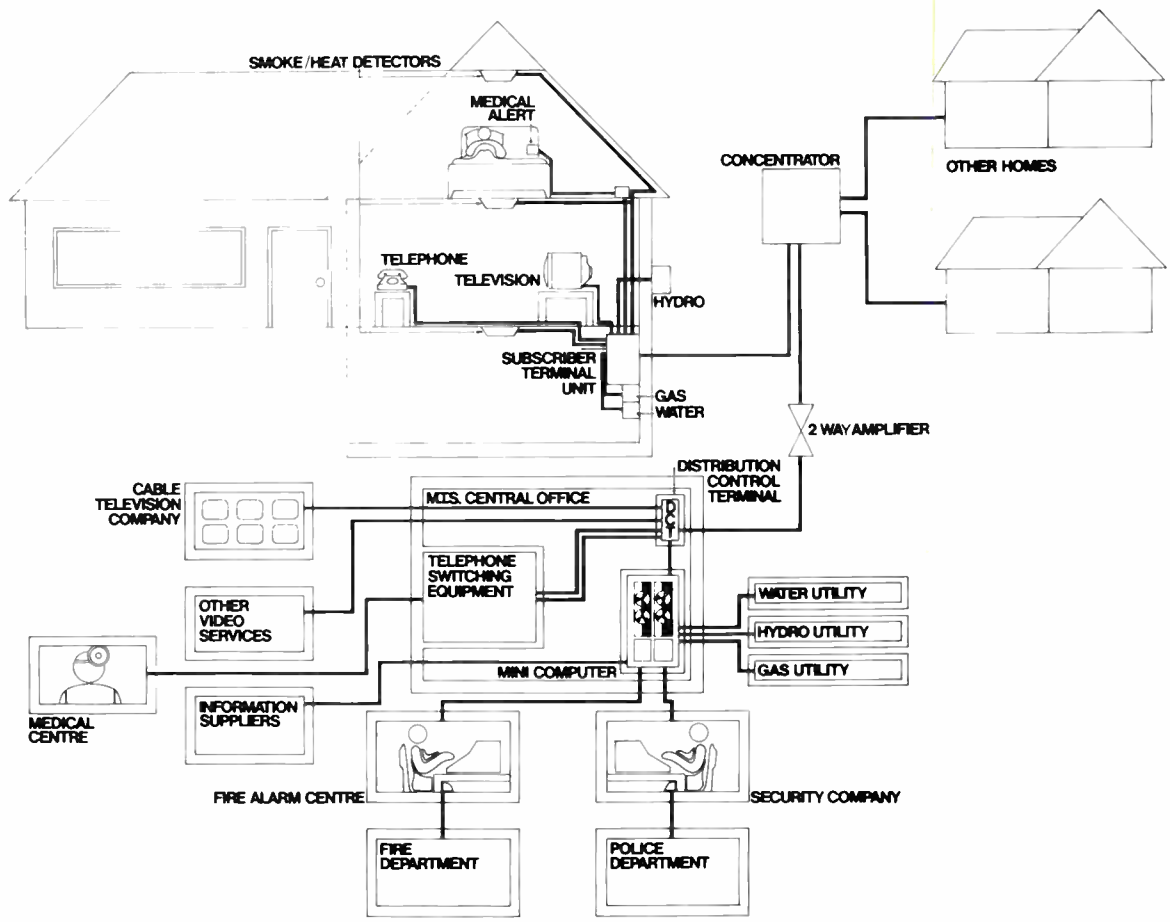
Manitoba's Project IDA

by Pat Link, Managing Editor

Manitoba Telephone System calls its futuristic communications project, Project IDA, in memory of Ida Cates who became the first woman telephone operator in the province in 1882. Ida, who customers soon came to recognize as the "voice with the smile," was typical of the kind of operator who could handle almost any kind of request beyond her call of duty. You could ask her for medical advice, a recipe, hockey scores, the weather forecast, the time of day or details about an important news event, or even to wake you up in the morning.

The information role established by Ida Cates and her contemporaries has remained part of the communications heritage in Manitoba. While the nature of telecommunications has changed dramatically, adapting to newer methods and improved equipment has enabled the system to keep up with the demands of its customers.

Project IDA is designed to provide a variety of services over a single integrated system to customers in south Headingley. The project is scheduled to begin in April 1980. At that time, Dennis McCaffrey, the project manager, feels



Project IDA will explore the potential of a wide range of telecommunications services over a coaxial cable network. Over 20 independent suppliers will ultimately share the MTS network during the "home of the future" trial.

water and gas meter reading, fire alarm reporting, and video services will be available to customers. Project IDA will also offer information retrieval services, medical services, and additional video services. These new telecommunications services are expected to have a dramatic impact on the homes, offices, and farms of future Manitobans.

Two groups of services are being examined which connect the home TV set to stored information in computer data banks. The possibilities will likely include transportation schedules, advertising, news briefs, library services, entertainment directories, telephone and television directories and a number of computer games. Access to financial, business, agricultural, government, and educational resources could also be offered at a later date.

Several thousand pages of information will be available for the trial, and this number is expected to increase rapidly should the trial prove successful. Approximately 50 homes in the south Headingley area will be offered the videotext services and a chance to experiment with the concept of TV-on-request: movies, sporting events, etc., without commercials and at no charge to the viewer. Stereo music-on-request will also be available.

Water and gas meters will be read automatically in about 50 homes, and up to 100 residents will be offered automatic fire alarm reporting.

In the event of fire, smoke and heat detectors will not only sound the alarm in the home but send an electronic message to an alarm company, which verifies it and relays it to the fire department. One of the popular types of smoke and/or heat detectors is installed in each participating home. These alarms, provided by private alarm companies, are tied into the subscriber terminal unit, or STU. When set off by smoke or heat, the alarm travels through an MTS distribution network—the coaxial cable portion—to a computer placed inside an MTS switching center. From there it goes through an MTS communications link to a reporting outlet. There, an alarm company representative has access to a screen display and customer file. After contacting the residence to verify that there is a fire, the representative notifies the fire department.

Along with the automatic fire alarm system, the coaxial network will have the capacity to bring cable television service to the area, pending licensing of an operator by the Canadian Radio-Television and Telecommunications Commission. The coaxial cable will carry these new services as well as digital telephone transmission. Coaxial cable holds promise for people in these rural and northern areas, where the cost of installing individual telephone lines is extremely high.

Dennis McCaffrey, MTS project manager said, "Headingley was chosen as the trial site since the area is scheduled for telephone network upgrading and the trial can be economically incorporated into the improvement plans. Also, Headingley is not currently being served by cable TV, and this presents an opportunity for the residents to have cable service, providing an independent operator is licensed by the Canadian Radio-Television and Telecommunications Commission. To date over 20 private companies have already indicated an interest in participating as suppliers of service 'home of the future' trial."

MTS views its role in the introduction of new services simply as a common carrier, providing an electronic highway to all Manitobans. The actual services will be provided by private business.

Q From time to time, we have hairline cracks in our cable and cannot always replace the defective section when we should. Is there a way to make a temporary fix to eliminate leakage until a permanent repair can be made?

A Yes! But get that defective section replaced pronto! Aside from leakage, you run the risk of water ingress into the cable dielectric and then suffering from signal degradation downstream from the bad section.

Some companies make conductive adhesive foil tapes that can be wrapped around the crack and the leakage will be contained. Make sure the area that will come in contact with the adhesive is clean and free from corrosion and oxides. The adhesive has metal particles imbedded in it for conductivity that will make contact between the foil and the cable.

Q Each time a fuse blows, a customer loses his TV programming and a technician must be sent to the subscriber's home to investigate the problem. Is there any means of reducing the number of trips to the subscriber's homes?

A One solution was found in Junction City, Kansas, by Junction City Television, Inc. They replace as many fuses as possible with thermal, resettable circuit breakers so that if a fuse blows because of a power surge, for example, the circuit breaker will reset itself. Not all systems have the capability of interchanging the fuses with circuit breakers; however, in Junction City's situation, the debridgers and line extenders that they use are suited for the circuit breaker holders. The original fuse holder is replaced by one compatible with the resettable circuit breaker with the leads on it so that it fits right into the holder. This procedure saves many trips to replace fuses and unhappy customers who miss TV as well.

Q We are having a continuing problem in one area of our system. The low-band channels just don't seem to make it through the system at that point like they should. We've checked the cable, the trunk amps and line extenders and they all come up OK. Everything's tight and the power supplies look fine. Mid- and super-bands seem fine also. What's going on?

A Everything may not be tight all the way around. Look for a defective seizure screw in a line extender, for example, to see if after it is tightened, it may pop loose again. The result of all this will be capacitive coupling and, in effect, a high pass filter in the system. Replace the screw or the entire clamp and test it again.

Cable Makes the Rounds at OCTA Show, CBL Conference

By Pat Link, Managing Editor

Attendance was good at the Ontario Cable Telecommunication Association's (OCTA) second annual convention in Toronto on October 30 and 31.

Session topics included "Satellite Software", "Canadian Position on Satellite Delivery Systems", "Impact of Pay Television and New Services", "Establishing Credibility in Your Community—Is It Time for Experimentation?", "How Will Provincial Jurisdiction Work and What Will Be Its Immediate Effects on Ontario Cable Operators?", and "Cable TV's Future—A Look Forward to 1985 and 1990."

At the session on the impact of pay television and new services, Ted Rogers, president of Rogers Cable TV, began his talk (part of which is reprinted below), with a clear definition of cable operators.

"Cable communications is a broad-band, high-capacity electronic highway into the homes of the nation.

- We are retailers of video services to residences. That is our future.
- We will retail video entertainment services with a variety of pay television services to suit all tastes.
- We will retail video and hard copy information services with an infinite variety of choices.
- We will retail video educational services including college courses, general knowledge, and hobby courses.
- We will retail security services, medical test services from the home, etc.

"We will retail anyone's legal video product to the residences we serve. We will not produce, ourselves, much of what we retail to the public. However, we insist on retailing the electronic video home delivery services which we distribute. What do I mean, we insist on doing the selling? I mean doing the billing and collecting for each video service, as well as delivering it. We know that if we were to be just a carrier, waiting for others to rent channels, our cables would be mostly empty."

At another October conference sponsored by the Canadian Broadcasting League (CBL) in Ottawa on Thursday, October 25, a morning panel dealing with "Satellite Cable Networks and the Option of Pay Television"

produced many questions from the audience of 150.

Charles Dalfen, vice-chairman of the CRTC, chaired the panel. The views of the five panelists are summarized below.

Al Johnson, president, CBC, questioned whether pay TV and/or a satellite package would add to Canadian viewing of Canadian programs. "It's a national disgrace that we've multiplied our cable showing of U.S. stations with nothing being done to increase the showing of Canadian channels," he stated. In the past, Johnson has opposed the introduction of pay TV and he stated he will present his vision of pay TV at the CRTC's hearing of intent.

David Golden, president of Telesat Canada, pointed out that "the cost of renting satellite space is miniscule compared to that of providing programming." He proceeded to cite expensive launch and building costs as reasons why charges for use of Canadian satellites are "somewhat" higher than U.S. rates. He argued that Canadian satellites are, in fact, well used.

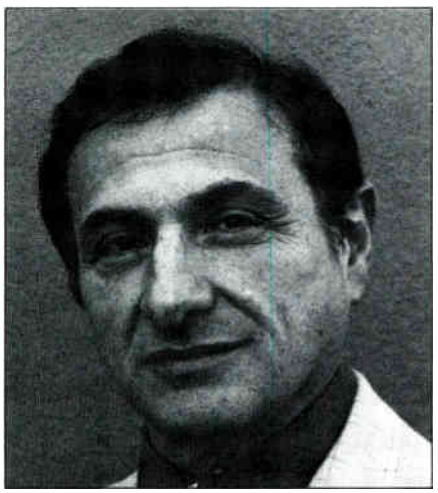
Alain Gourd, president, CHOT TV and Radio-Nord, expressed concern with the lack of viewing choice just 300 miles from Ottawa as compared to that of urban centers. "The inequalities indicate the first priority in use of the satellite is to bring basic service to rural areas of the country." Pay TV and a satellite package should respond to "Canadian cultural specificities" providing programming in French and English, with pay TV as the "engine" plus other "wagons" such as CTV, House of Commons, etc.

Alan Walter, assistant vice-president policy, Bell Canada, chose to steer away from any discussion of pay TV content given that his company is solely a carrier. He made it clear, however, that when pay TV comes on stream, Bell has the technology to deliver pay, especially on a pay per program basis.

Ted Rogers, president, Rogers Telecommunications, had the last word on the panel. His strong message was that "competition is the best friend of the consumer and cable companies will compete with telcos to deliver video services. The cable industry must consolidate to compete. The largest cable company is an ant—compared to the elephant Bell Canada—there can be no relative research and development until there are two elephants. Pay per program, he said in response to a question from the floor, "is the fallback position of those who are opposed to pay TV. It won't work; customers don't like it. All pay per program systems in the U.S. have switched. Subscribers were afraid of what their total bill at the end of the month would be so a maximum was put on the monthly price and viewers select at pleasure. Pay per program takes money away from software and puts it into hardware."

David MacDonald gave the opening address to the CBL conference. Casting aside his prepared text, MacDonald emphasized "the need for adequate public input in forming policy, at the federal-provincial levels, and at that of public interest groups like the CBL."

★ Harry L. Sadel, president of **Sadelco, Inc.** has announced that **Robert Fein** has joined the organization as national sales manager. For more than a decade, Fein was with CBS as planning manager for program sales promotion. Fein stated, "With the reorganization of Sadelco's sales division and the institution of innovative production procedures, we look forward to serving the industry with faster service."



Robert Fein

★ Earle Davis has been appointed vice president/marketing for Microwave Specialties Corporation of San Diego, California. Mr. Davis formerly of Comtech Data Corporation will head up all marketing and sales of the company's standard and custom earth station satellite antenna systems.

★ **Bill Isenberg** has joined RTS Systems as senior design engineer for the firm's 400 series professional audio products line, it was announced by **RTS Systems, Inc.** Isenberg was formerly in the research and development department at Pioneer of North America in Pasadena, was chief engineer at SAE and also served as a design engineer at JBL Sound. He will be based at the new headquarters for RTS Systems in Burbank, California.

★ **Western Communications, Inc.,** has announced two promotions at Las Cruces TV Cable, their New Mexico cable system. **Robert S. Macioch** has been promoted from chief engineer to the newly-created position of director of operations. Macioch joined Las Cruces TV Cable in 1975, after working for Teleprompter. **Carl L. Badger** has been promoted from chief technician to chief engineer. He joined the cable system in 1978, from Clear Lake, California. Western Communications, Inc. purchased Las Cruces TV Cable from Daniels & Associates in 1975, and is Western Communications, Inc.' only cable system outside California.

★ The CATV division of **Oak Communications Inc.** has announced the appointment of **O.J. Hanas** as vice president of engineering, Hanas was previously director of engineering. Before joining Oak in 1978, he was manager of RF equipment engineering for the RCA astro electronics division, Princeton, New Jersey, a partner of Satellite Communications Inc., and also director of engineering at All Systems, Moorestown, New Jersey. Hanas is a graduate of the University of Maryland with a BS degree in electrical engineering. He also received an MSEE degree from Drexel University, Philadelphia, Pennsylvania.

O.J. Hanas

★ The appointment of **Richard F. Naughton** to manager of proposal management for **GTE Lenkurt Incorporated** has been announced by Kenneth S. Durey, vice president-marketing. Naughton, who was supervisor of proposal management, has replaced E.E. (Don) Gohn who recently retired after 19 years of service with GTE. Naughton is responsible for coordinating the preparation of proposals for the industrial, telephone, and international markets. Naughton joined Lenkurt in June of 1963 as a field engineer serving Europe and Asia. He joined the proposal group in April of 1966 and was later appointed to supervisor before assuming his current position.

★ **Dr. Richard Green,** formerly with the American Broadcasting Company, has been appointed to the position of director of engineering—fiberoptics for the fiberoptic division of **Times Fiber Communications.** In his new position Dr. Green will assume responsibility for design and development efforts in the area of fiberoptic communications and data transmission

Dr. Richard Green

systems. Dr. Green has over 17 years of professional experience in laser research, fiberoptic and image processing applications. In his last position at ABC, he was the video tape post-production manager and was involved in design/ development and operation of computer-aided editing systems for network programs. Prior to that, Dr. Green was program manager for Hughes Aircraft, specializing in laser counter-measures, optical collection, computer processing, and transmission of imagery.

★ **Six Star Cablevision** has appointed **Donald R. Robinson** to the position of district engineer of its Tigard, Oregon office. The company stated that Mr. Robinson's experience in CATV, from safety supervisor to maintaining inventory control, will enable him to make contributions to Six Star's operations. Before joining Six Star, Mr. Robinson was affiliated with Liberty Communications, Inc. where he supervised phases of the first CATV microwave hop across the Cascade Mountains from Corvallis to Bend. Prior to 1969, he was associated with Teleprompter of Seattle.

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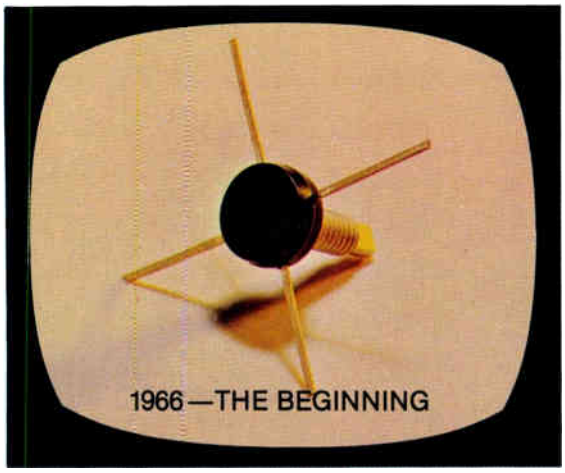

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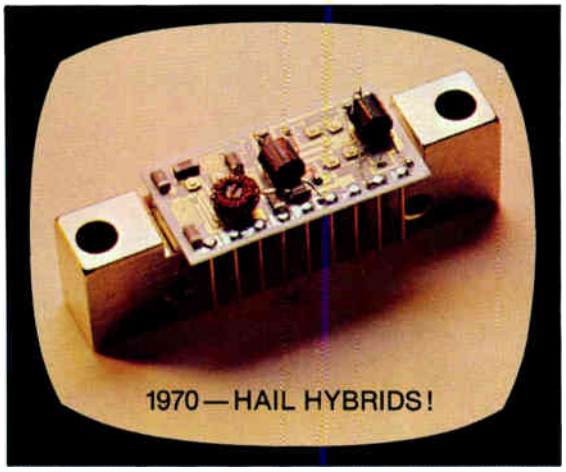

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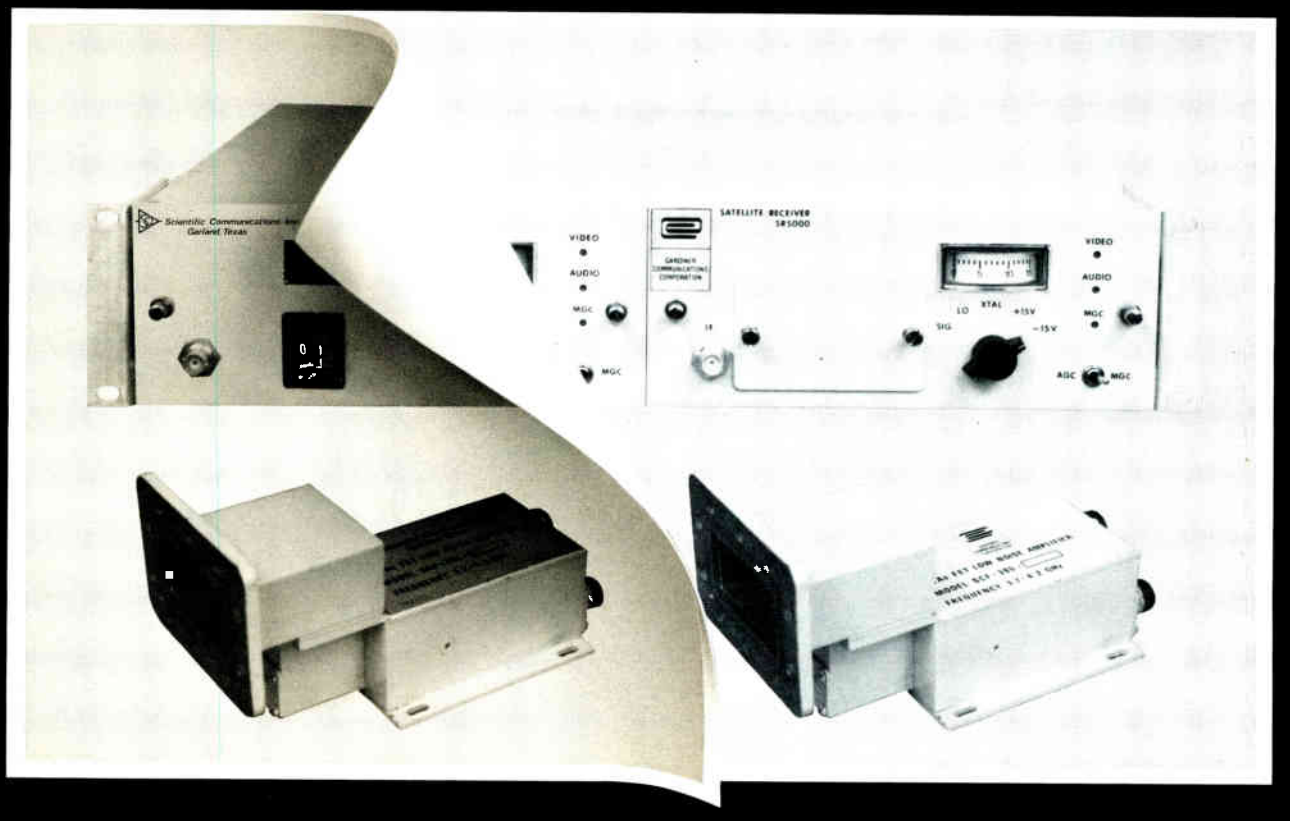

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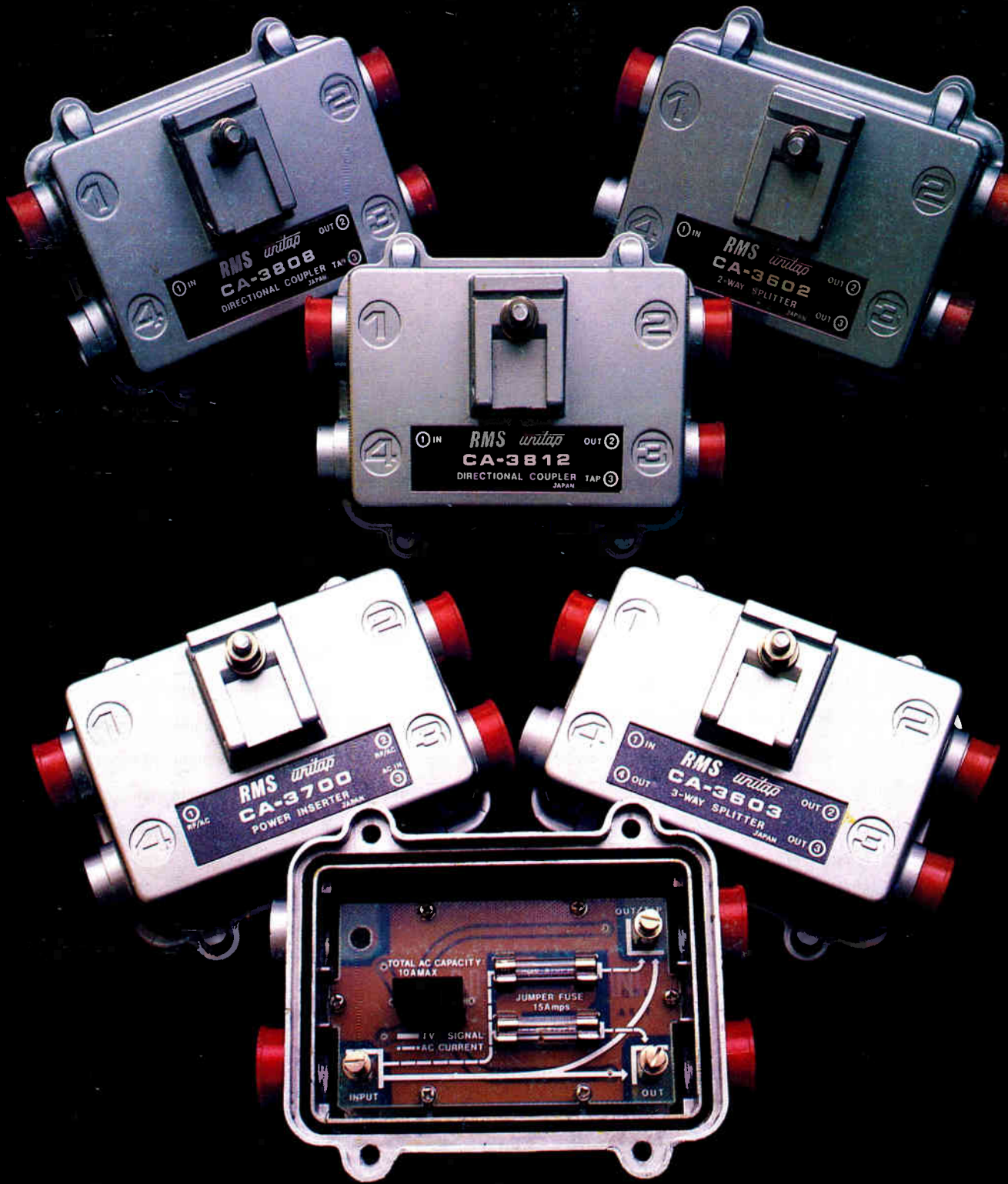

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