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june 1976
volume 2, no. 6

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20 ON BETTER ENGINEERING MANAGEMENT: VALUE ANALYSIS

by Judith Baer, Editor, C/ED

What is Value Analysis, how to put it use and make it work.

25 GRAPHIC SOLUTIONS FOR SATELLITE EARTH STATION DESIGN

by Robert Tenten

This paper was presented at an SCTE Eye Opener Session at the NCTA show in Dallas. The author presents some simple solutions to what could be a dilemma to cable television engineers.

AND—**Opinion** talks about Brenda Starr and Barbara Walters; **SCTE COMMENTS** on wining and dining; **NATIONAL AFFAIRS** centers on FCC actions; the **CANADIAN COLUMN** introduces you to the New Canadian National Communications Tower in Toronto; **NCTA** looks back to Dallas; **NEWS/NEW PRODUCTS** is loaded with announcements; **WRAP UP** picks last minute news on people, ideas, books, etc.; **CRITIQUE** lets you know what other readers feel.

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communications/engineering digest is published monthly for the Society of Cable Television Engineers by Communications/Engineering Services, 1300 Army Navy Drive, Arlington, VA 22202. Subscription cost is \$12 per year U.S. and possessions, \$15 Canada and Mexico, \$17 foreign, \$1 single copy. Copyright may be held by individual authors and is so noted. Reproduction in whole or in part without permission of the author is prohibited. **c/ed** is provided to SCTE members as a membership service. Application to mail at Second Class Rate is pending at Baltimore, MD with additional mailing offices. Correspondence, change of address and unsolicited manuscripts should be addressed to **c/ed**, 1300 Army Navy Drive, Arlington, VA 22202. POSTMASTER: Send Form 3579 to Box 2665, Arlington, VA 22202.

opinion/editorial

Judith Baer, Publisher

When I was a little girl growing up with the San Fernando Valley with movie stars' kids as playmates, all I wanted was to be Brenda Starr, Girl Reporter, when I was a big person. Brenda seemed to have it pretty good when I was a kid. She is a red-head, as I am. She searched all over the world for her Mystery-Man who seemed to have some perverse interest in black orchids. I only searched over the Santa Monica mountains for my mystery man and here I am at the age of 35 still looking for him, only on the other side of the country. Brenda went to work and was probably one of the first real liberated ladies, but she always had stars in her eyes and furs on her shoulders and was in love with love. She just recently got (ugh!) married and is currently spending a portion of her honeymoon on a deserted island with Basil St. John and the survivors of her honeymoon ship, some 150 odd persons including two little kids and a pet whale.

As time passed my ideal changed. I moved on, to more romantic and classic characters in literature, the arts, and not surprisingly, the business-world. I have gone through stages of thinking that I'd like to be Katherine Graham, publisher of the Washington Post; I thought for a while that the ultimate would be to be a commissioner on the FCC (the thought has not been lost in my mind and remains as a goal); I believe that I could produce a very funny novel highlighting some activities from my "indelible book of memories." Now; at 35, my ideal ideas have been blown away by our new entry into the evening news market, Barbara Walters.

If she is worth a million dollars, I am priceless and a museum piece. So what if she had to get up at 4 a.m.? That's what she was paid to do. I don't begrudge her the cool million. I resent the fact that she is probably going to bomb out within two months of her "maiden" (excuse me) appearance with veteran newsman Harry Reasoner. Curiosity will cause the people to turn to ABC for awhile, but she's going to wear thin, as did Sally Quinn on the CBS Morning News. And, as she wears thin the wags will say that "she" bombed out; that a "woman" can't cut the mustard as an anchorperson; and that will make it harder for all the other bright and competent women in the news field.

Connie Chang of CBS is super; Betty Furness of NBC is good; there are at least twenty women out there who are better equipped to anchor an evening news spot than Barbara Walters. But she got it!

The only news that is worth a million dollars would be perhaps a pro-nouncement of the declaration of World War III. In which case we wouldn't have to listen to her anymore and she couldn't spend her money anywhere. I feel

certain that the higher-ups at NBC would have put her into an evening slot if they thought that it would work. I feel sorry for the other women in the industry and hope that one person's excess will not set them back in their individual careers.

This has nothing to do with cable television, broadband communications and engineering. It does have to do a little with equal employment opportunity. It has more to do with my particular feelings than anything.

Perhaps in 1980, Raquel Welch, who will then be older and more suited to the part, can add a role to her collection of Myra Breckenridge and the Bomber of the Roller Skating Rinks. Barbara Walters portrayed by Raquel Welch in Barbara's life story should be good for late night viewing on the tube.

The saddest part of this whole thing is that I am not alone in my feelings. If the networks continue this sort of silliness, cable will do just fine and dandy. Thank you!



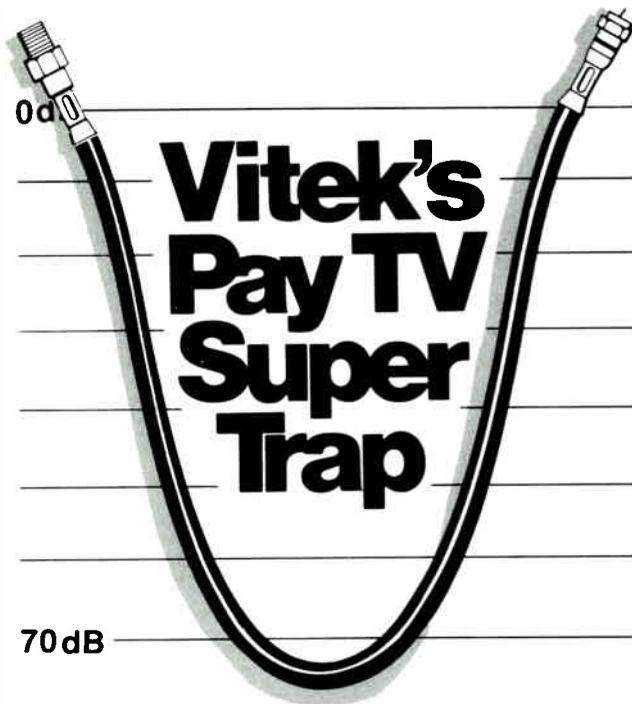
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scte comments

Bob Bilodeau, President

REST IN PEACE, HE ATE WELL

If the being we call CATV ever becomes decreased, one fitting epitaph might be; "Rest in Peace, He Ate Well." The annual conventions reinforce my concern for this theme more poignantly than any other cable activity.

The practice of wining and dining customers by suppliers carries with it subtle threats to our composite health. Food poisoning is not one of them. These pitfalls are more lasting and painful. The nature of this lacking malady comes in the form of a gradually debilitating economic malnutrition.

Cable's survival is going to depend upon its ability to defend itself against this force and others chewing at our heels. We have had times of great need, we have times of need now, and we will continue to have them.

CATV is a small frog in a pond of big frogs. Even so, the amount of money spent on "internal entertainment" could be better spent. The major beneficiaries now are the restaurant and liquor industries. None of this flows back to the cable industry. These dollars spent within the industry would leverage by normal economic principles and cause more meaningful things to happen than indigestion, diarrhea, and hangover. These are available for less. The next time your friendly salesperson comes to call and suggests Chateau-Briand for six, try telling him you'll settle for a cheeseburger at Burger Chef if he will allocate the difference to research and development of new products or the Political Action Committee. I am really interested in the reaction.

Bob Bilodeau

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national affairs

Melvin N. Abramovich, National Affairs Editor

FORD OKAYS WHITE HOUSE SCIENCE POST

President Ford signed a bill reestablishing the White House Office of Science and Technology during early May. The office had been dismantled by President Nixon three years ago.

Ford said "a strong federal effort in science, engineering and technology is critical to our future." The bill was signed in an East Garden ceremony attended by several leading American scientists and engineers.

The Office will have a budget of \$3 million for FY' 1977 with about \$750,000 allocated to support the effort between now and the end of the current fiscal year end in June. Ford will name a director soon who will double as Ford's science adviser. The Office will include four associate directors and a staff of about 15.

FCC MAJOR STAFF CHANGES

Resigned are Ashton R. Hardy, the Commission's General Counsel, to become effective in late summer, and David D. Kinley, chief of the Cable Television Bureau, as of May 1.

Other announced changes, subject to the approval of the Civil Service Commission, are: Werner K. Hartenberger, now Deputy General Counsel, to succeed Hardy as General Counsel, and Lawrence W. Secrest, now Administrative Assistant to Chairman Richard E. Wiley, to become Deputy General Counsel.

Still other changes effective May 1, are as follows:

- Acting Associate General Counsel - J. Clay Smith Jr.
- Acting Chief, Policy and Rules Division, Broadcast Bureau - Roscoe E. Long
- Acting Chief, Cable Television Bureau - James R. Hobson
- Acting Deputy Chief, Cable Television Bureau - Jerold L. Jacobs

- Acting Assistant Chief for Management, Cable Television Bureau - Albert J. Baxter

MODIFICATION OF CABLE TELEVISION TECHNICAL STANDARDS PROPOSED (DOCKET 20765)

The Commission has proposed modification of its cable television rules to:

- clarify the scope of application of the technical rules, based on the physical characteristics of the cable system rather than on the basis of number of communities served;
- relax frequency standards in the case of certain broadcast television signals received by means of television broadcast translator stations;
- clarify the frequency standards for cable television converters by replacing the frequency accuracy requirement by a frequency stability requirement; and
- broaden the applicability of the requirement for minimum ratio of visual signal level to system noise.

The proposal resulted in part from the final report of the Cable Technical Advisory Committee (CTAC), constituted to provide the Commission with technical information to give a sound engineering basis for possible regulatory standards of good engineering practice in the cable television industry.

The Commission said Section 76.5(a) of the rules which defines a cable television system in terms of the services it provides, excludes two types of facilities, and specifies that, in general, each separate and distinct community or municipal entity served by cable television facilities constitutes a separate cable system, even though there may be a single headend and identical ownership of the physical facilities.

It said that, while this definition is

appropriate for many of the Commission's actions, it does not lend itself to the convenient specification of technical standards and testing procedures. The requirement for measurements at three locations within a cable system places artificial and unnecessary burdens on a facility that happens to serve several communities.

Under the proposed amendments, for the purposes of technical standards, cable television systems would be described in terms of electrically and mechanically continuous closed or shielded transmission paths, the Commission said.

It noted that this would imply that separate sets of cable which serve the same community but are not electrically and mechanically interconnected to each other would be considered separate cable systems, even though they may have common ownership and provide identical services and may even be interconnected by radio channels.

The Commission said this was appropriate, since a radio link was clearly not a "cable" system from the technical point of view, and testing and maintenance performed on one of the separated cable systems would in many cases not be applicable to the other or others.

On the other hand, the Commission noted, the proposed scope of the application of the technical rules would relieve some cable system operators from having to make measurements and keep records which have little or nothing to do with the technical configuration of the system, merely because his system happens to serve more than one community.

The Commission said the change would require fewer measurements in some cases but would require additional measurements in others. It said it wished to remove as soon as possible, the necessity for measurements which

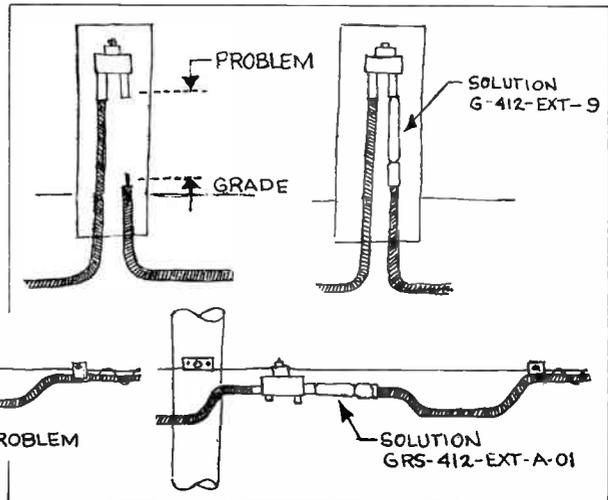
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do not correspond to the physical reality of cable systems, in view of its requirement that all systems make the required measurements by March 31, 1976. Therefore, it said, in the interim before final action on the proposed rule, it would permit systems to make the required technical measurements according to either the existing procedure or the proposed one.

With regard to the frequency accuracy standards specifying strict frequency control for visual signals carried on cable systems, the Commission, noting that TV translator stations did not have to comply with such strict frequency standards, proposed relaxing the frequency tolerance in the case of signals received from translator stations since the frequency standard for cable systems was not intended to require the cable operator to make corrections to the frequencies of broadcast signals as received.

The Commission also addressed the standard for output frequency of cable TV converters. The present rules state that the frequency of the visual carrier at the output of each cable converter must be maintained at $1.25 \text{ MHz} \pm 250 \text{ kHz}$ above the lower frequency boundary of the cable television channel. It said since converters with manual fine tuning capability may have a tuning range of several megahertz, the cable operator has no way to control the frequency output to the specifications given.

It said, however, that a frequency stability requirement was appropriate and the proposed rules would restate the requirement clearly as a stability requirement.

It said it did not propose to change the tolerance of $\pm 250 \text{ kHz}$, although it was open to suggestions to do so.

The Commission said that many of today's converters are capable of

significantly better stability than present requirements dictate and the stability should be such that none but the most critical viewers will feel the need to retune the converter during a reasonable viewing period, after initial tuning. Thus, the Commission said, it proposed the $\pm 250 \text{ kHz}$ stability be maintained for at least four hours after initial tuning.

Noting that the rules regarding signal to noise ratio exclude signals which are both originally picked up off the air and delivered to subscribers outside the predicted Grade B contour for that station, it was proposing modification of the rules to make it clear that the requirement also applies to signals obtained by direct connection to the television broadcast station, just as all other of the technical standards apply to such signals.



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1300 Army Navy Drive

Arlington, VA 22202 (703) 892-2450

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canadian column

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THE CANADIAN NATIONAL COMMUNICATIONS TOWER

Those of you that visit Toronto this year will immediately notice a major change to its skyline. It is impossible to miss from virtually any position in the city the 1800 foot Canadian National Communications Tower.

Operational on the 31st of May this year, the 1800 foot CN Tower is already a symbol of Toronto, Canada's largest city. Inevitably tagged with the title of the "World's Largest Free-Standing Structure," the tower consists of a 1500 foot post-tensioned concrete cantilever, topped by a 300 foot steel mast. The concrete structure consists of a vertical hexagonal form 18 feet on each side, braced by 3 tapering wings, extending up to the 1100 ft level.

Although the tower provides many other facilities such as of course the ubiquitous revolving restaurant, the whole purpose of its existence is to provide communications. Its height is the product of the concept of stacking broadband UHF/VHF television antennas over FM antennas on a single 350 foot mast, separated by 350 feet from the microwave installations directly below them at 1100 feet above ground level. The initial purpose of the Tower was to provide a solution to Toronto's horrendous television coverage problems. As such its effect on cable television companies in Southwestern Ontario, will have many facets, some of which are quite unexpected.

In common with many of today's major cities, the quality of urban broadcast reception in Toronto has always been impaired by multipath reception causing ghosts, and general interference from locally generated RF noise. Toronto stands on the Northern shores of Lake Ontario with Buffalo, New York with its many U.S. TV stations, almost directly opposite on the Southern shore. Many rooftop antennas are therefore oriented towards Buffalo so that they are often abeam of, or even pointing directly away from, Toronto's own transmitters. There is little wonder therefore that off-air reception in Toronto has varied from mediocre to completely unacceptable.

To some extent however, what has been a headache for domestic reception has been a bonanza for cable television companies. Many of the Toronto broadcasters, particularly those operating UHF, owe their viability to cable television with only a very small proportion of their viewers receiving the signals off-air.

The most obvious effect of the CN Tower on cable TV licensees (both in Ontario and New York State) will of course result from the extended television coverage. Five TV stations are using the tower, plus a number of FM

stations. Increases in the average radius of the Grade A Contour from the tower vary from a lower limit of 22% to an upper limit of a 167%. Bearing in mind that this covers an area of Canada that is at once the most densely populated and the most deeply penetrated by cable TV, some idea of the effect of the tower can be imagined. When this is coupled with the regulations of the Canadian Radio and Television Commission (Canada's regulatory body) which give absolute priority on the basic service of Canadian stations whose Grade A Contours intersect licensed area, the result is a major and perhaps catastrophic change around of cable television offerings when the tower is switched on.

As might have been guessed by the comment on the orientation rooftop antennas earlier in this column, American networks are extremely popular in Canada, particularly in the Toronto and general southwest Ontario area. The increased coverage that the CN Tower gives local stations may result in the displacing of some of the popular American stations from the basic service to converter service. As pay TV is not yet permitted in Canada, the programming that can be offered on converter service, is at times insufficient to cover the additional

cost. While it is likely that the market will adapt to these conditions, at the moment it is a major problem.

One of the more positive aspects of the effect of the tower on cable television is that being so high and being surrounded by highrise buildings, there is a significant skip distance in which the TV signals will be even poorer than before and reliance on cable systems even greater. Other positive factors are of course the comparative ease that non-ghosting signals from the local stations can be received at the headends of the many Toronto systems. Once again looking at the other side, direct pickup problems will become more significant to subscribers, and many TV sets which had not experienced these problems will now be affected.

It's unrealistic to expect that the CN Tower will remain the tallest unsupported structure for any length of time. What is Toronto's problems today, may well be yours tomorrow. I hope this brief outline of some of the effects on cable operators may help you in the future.

As you arrive in Toronto, perhaps the sight of the tower will remind you that what is a solution to one community, could be a problem to another, and in this case the challenge is with the Canadian Cable Television Industry.

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ncta technical topics

Delmer C. Ports, Vice President
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convention post-mortem

The Convention

The 1976 National Convention is history and most of the dust has settled. The painful process of sorting out invoices and comparing the experience with the estimated budgets is now in progress.

It is customary now to review the events, try to identify what was learned and begin thinking about ways and means for the 1977 event.

The almost universal consensus has been that this year's show was the best ever. There was a very noticeable upbeat on all fronts. Positive thinking was consistent and very much in evidence. The facilities of the Convention Center were more than adequate in almost every respect.

If you are interested in numbers, this year's attendance was 4308. This is up almost 1000 over the previous year's convention in New Orleans. Most significant of all is that the biggest increase in attendance was in cable system operating personnel. There was also a significant number of foreign attendees. They came from Great Britain, Switzerland, Spain, the Netherlands, Japan, Mexico, Brazil and Canada.

The Technical Program

The technical program got off to a good start with the combined lead-off session on Quality Improvements and Zero Defects. The leadoff speaker, Mr. Bob Vincent, who is responsible for quality improvements, motivations, and zero defects programs for ITT, who was subbing for Mr. Crosby, made a presentation that literally set the tempo for the rest of the program. He was motivating, thought-provoking, and left many of us rethinking our attitudes toward quality improvements. A frequent comment heard around the floor was that his presentation

should have been made to everyone at the convention and not just to the technical attendees. This session was attended by well over 300 with standing room only for most of the session.

The attendance, in fact, at all of the sessions was very gratifying. The early morning sessions would usually reach 150 by the mid-point of the session and most of the mid-morning sessions would reach at least 200 with standing room only for part of the time. The mixture of invited speakers from facilities other than directly cable related activities with contributed papers from speakers representing cable activities proved to be very effective.

The two sessions on satellites proved to be very interesting and helped put a number of critical issues into perspective. On the important practical side of making things work, there was plenty to hear about practical routine maintenance, solving ingress problems, and some basic objectives in designing reliable systems. Back on what's ahead for us in the future, we heard a paper describing a fiber optics installation in England that was in operation. In short, there was a little something for everyone.

The Exhibits

The exhibits were very interesting; and, unfortunately, there was not enough time to go through them in the detail that I would have enjoyed. Again, the optimism of the whole convention was very apparent in the Exhibit Hall.

Satellite and related equipment were very much in evidence. Various kinds of pay TV systems and accessories were also a popular subject.

Engineers Reception

The Engineers Reception was well attended with over 300 registering at

the door. Everyone seemed to have a very good time and the only complaint I heard was that the bartenders got lonesome while the presentation of the awards were being made. It was very gratifying to see that more management people attended and took part in the many free-wheeling discussions than in previous years. FCC Chairman Wiley presented the Technical Achievement Awards and seemed pleased to be included in the affair.

If you were not there you missed something. Start planning now to attend next year.

We will soon be starting our plans for next year's convention. We hope that everyone will feel free to make any comments or suggestions that will help us.

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JERROLD BROCHURES

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tions. All may be requested from T. Barnett, Jerrold Electronics Corp., CATV Systems Division, 200 Witmer Road, Horsham, PA 19044. Literature is free.

NCTA RELEASES SYMBOLS STANDARD

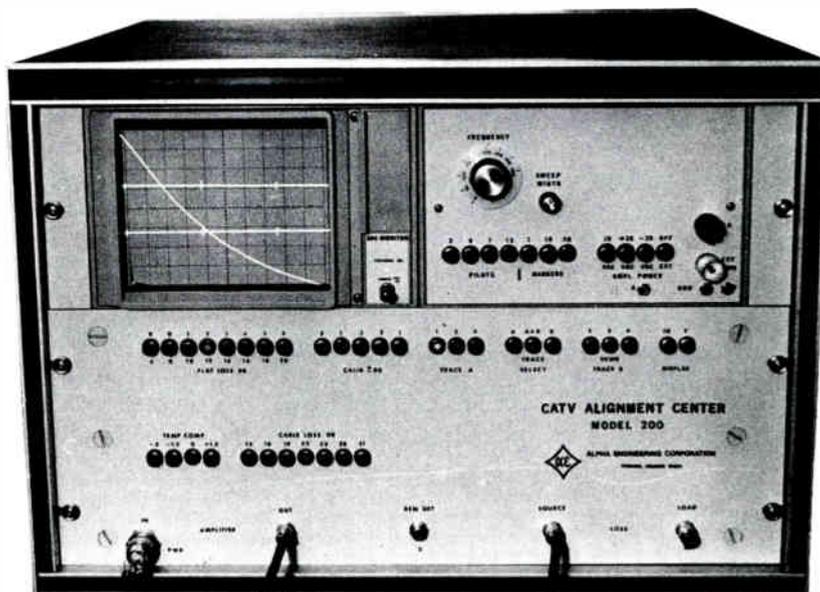
Standard Graphic Symbols for Cable Television, NCTA 006-0975 has been released by NCTA in a 24 page booklet. NCTA's Board of Directors approved use of the standard late in 1975 and it has been endorsed by the Society of Cable Television Engineers, the Canadian Cable Television Association and the Canadian Standards Association. It is under review by IEEE. More than 50 graphic symbols for use on CATV maps are detailed with instructions. The booklet is available for \$5



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to NCTA members and \$8 to non-members. Order from NCTA, 918 16th St., NW, Washington, D. C. 20006.

C-COR APPOINTS EUROPEAN DISTRIBUTOR

OAK-Holland was appointed distributor handling C-COR's complete line of equipment for CATV systems in Europe during April. John P. Donahue, Jr., Gen. Mgr. of OAK-Holland and James R. Palmer, Pres. of C-COR made the joint announcement. "C-COR's new distribution amplifier was designed for the European market with such provisions as 50-60 Hz operation, 40-300 MHz bandwidth and return loss specifications that are tighter than U. S. standards" according to Palmer. OAK-Holland headquarters with a main sales office in Brussels, Belgium.

ALPHA ENGINEERING PRODUCT ANNOUNCEMENTS

Alpha Engineering has brochures available describing Model 400 CATV System Calibrator and Model 200 CATV Alignment Center.

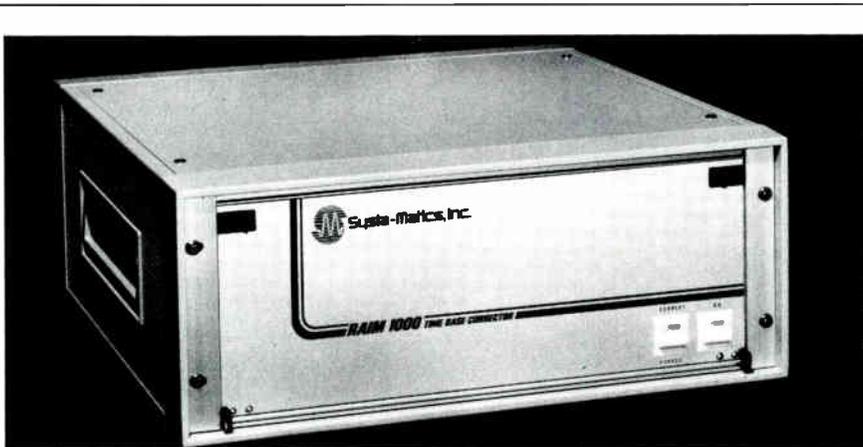
The Model 400 Calibrator features precise monitoring and setting of individual TV signal levels with high consistent accuracy. The unit feeds directly into the main trunk cable. Model 400 includes combining networks for up to 36 signal sources, booster amplifier, cable power inserter and trunk monitoring. Summation sweep input and leveling are provided with reverse signal output and visual test points. The unit is available with only 17 input channels. (Circle Reader Service No. 142.)

Alpha's Model 200 Alignment Center is a complete amplifier test station claiming high accuracy, multiple display logic, cable spacings 13 to 31 dB, a built-in VSWR cable, amplifier powering, pilot and marker generators, high gain test channel and five detectors. (Circle Reader Service Card No. 157.)

LIVE FROM LINCOLN CENTER

April 21 saw simultaneous stereo radio transmission with live television

continued on next page



\$2,995 Time Base Corrector from Syste-Matics

new product feature showcase

Syste-Matics of Tulsa, OK has set out to solve the problem of a low-cost, efficient time base corrector and it looks like they have done it. This unit features an electronic technique totally new to the video industry and as it was introduced in Dallas at the NCTA convention, it caused a stir.

The unit, called the RAIM 1000, introduces a new concept in electronic design allowing Syste-Matics to manufacture a time base corrector with capabilities not previously available. The unit is priced at \$2,995.00.

The RAIM, (Random Access Incremental Memory) system was developed as a result of the company's pursuit of a time base corrector that was automatic, dependable and costing less than \$3,000.00. Syste-Matics president, Ed Covington, explains that closed circuit and cable television systems utilizing the company's automatic video cassette changer-programmer systems could seldom afford a dependable hands-off time base corrector.

"We waited two years for the industry to introduce a TBC which, in our opinion, truly meets the needs of our segment of the market," Covington explains, "and we thought it would happen. We became impatient, so with our research and development staff headed by A. D. Self, and Ed Breedlove, we pursued a new concept which resulted in the RAIM 1000."

Operating controls of the unit con-

sist of only two switches: an "ON-OFF" switch and a "CORRECT-BYPASS" switch. Automatic functions eliminate a need for additional controls. RAIM 1000 features include instant picture lock-up or no more than .250 second; full picture correction above and below the head switch; true picture resolution without loss of crispness; full correction within the window, errors in excess of the window will not cause picture breakup; a floating signal window which automatically centers on the error, effectively doubling the window range for skew error; correction or reduction of waterfall without horizontal line breakup; automatic processing of EIA or industrial video input without any manual changeover.

Covington stresses that the RAIM 1000 is not designed to meet the requirements of the broadcast industry, although the RAIM technique could be applied to that end. "It is the technique and our purpose," he continues, "that allows so many qualities for so little expense."

Production on the unit has started and it will be available through Syste-Matics or its dealers. The RAIM 1000 features a hinged front panel for easy electronics access, and is a free standing or rack mount unit. It is 7 inches high, 14 inches wide and 17 inches deep. (Circle Reader Service Card No. 156 for more information on this unit.)

news/new products

broadcast of "The Ballad of Baby Doe" from the Lincoln Center for the Performing Arts in New York City. The live broadcast had an ability of reaching more than 50% of the U. S. television households. "Live From Lincoln Center" with its stereo network reaches 17 of the top 20 markets with its key feature being use of satellite transmission to reach Chicago, Los Angeles, and Dallas. Mark Schubin and Tom Werts were consulting engineers on the project.

HBO SERVICE TO FOUR VIKOA SYSTEMS

Rochester, PA on June 1 will inaugurate HBO programming to four Vikoa systems totaling 37,000 subscribers in western PA and Ohio. Subsequent systems to receive the service include New Castle and Uniontown, PA and Zanesville, OH. Vikoa with 100,000 cable viewers is one of the top 20 MSO's in the cable industry. HBO, as of April 15 connected 143 affiliated cable systems in 26 states by microwave and domestic satellite transmission.

B & K DIGITAL REAL TIME ANALYZER

An All Digital 1/3 Octave Real Time Analyzer, Model 2131 has been introduced by B & K Instruments, Inc. The unit features digital 1/3 octave filtering; digital detector, linear and exponential; 1.5 Hz to 22 kHz analysis in 2 ranges; alpha-numeric scale calibrations on 8 1/4" x 6" display screen; IEEE Interface option for on-line computer control and dual spectrum display. A product brochure detailing the unit is available. (Circle Reader Service Card No. 143.)

PC BOARD TERMINAL STRIP FROM ELECTROVERT

Compact in design and molded of unbreakable Polymid 6.6 insulating body that protects all contacts and terminal

screws for dead front safety. Considered by Electrovert to be the most compact of any similar product, the 12-pole strip measures only 2.39 inches long and is available in any number of poles up to 24 with a 0.2 inch pin spacing with each hole consecutively numbered. Other pin spacings include 5 mm and 10 mm. Solder pins are hot tinned electrolytic copper to prevent zinc diffusion into solder joints. Connectors are tinned brass with pressure terminal screws zinc plated and di-chromated steel, staked to prevent loosening. Rated 300 V, 10 amp to accept wires up to 14 AWG. Soldering pins are .001 square inches. (Circle Reader Service Card No. 144.)

COMSONICS SNIFFER LITERATURE

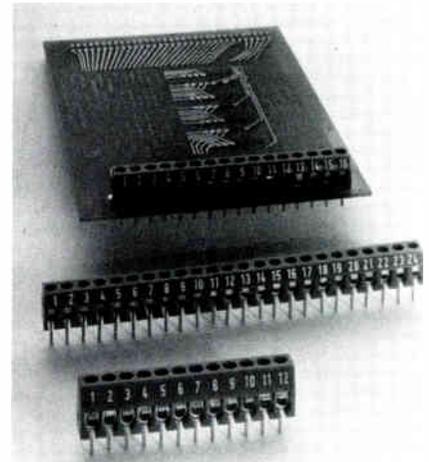
New literature from ComSonics features the Sniffer RF leakage and ingress detection system, designed for trouble-shooting CATV plants. The new catalog sheet shows and describes each of the system's benefits and components, including transmitter, sensing unit, receiver and accessories. (Circle Reader Service Card No. 145.)

TEMTRON REPAIR PARTS

Temtron introduces a full range of CATV repair parts for most major lines of equipment according to this New York company. 100% tested RF components are selected and tested to second order distortion, gain, cross-mod, etc. Temtron claims an inventory of more than \$100,000 in CATV parts alone. Thermister-resistor, coils, chokes, capacitors, relays, fuses to stud-mount transistors both single-ended and fully matched pairs are available from the company. Hybrid chips and I. C.'s, rectifiers and diodes, equalizer boards, test point probes, plug-in pads, transformers, converter parts and sub-assemblies are included in the line. (Circle Reader Service Card No. 146.)

ITT TEST PROBE

ITT Pomona Electronics reports production of new DC high voltage test



Electrovert PCB Strip



ITT Model 4242 Probe



LPS Super Cleaner

THE SOUTH WILL RISE AGAIN!

Sept 12-14, 1976



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probe with a built-in meter. Model 4242 is a self-contained portable, 8½ oz., test instrument for rapid measurement of high voltages. No warm-up time is required for the unit and it needs no batteries for operation. Sensitivity is 20,000 ohms/volt (50µa) movement; accuracy ±2% of full scale; length is 14¾ inches. Handle is high impact thermoplastic and the probe is high impact polycarbonate. (Circle Reader Service Card No. 147.)

INSTANT SUPER CLEANER FROM LPS

A stabilized, fast-acting, non-flammable solvent for cleaning and degreasing parts and equipment. Cleans and removes oil, grease, wax, moisture, dirt, brake fluid and other contaminants. LPS Instant Super Cleaner has no flash point, no fire point and is extremely low in toxicity, non-staining and non-corrosive to metals according to the

manufacturer. Available in 20 oz. aerosol cans or in bulk. (Circle Reader Service Card No. 148.)

ITI ELECTRONICS SALES UP

ITI, Clifton, NJ, announces that audited year end financials again showed improvement. In ITI's fiscal '75, which closed on January 31, 1976, sales were up about 3% over 1975, while profits were 20% higher than the previous year. ITI manufactures a line of communications products to industry.

TRANSCOMMUNICATIONS FORMS SUBSIDIARY

Satellite Network Services is new subsidiary of TransCommunications Corp. of Greenwich, CT. Group is dedicated to "increasing the revenue of earth stations and their associated ground facilities." Edward L. Saxe, president of the group and former president of

CBS Television Services, announced in April that Robert Rosecrans has signed UA-Columbia as the first SNS affiliate. UA-Columbia was the first U. S. cable television system to install and operate a satellite earth station. Other SNS affiliates include Charles Dolan's Oyster Bay cable systems in Long Island and William Grove's Frontier Broadcasting Co., Cheyenne, Wyoming.

CANADIANS HOST 19th ANNUAL CONVENTION

June 1-4 were dates for 19th Annual CCTA Convention held in Toronto, Ontario, Canada at the Sheraton-Four Seasons. Attendance was estimated at 1,600 at the show that was themed "around "The Challenge of Choice/Une Question De Choix." Sessions on business, programming, marketing, technical, long range planning and law were included.

news/new products

DEVINES CRT 23R3 TRAILER

The Devines CRT 23R3 trailer shown here with reel brakes has been granted a U. S. patent, as well as Model CRT SR4, a larger capacity trailer utilizing this design. The trailer provides three loading spindles and the CRT 23R3 handles a reel up to 60" diameter on center spindle and reels up to 41" diameter on the ends. The payload is 2100 lbs. and the GVW is 3000 lbs. A catalog showing these and five other trailers and accessories is available. (Circle Reader Service Card No. 149.)



Devines CRT 23R3

SYSTA-MATICS VIDEO MOVIE PLAYER

Designed for the market needing more than three hours of automatic un-repeated programming of unlimited re-play time. The VMP-6 is a video cassette changer-programmer system less sophisticated than the company's VJB-12 which provides 12 hours of automatic programming. The unit plays from one to six 3/4 inch cassettes repeatedly or on schedule to a built-in 24-hour timer. Cassettes can be tone programmed to advance to the next cassette at any time or go into a "wait" function. The unit is available with or without a cassette player, and was designed to meet the demands of educational, industrial, CCTV entertainment and cable television operations unable to economically justify 12 or more hours of un-repeated programming provided by the VMP-3. (Circle Reader Service Card No. 150.)



VMP-6 From Systa-Matics

or spaced according to rigidity and protection required of the finished bundle. Material is available in natural and ultraviolet Polyethylene, fire retardant Rulan and Nylon. Electrovert also manufactures Spiroband in 1/8, 1/4, 3/8 and 1/2 tube diameters. (Circle Reader Service Card No. 151.)

TEKTRONIX INTRODUCES NEW EQUIPMENT

Two new RF sweep generators have been announced by Tektronix, Inc. SW 503 (50Ω) and SW 503 Option 1 (75Ω) are small, compact units with features of larger laboratory-type sweep generators according to the manufacturer. They are designed to operate in a TM 500 Series Power Module. Either covers a frequency range of 1 to 400 MHz and has variable sweep rate, step attenuator, 20 dB vernier attenuator and crystal controlled marker generator providing comb type markers



Tektronix SW 503 Option 1



Tektronix Preamplifier

at 1, 10 and 50 MHz. (Circle Reader Service Card No. 152.)

Tektronix also announces a new CATV preamplifier, the AM 511, to plug into a TM 500 Power Module and to be used with the 7L12 or 7L13 Spectrum Analyzer. Tektronix says "It is also an excellent amplifier for use with any wideband scope such as

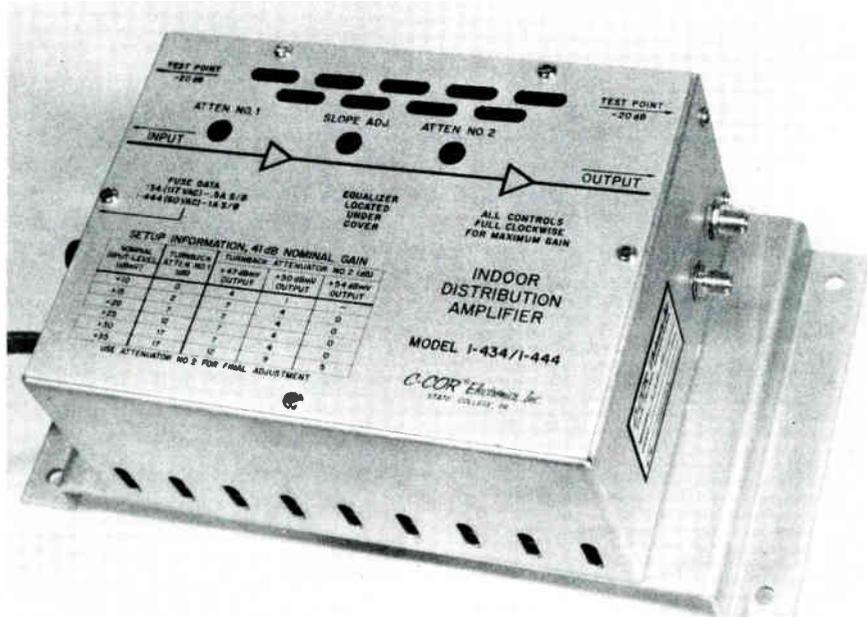
the 475 or 485, or with the 7A16 or 7A19 where low-noise nano-volt sensitivity is desired." The AM 511 is built for measuring signal-to-noise, radiation, and field intensity to FCC specifications on CATV, television and FM installations. Other uses include radio system servicing and measurements as well as increasing sensitivity for EMI measurements within the 30 to 890 MHz frequency range. Input impedance is 75 Ω ; reference level is calibrated in 1 dB steps from +70 dBmV to 0 dBmV; intermodulation distortion is at least 70 dB down; VSWR is 2:1. (Circle Reader Service Card No. 153.)

C-COR ADDS MULTI-CHANNEL INDOOR AMPLIFIERS

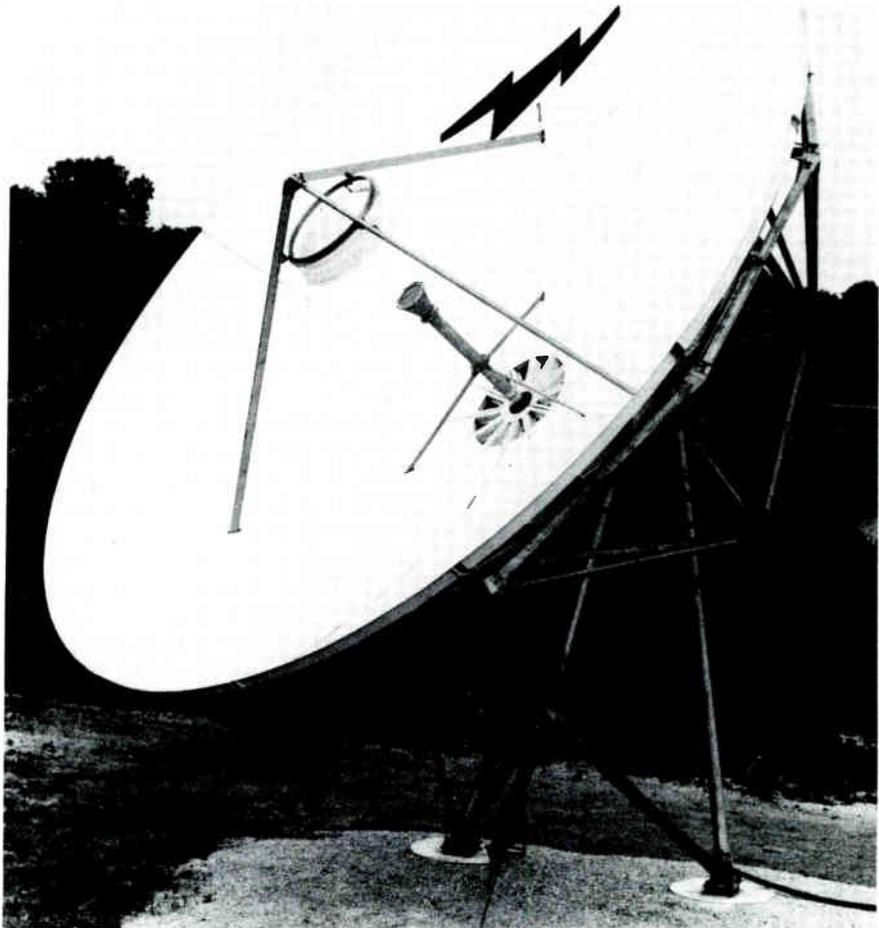
A multi-channel, reliable Indoor Amplifier has been announced by C-COR Electronics. The extremely low operating temperature and high quality hybrids insure high reliability, according to James R. Palmer, president of C-COR. Features include 41 dB gain with two hybrids for flexible distribution; two-way filters and reverse amplifier option; powering voltages of 30, 60, 115 or 230, 50 to 60 Hz; and plug-in fixed or thermal bandwidth limiting equalizers with bandwidths of 220 MHz, 245 MHz, 270 MHz, and 300 MHz. (Circle Reader Service Card No. 154.)

ANDREW TV RECEIVE EARTH STATION

Designed to receive network quality TV signals, the earth station consists of an ESA10-46, 10 metre antenna with mount, low-noise pre-amplifier and receiver. Aluminum reflector panels are easily aligned at installation, dual reflector feed system provides high antenna efficiency (51 dBi gain at 3.95 GHz), superior cross-polarization discrimination, receive and transmit capability and 360° polarization adjustment. The structure has a steel-back-up assuring maximum rigidity under severe wind conditions. (Circle Reader Service Card No. 155.)



C-Cor Indoor AMP



Andrew Earth Station

COMSONICS® AWARDED CONCEPTUAL PATENT FOR TWO-WAY USE OF EXISTING ONE-WAY AND TWO-WAY SYSTEMS

ComSonics® Inc. has announced the award of U.S. Patent 3,943,447 to Glen Keller Shomo, III of their Research & Development Laboratory, which will permit any existing one-way CATV system to employ two-way transmission, without reverse amplification equipment. The fact of the patent's covering a concept, rather than specific hardware, is particularly significant in that it guarantees the company exclusivity in providing services to the CATV industry, based upon that concept.

The most immediate application of the patented concept is evidenced by ComSonics® Model RSS, Remote Signalling System, providing an economical reverse signaling capability to existing one-way systems. This equipment has been in reliable and active use for the past three years and usually provides a means to remotely switch non-duplication programming at the headend from a distant studio or office. Requiring no reverse amplifiers, the RSS may provide many other remote-control functions and even pass digital data.

Glen Shomo's Patent is entitled "Method and Apparatus for Bi-Directional Communication Via Existing CATV System" and is assigned to ComSonics® Inc.

Anticipated development of the ComSonics® patented concept includes remote status monitoring and control of various line equipment, and control of signal delivered at subscriber drops, as a viable alternative to the so-called "smart-tap." ComSonics® is actively seeking alliance with operating companies for co-development of such applications.

GWTW ALL-TIME FILM CLASSIC, SCHEDULED IN JUNE BY HOME BOX OFFICE PAY NETWORK

New York, May 6—Home Box Office, the national pay TV network, has announced that it will show the MGM classic, *Gone With The Wind*, for its more than 400,000 subscribers in June.

The historical romance is scheduled for 14 exhibitions on the HBO network with afternoon and prime-time evening showings on June 11, 13, 15, 18, 24, 26 and 28.

Conforming to HBO policy for feature films, the three-hour, 40-minute film will be uncut and uninterrupted except for one intermission.

Now the fourth largest grossing film of all time, with over \$74 million in box-office receipts, GWTW will be carried to over 150 HBO cable system affiliates by domestic communications satellite and terrestrial microwave.

Rights for a single showing of the film were sold in 1974 to the NBC network for a reported \$5 million. NBC reportedly plans a split play of the feature on two nights this fall. HBO's rights to the film expire June 29, when a "buffer period" begins prior to NBC's play of the film. It appears that there will be a period of three months or more between the pay TV and broadcast television airing.

Until 1974, *Gone With The Wind* was considered the "unobtainable" film for television, with MGM having turned down offers from all three commercial networks.

Harlan P. Kleiman, programming vice president of Home Box Office, said the enduring popularity of GWTW is illustrated by the fact that it has been shown theatrically somewhere in the world every day since its release in 1939.



Glen Shomo, left, with patent award. Richard Shimp, Director of R&D, ComSonics, right

The original production by David O. Selznick based on Margaret Mitchell's first novel stars Clark Gable, Olivia de Havilland, Vivien Leigh and Leslie Howard in the roles of Rhett Butler, Melanie Hamilton, Scarlett O'Hara and Ashley Wilkes. It was completed in late 1939 at an estimated cost of \$4 million.



SBE PLANS NOVEMBER CONVENTION

The Society of Broadcast Engineers is making plans to present its Third Annual New York Convention, November 7 and 8 at the Holiday Inn in Hempstead, NY. The Society of Cable Television Engineers has been invited to participate and will host a panel during the meeting.

The 1975 convention included displays from nearly 40 hardware manufacturers and distributors. These exhibitors carried equipment of interest to both broadcast and cable television personnel. The Third Annual Convention also will provide a showcase for exhibitor's wares.

Mark Shubin has put out a Call for Papers for SBE and invites papers covering topics of audio, video, RF, and control engineering. Abstracts are invited on such specific areas as digital audio and video, satellite communications, electronic news gathering, circular polarization, dynamic range compression, noise reduction, A stereo, discrete and matrixed quadraphonic FM, and operating practices and techniques.

Abstracts of 100 to 300 words should be forwarded to Mark Shubin, SBE, P. O. Box 607, Radio City Station, New York, NY 10019 no later than August 1, 1976.

WARC CABLE COMMITTEE PRELIMINARY REPORT SUBMITTED

The WARC Advisory Committee for Cable Ancillary Radio Services met in Mid-May in Washington, D.C. at the Cable Television Bureau to review the preliminary Final Report to the Steering Committee. Included in the preliminary text were the Purpose; Scope; Assumptions and Modifiers and; varied Recommendations to the committee.

Under Assumptions and Modifiers, the text stated that "Cable Television Systems will continue to serve an increasing percentage of the U.S. population and will be the primary means of providing broadband communications to the general populace." Also stated as an assumption were more positive statements regarding the anticipated future growth of the industry.

"Existing broadcast services will be directly serving a dwindling percentage of the U. S. population. This may result in a shift to more appropriate transmission system configurations," the report says.

The preliminary draft recommends that definitions adopted by the 1971 Space WARC for Fixed Satellite Service, Broadcasting Satellite Service, Individual Reception, and Community Reception are satisfactory.

"By showing this remarkable epic film in its entirety," he said, "we will sustain the special mood that has enthralled succeeding generations of theatre-goers for 37 years. In addition, our multiple showings over this 18-day period will enable subscribers to see it at their convenience."

deserving special notice

On Better Engineering Management: Value Analysis

Judith Baer, Editor
Communications/Engineering Digest

Within every large aerospace and electronics firm there is a program of "cost reduction" which might be called any one of various names: Value Analysis, Value Engineering, Zero Defects, or any combination of these words. Brought to company personnel, the program might take on the name of "VIP" or other such coined slogans that encourage employee participation on a day-to-day basis in the company's goal of reducing costs and improving productivity.

There are sound reasons for such programs, and it can be proved both from the standpoint of company dollar savings each year and an improved morale for employees taking an active part in company business. Certainly when company management goes so far as to award cash to employees for suggestions in cost reduction, morale increases substantially. These awards usually equal a percentage of the net annual savings to the company. If a method for a production technique saves the company \$35,000 annually, the employee might receive a check for anywhere from \$350 to \$3,500 for the suggestion. Since some of the savings have been in the hundreds of thousands of dollars within the larger companies, the awards are determined on a "sliding" scale with regard to percentages saved.

The management of these companies have learned that people who do the jobs day after day might be the ones who know how to do the jobs better. But unless encouraged to investigate cost reduction methods and asked directly for opinions, human nature usually demonstrates itself with complaints and barbs, rather than with actual implementation of the better way of doing things. We have all heard the standard phrases, such as "I'm the one who does the job, why don't they ask me what I think about it?"

What is Value Analysis?

Value Analysis can be defined as an efficient aid for making products that fulfill technical requirements of the marketplace at the lowest possible cost. It can be applied with new development and new designs and with redesign and revision of existing products. It is aimed more at the end product rather than at the production process. Build a better mousetrap. Deliver a clearer picture.

VA or Value Engineering was introduced in the early 1950's and is generally believed to be the brainchild of L. D. Miles at General Electric. The programs have been en-

couraged by numerous government military agencies and the concept is accepted worldwide. It has paid off in millions of dollars of savings on various projects, and has certainly paid off in companies reducing overhead in paperflow, inventory costs and general goodwill.

To Use It

To use Value Analysis, we must produce a measurement method to determine which costs are necessary and which are superfluous. This can be done in somewhat the same manner as measurement of a product's technical characteristics, e.g., number of revolutions, pressure and current strength, economic characteristics.

It is not enough to determine actual costs with the usual calculation methods since these give only information about what the product and its parts cost with a certain manufacturer and in a given production situation. Corresponding products, from other manufacturers produce totally different costs. Therefore, the calculated actual costs do not correspond to an objective measurement of product value. The desired measurement value cannot be obtained by calculating parts costs of the product in a conventional manner. With Value Engineering, the product's functions and the functions of its parts are studied. By producing the connection between functions and costs, starting from what the industrial development has previously made possible, a method has been obtained for more generally stating the objective price and cost level of an industrial product. Producing the connection between functions and cost can be called functional measurement value.

When the function-to-cost relationship has been determined, we know where the unnecessary costs are in the products and how large they are. Unnecessary costs that have been added to the product also become apparent. Experience shows that these unnecessary costs occur through mistakes in judgement on the administrative side, the market side and the design side—either by choice of design principle or during part design work—the production side—either when the product is being prepared or during the production itself—the materials procurement side—either during outside purchasing or internal provisioning.

Merely knowing and measuring unnecessary cost does not solve the problem. They must be eliminated and

certainly, they should be prevented from creeping into future projects.

Developing the Job Plan

Value Analysis follows a specially suited job plan to point out, measure, prevent and eliminate unnecessary costs. The job plan is based on studies of how technical problems in general can be solved in the most rational manner.

A problem is treated systematically, step by step:

- the necessary facts are collected
- the facts and problem is analyzed and clarified
- alternative ideas are produced for the solution and these ideas are objectively assessed and the best solution determined and implemented.

So, the job plan takes on five steps:

- Information
- Analysis
- Creativity
- Evaluation
- Implementation

Aids are used which characterize Value Analysis:

- Cost studies (the information stage)
- Definitions of functions and functional limits. Valuation of functions.
- Motivation for change (the analysis stage)
- Stimulated creation of ideas (the evaluation stage)
- Systematic idea assessment (the evaluation stage)

Study the Function and Create Ideas

When all of the necessary facts are collected during the information stage, the functional study of the product is carried out in the analysis stage.

We must start with the premise that a customer buys the product because it fulfills a certain function and that the designer has built up the product with a certain number of sub-functions which together contribute to fulfilling the function desired by the customer. Therefore, we study the product on the basis of functions and not on the basis of parts or detail. This concept is the logical method by which functions can be defined. The functions are named in the most simple manner and if possible, with only two words, a verb and a noun. Gradually, as this functional study moves

ahead the functions are classified in various different ways, i.e., as use function and attractiveness function; basic function, secondary function and support function.

The functional study generally gives a clear picture of the functional requirements put on the product and how well the product fulfills the desired functions. It may be that more information is required, which means that you would go back to the information stage again. For a more complicated product, it may be necessary to alternate between information and analysis stages several times before all your questions are answered.

After we've defined the function, we must do two things. We must determine what the function costs in its current form and produce an objective measurement value for each function.

Functional measurement values are important in order to clarify how we'll attack the problem and get aim for desired cost reductions. Functional valuation can take place either with comparison techniques or with theoretical calculations.

A Basic Example of Value Analysis

Let's take the simple screw and spacer combination used to hold together tops and bottoms, sides and sides, and outsides and insides of numerous things we encounter both in business and personal life each day.

- Let's define the function of a simple standard screw as "to hold parts together." The cost of such a simple standard screw might be \$0.01.
- "To hold parts together" might be the function of a simple piece of tubing with a value of \$0.005.
- The function "to be taken apart" is already fulfilled by the fact that a simple standard screw has assumed that function by holding the parts together and therefore is worth nothing in this discussion.

The measurement value for all of these functions together can be obtained by simple addition since the solutions do not exclude each other.

The measurement value is \$0.015.

If it is necessary to add more costs because of a difficult assembly, we must not forget such details. In this case we'll assume that \$0.02 is considered appropriate and justifiable.

Compare this figure with the cost of purchasing the unit complete at \$0.07 each with an annual requirement of 100,000. The function for which \$0.07 has been paid, therefore, should not be worth more than \$0.02. The unnecessary costs in the product have been determined to be \$0.05.

In this example it is the functional study which makes an evaluation of the product possible. Comparison tech-

niques are built on the fact that the functions in a certain product have counterparts in other and similar products and even in products from other product ranges. Looking at things in this manner rather than from a detail study, opens ways to determine how, in the cheapest possible way, a function can be fulfilled with given functional limits, by usage of today's current techniques.

Start Thinking

Creating ideas follows the collection of facts during the information stage and after the problem has been clarified. Now we must rid ourselves of "ingrown" solutions to problems and start to produce alternative solutions. We call that "brainstorming." The basic aim of this stage is to devote yourself completely to developing and hatching new ideas and remove assessment and critical inspection. Open up your mind and clear out the age-old cobwebs. This is the way to finally produce really good and usable ideas.

Making it Work

The simple screw and spacer example serves to show what the creation of ideas followed by assessment and implementation of the ideas using Value Analysis techniques can produce.

The functional valuation of the unit indicates the occurrence of unnecessary costs amounting to about \$0.05 each on use of the current model. That totals \$5,000 a year in waste just in one simple screw and spacer combination. Eliminating this \$5000 a year waste becomes the object of "free creation of ideas." We'll reject the idea "nail" even though it certainly fulfills the function "to hold parts together," do some more assessment and more thinking, and find out that it could be possible to mass produce the unit from a wire by cutting, upsetting and roll threading with a method similar to that used in producing a standard screw. Then we'll look around and find the right supplier and contract out for that company to produce the screw and spacer unit for about \$0.01 each.

Value Analysis is not excluded to screws and spacers by any means. It has been successfully used for the rationalization of routines, services and processes. It has been very successful when used to cut costs of office and paperwork routines. It can be used both as a review of existing plant and products and for the development of new plant and products. Smaller units can be studied in detail or it can be used to study the overall project. Products with a low unit price, produced in large numbers and usually purchased in large volume, as well as products purchased individually and of a more sophisticated nature can come into question.

Indeed the low cost, high use, commonly called "min-max" inventory items are often the problem units and could do with some Value Analysis techniques.

The technique is best learned by practice on the simple cases at hand. Begin with existing products or services and then move on to the more sophisticated routines. Skill will gradually increase and as it does, the complicated products may be analyzed and will seem less complicated. Each piece of hardware is merely a combination of many pieces of hardware and electronic components. It was designed by the human mind and we all have one to make the most of.

Value Analysis does not guarantee results and it claims no place as a wonder method of cost reduction. However, large savings and cost reductions have been achieved and nobody can afford to pass over cost reduction these days. VA has also disclosed potential alternative forms which were not previously thought of and put to use.

Apply VA

Value Analysis can and should be included as an integral part of the design and development of any project. The technique should be encouraged so that designers unthinkingly include it within their plans. This may take some time to promote, but it is a good aim to strive for and when reached, the benefits are great. While in large companies there are often separate departments that do nothing but develop VA programs to encourage employees to use

the technique, smaller companies may have to rely on other such means to develop a VA program. Universities are handing out certificates in Value Analysis and there is a whole industry based only upon this one topic. Certainly engineers and purchasing agents should practice VA on a continuing basis.

Since VA is a systematic procedure to attack problems associated with the making of products or the delivery of a service, it is necessary to have the cooperation of company management when using the technique. More in-detail and complete cost information and cost estimates are required from estimating and cost departments. Policing cost estimates in itself is a part of cost reduction and value engineering. Where are the three bids? Is it really the best product just because it costs ten percent less. These are all careful considerations that must be determined.

For the purchasing department the demand will be for better capability for finding out suppliers' specialties and possible new techniques. For the design and production or construction departments it will be made clear what a function should cost and in what way it can be fulfilled at an acceptable cost. For the engineering department, who should always be cost conscious, functional thinking and functional valuation can give new impetus on working out internal company standards for performance. Management of the company will utilize Value Analysis as a tool for efficient product planning and development and for the development of its staff.

“Value Analysis can and should be included as an integral part of the design and development of any project.”

There are many factors that must be considered in designing an earth station for satellite reception. This paper is an attempt at presenting these factors in a graphical form to minimize the calculations that must be performed.

The basic information that is required to design a system includes: the satellite location, the earth station location, the satellite power at the earth station location (EIRP). The assumption is, of course, that the satellite is operating in the 3.7 to 4.2 GHz band.

The first thing that must be determined is the elevation angle of the earth station, that is the angle that is made relative to a horizontal plane when the antenna is pointed at the satellite. Figure 1 shows the elevation angles for earth stations at given latitudes as a function of the difference in longitude between the satellite and earth station. Figure 2 shows typical elevation angles across the United States for a satellite positioned at 119°.

Knowing the elevation angle, we can determine the path loss from the satellite to the earth station at various frequencies as is shown in Figure 3.

Having found the path loss and knowing the power from the satellite, one can calculate the most important factor in the earth station design, i.e., carrier-to-noise (C/N) ratio. A C/N ratio of 11 dB is generally considered to be the

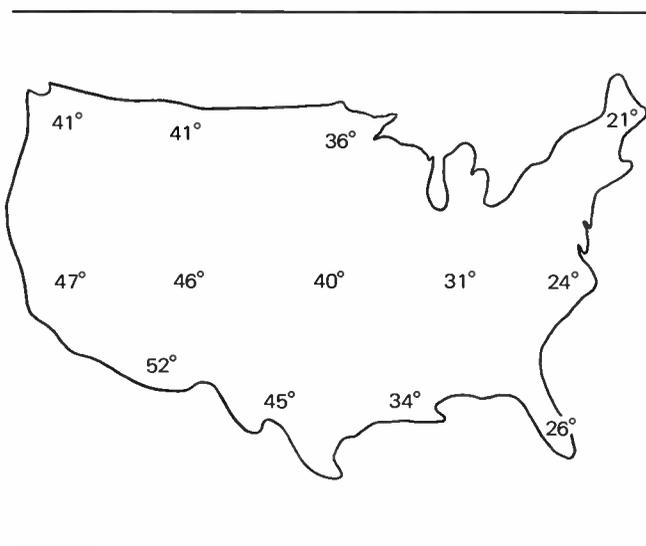


Figure 2. Earth Station Elevation Angles for a Satellite at 119°

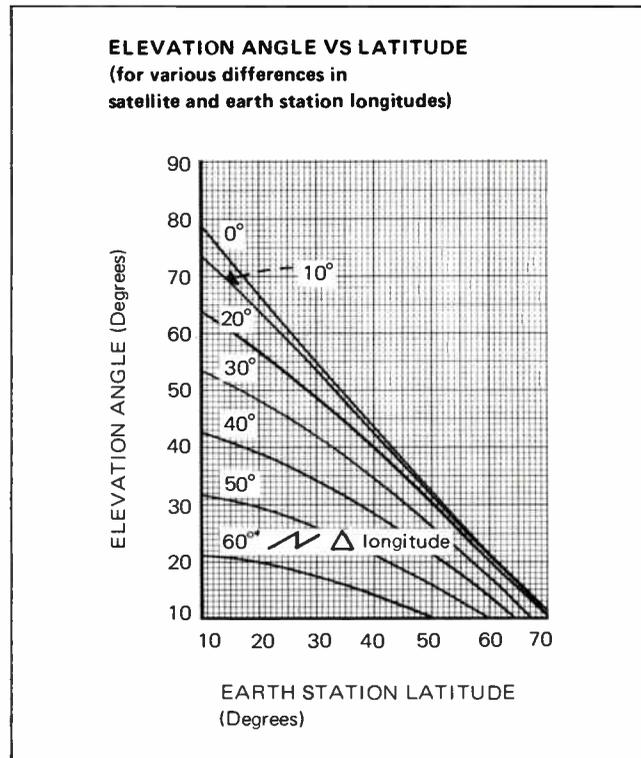


Figure 1.

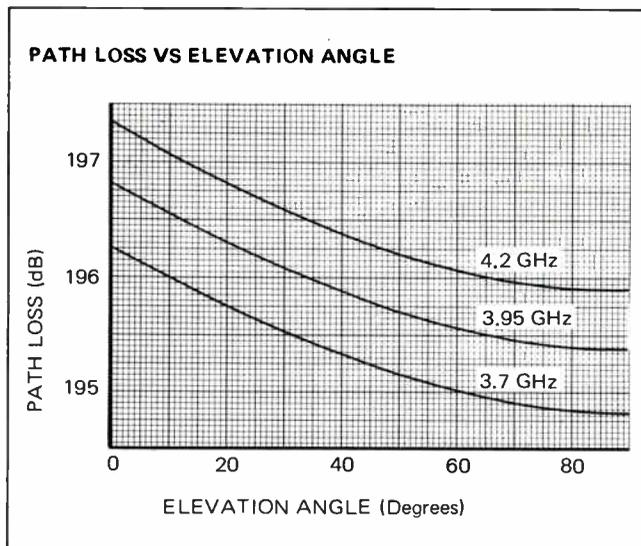


Figure 3.

Graphic Solutions for Satellite Earth Station Design

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threshold level for most receivers. This is the point at which the signal-to-noise (S/N) ratio no longer changes linearly with C/N ratio, and impulse noise begins to appear in the picture. Figure 4 shows the C/N ratio that would be obtained with earth stations having different levels of performance (G/T). G/T is actually the gain of the antenna in dB minus $10 \log T_s$ where T_s is the system noise temperature in degrees Kelvin. It is obvious that the higher the antenna gain or the lower the system noise temperature, the "better" the earth station will be.

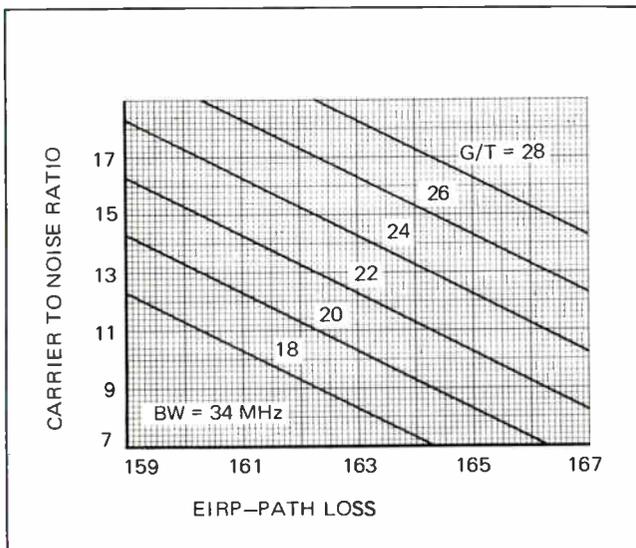


Figure 4

Some margin above threshold should be allowed for in the system design. Various factors which reduce the C/N ratio include rain attenuation, antenna pointing error, atmospheric attenuation, and polarization and isolation. These factors can add up to about 2 to 3 dB and should be taken into account by increasing the G/T of the station by that amount. This means that the clear weather "everything perfect" C/N ratio would be about 14 dB as a minimum.

The video performance of the system can be determined by adding the FM improvement factor to the C/N ratio. This factor depends on the modulation parameters of the signal and is 38 dB for the HBO signal. This means that under clear weather conditions, a station with a 14 dB C/N ratio would have a 52 dB S/N ratio.

At present the 10 meter earth stations have no difficulty meeting or exceeding these minimum performance requirements; however, if and when small earth stations are approved by the FCC, there may be a requirement to minimize the cost of the low noise amplifier at the expense of S/N ratio. If this happens, the receiver could then be operating very close to threshold. One way to help this situation is to use a narrower IF bandwidth in the receiver. This will not improve the S/N ratio but will improve the

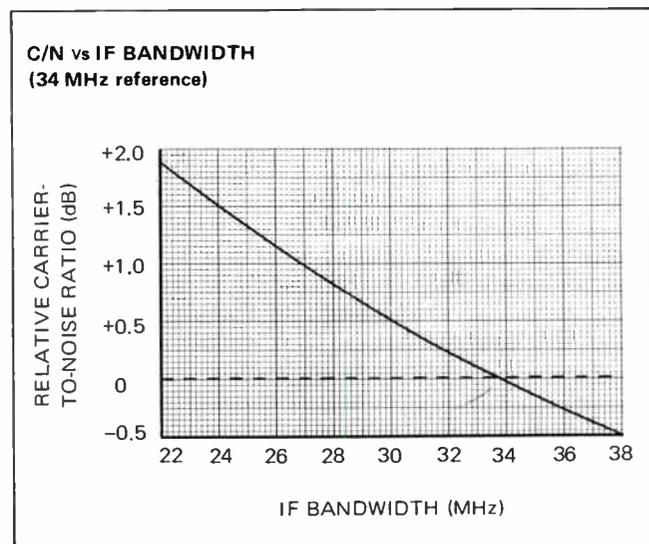


Figure 5

C/N ratio and thus bring the receiver out of the threshold region. Figure 5 shows the C/N improvement (relative to the 34 MHz bandwidth) as the IF bandwidth is reduced. Experiments indicate that approximately 2 dB improvement in C/N ratio can be achieved without noticeably degrading the picture.

Knowing the required G/T of the station and the gains of various antennas, the required system temperature can be determined. This relationship is plotted in Figure 6.

The antenna noise temperature must be known in order to determine the temperature of the low noise amplifier. This noise temperature is a function of antenna elevation angle. A typical curve of antenna noise temperature vs. elevation angle is plotted in Figure 7.

Another factor which must be considered in determining LNA temperature is the loss between the antenna flange and the LNA input. This relationship is plotted in Figure 8. To use this curve, the antenna temperature (from Figure 7) is first subtracted from the system temperature (from Figure 6). Curves for T_{LNA} vs. $[T_{system} - T_{antenna}]$ for various amounts of loss are plotted.

A plot of noise figure versus noise temperature is shown in Figure 9 for convenience.

Example

1. Find earth station latitude and longitude, satellite longitude, and EIRP at the earth station.
 - a) Earth Station longitude 70°
 - b) Earth Station latitude 37°
 - c) Satellite longitude 119°
 - d) EIRP 33.5 dBW

2. Subtract earth station longitude from satellite longitude and use Figure 1 to find elevation angle.
 - a) Satellite longitude - Earth Station longitude = $119^\circ - 70^\circ = 49^\circ$
 - b) Read elevation angle of 24°

3. Knowing elevation angle, use Figure 3 to determine path loss.
 - a) Elevation angle 24°
 - b) $f = 4.2$ GHz
 - c) Read path loss = 196.8 dB

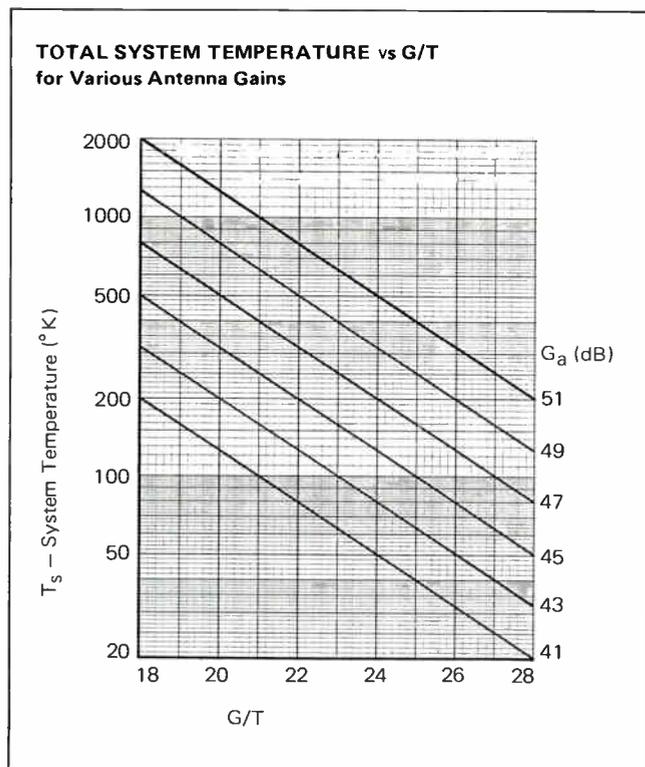


Figure 6

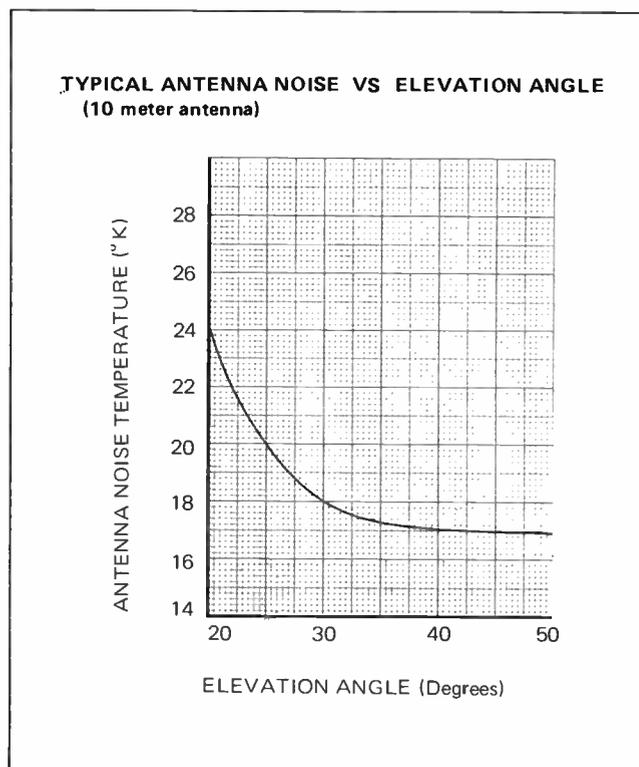


Figure 7

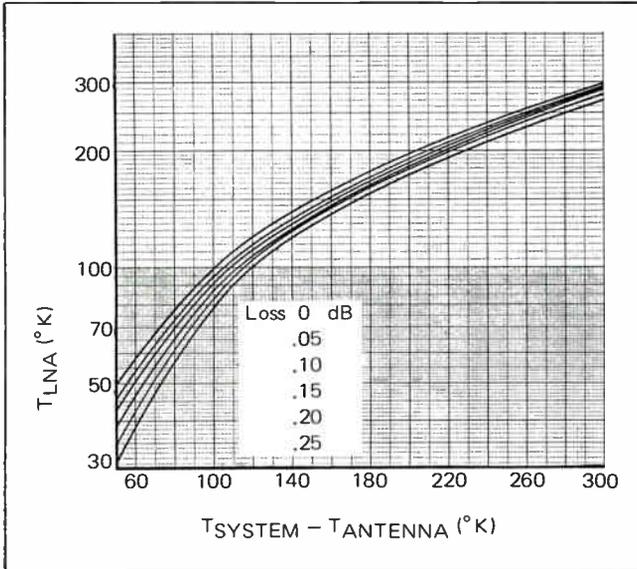


Figure 8

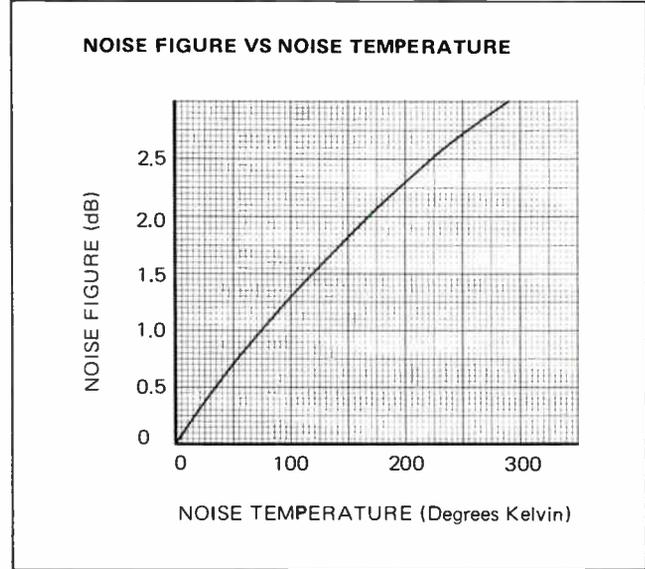


Figure 9

4. Subtract EIRP from path loss and use Figure 4 to determine G/T of station for C/N of 11 dB. Remember to add station margin to G/T.

- a) EIRP = 33.5 dBW
- b) Path loss = 196.8 dB
- c) Path loss - EIRP = 196.8 - 33.5 = 163.3
- d) Read G/T = 21 dB at 11 dB C/N
- e) Add 3 dB to G/T (21 + 3 = 24 dB)

5. Use Figure 6 to determine system temperature (T_s) from required G/T and antenna gain.

- a) Assume antenna has 44 dB gain
- b) G/T = 24 dB
- c) Read system temperature = 100°K

6. Determine antenna temperature from elevation angle using Figure 7.

- a) Elevation angle = 24°
- b) Read antenna noise temperature = 21°K

7. Subtract antenna temperature from system temperature and determine low noise amplifier temperature from Figure 8. Select the curve corresponding to the appropriate waveguide loss.

- a) System temperature = 100°
- b) Antenna temperature = 21°
- c) $T_s - T_{\text{antenna}} = 100 - 21 = 79°$
- d) Waveguide loss = 0.1 dB
- e) Read $T_{\text{LNA}} = 68°$

wrap up

CABLE NEWS publisher **Bob Huston** has announced that magazine will no longer be published but that a new weekly newsletter format will start soon from Washington, D.C. Price of annual subscription is \$90 with introductory offer of \$22.50 for three months. **THETA-COM** announces that **CANADIAN WIREVISION** of Vancouver, B.C., the world's largest CATV system, has purchased a 23 channel AML system. The Canadian system has 220,000 subscribers and the initial AML installation will serve 12 receiving sites. Canadian Wirevision is owned by **PREMIER CABLEVISION**. **CATEL** has started a new technical publication called the **CATELGRAM** to be published periodically with information on equipment in the company's line. The first issue addresses baseband video transmission using FM modulation. **DICK MUNRO** of Time Inc., Group Vice Pres. for Television and Films, has been appointed Chairman of the NCTA Equal Employment Opportunity Committee by **Burt Harris**, Chairman of NCTA. Munro is newly elected member of the Board of Directors of NCTA. He holds responsibility for Manhattan Cable, HBO, Time-Life Films and WOTV, all properties of Time, Inc.

CONFERENCE RECORD from **SCTE/IEEE Reliability Conference** in February is available from SCTE, 607 Main Street, Ridgefield, CT 06877. Price is \$15 to SCTE/IEEE members, \$18 to others. Copies of the **CTAC REPORT, VOLUME I, STEERING COMMITTEE REPORT TO THE FCC** are available from SCTE for \$11. Order from SCTE at address above.

NCTA ASSOCIATES received letter from **Wally Briscoe** regarding lobbying effort for amendment of the Tax Reform Act of 1976-HR 10612 during late April. Act essentially would cause change in tax exemption for income from trade shows for NCTA and reduce the value of the show to exhibitors. Basic problem-

exhibitors cannot sell at shows. **NCTA-MPAA** Copyright agreement continues to cause comment from all quarters. **CATA** doesn't like the idea of another "secret agreement" and is lobbying on Hill in Washington to get amendment. **CATA** figures that **NCTA-MPAA** agreement will hurt operators in 2,000-4,000 subscriber category.

Names continue in the mill for various vacancies: **Bruce Lovett** for FCC Commissioner **Glenn Robinson's** chair at commission; nobody knows for sure since in one week two different trade publications published two different names. **Joseph Fogarty** was reported in **TV Digest** as possible replacement for Robinson. **CATV WEEKLY** speculated on Lovett. Robinson's term expires June 30. **TV Digest** says that "package" of Houser and Fogarty "seems assured." Fogarty is Senate Communications Subcommittee Counsel. Houser is attorney with Chicago law firm, was commissioner at FCC for short time and is talked of as probable new director of the Office of Telecommunications Policy at the White House.

SCIENTIFIC-ATLANTA president and chief executive **Sid Topol** was featured as profile in **BROADCASTING** during May. **BILL KENNY**, who was serving as dual-roled executive director of New England Cable Television Association and New York Cable Television Association resigned recently as director of the NY group. **Ray Crawley** is new products administrator of Jerrold's Terminal Products Division. **Ken Gray**, who started as a technician in industry with UA-Columbia is now on inside sales staff at **Anixter-Pruzan** in Northeast district office.

JOHN SIE, general manager of **Jerrold's Terminal Products Division** has assumed added responsibility of CATV set converters as well as pay-TV systems and associated hardware according to **Bob Eisenhardt**, president of Jerrold. John is responsible for numer-

ous innovations in Jerrold's line of home terminals and remains active developing better ways of doing things.

UA-Columbia reports record earnings of \$.30 per share for three months ended 3-31-76. **C-COR** showed net income of \$30,253 in 1975 on net sales of \$1,550,000 according to president, **Jim Palmer**. **Harris Corp.**, Broadcast Products Division announced that the **Blackhawk Baptist Church** in Fort Wayne, Indiana ordered three **Harris TC-50** live color television cameras to broadcast weekly worship services to the Fort Wayne area.

JERROLD announced various activities at the NCTA Convention in Dallas. Included are a 160 mile CATV system for Cleveland, TX; construction of a new headend facility for Valley Cottage, NY; turnkey systems for Tower Communications and Telesystems; a cable system for Kenner, LA; and **George Fletcher** being named **Jerrold's Salesman-of-the-Year**.



Bob Eisenhardt, president of Jerrold presents Salesman-of-the year Award to George Fletcher, Eastern Regional Office.



Shown Theta-Com and Canadian Wirevision signing contract are Bob Peake, General Manager of Canadian Wirevision and Duane Crist, Theta-Com Marketing Manager. Standing left to right are Manuel Saperstein, President of Saperstein & Associates, Consulting Broadcast and Telecommunications Engineers, Mark Beggs, National Microwave Sales Manager for Theta-Com's Canadian AML Distributor—Welsh Communications, and Abe Sonnenschein, Director of Engineering at Theta-Com.



Nearly two years of work on the part of EastBank Cable TV Inc. Kenner and Harahan, LA. was culminated NCTA Convention in Dallas, when officials of EastBank Cable met with representatives of Jerrold to sign contract authorizing construction of cable TV system in Kenner, La. Pictured (left-to-right) are Robert M. Garner, sales engineer from Jerrold's southern regional office, Charles S. Lambert, president of EastBank Cable TV Inc., and other EastBank company officials: John M. Sims, vice-president engineering; Harry W. Bennett, Jr., executive vice-president/operations; and Gerald F. Coogan, treasurer.

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critique/letters

Dear Judy;

I read with great interest your editorial and Bob's comments in the April issue. Copies of these should be circulated to the management of all systems. I must, however, take issue with your proposal for a special rate for technicians.

Most management types, when asked about their technicians, will agree that they work hard, do a fairly good job, have to work in inclement weather, don't have all the tools they need, probably could be trained better, but. . . . The but, it seems to me, is the place where the SCTE can step in and change things. What the technicians in this industry don't need is reduced rates to conventions. The point being that systems should be willing to spend at least as much on the education, training, and entertainment of their technicians, as they do for those persons who go to conventions.

We in the technical departments are often confronted with statements like, "I buy you a bucket truck, spectrum analyzer, scopes, meters, and you want to go to the convention too!" We are all, it would seem, part of a conspiracy to use FCC and State compliance to get some new test equipment.

If, as Bob Bilodeau seems to think, the people making the equipment buying decisions aren't making the conventions, then a change in thinking about the worth of attending these conventions and their technical sessions is in order. All members of the SCTE can contribute by influencing their local management. Having a body of qualified technical people is the only way we're going to get this nation wired, and bring the "blue sky" concepts out of the labs and into our homes.

Sincerely,
Gregg Lawson
President
Upstate NY Chapter
SCTE

ATTENTION BRUMLEY PRUNK

Dear Brumley,

So! You have been bitten by the Muse. You have assembled be-cabled nursery rhymes which are not without whimsy despite their surfeit of displaced dactyls, wandering anapests, and withered rhythm. Noble Brumley—long life and minimum outages to you and yours.

And yet cable poetry should express more than fables. More meat, flesh on poetic bones. Such as:

Tall Tale from the Back Country

While searching for bad RF leaks
On early vintage cable,
A system tech checked feeder lines
As well as he was able.
A puzzled frown did crease his brow—
He found a thing incredible
Holes at six-foot spacings gaped
(As if the plant were edible).
Some educated rodents had
Gnawed through sheath and poly
At half-wave intervals precise
For channel five by golly!
Yours in literary delirium,
D.B. Frudd

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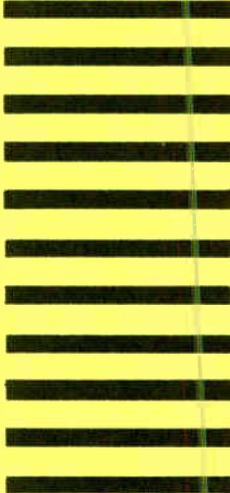
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