September/October '73 vol. 9/ no. 3

CABLECASTING
Cable TV Engineering

SCTE
The official journal of the
SOCIETY OF CABLE TELEVISION ENGINEERS

Highlights of the
NCTA TECHNICAL EYE OPENER SESSIONS
Sponsored by the SCTE

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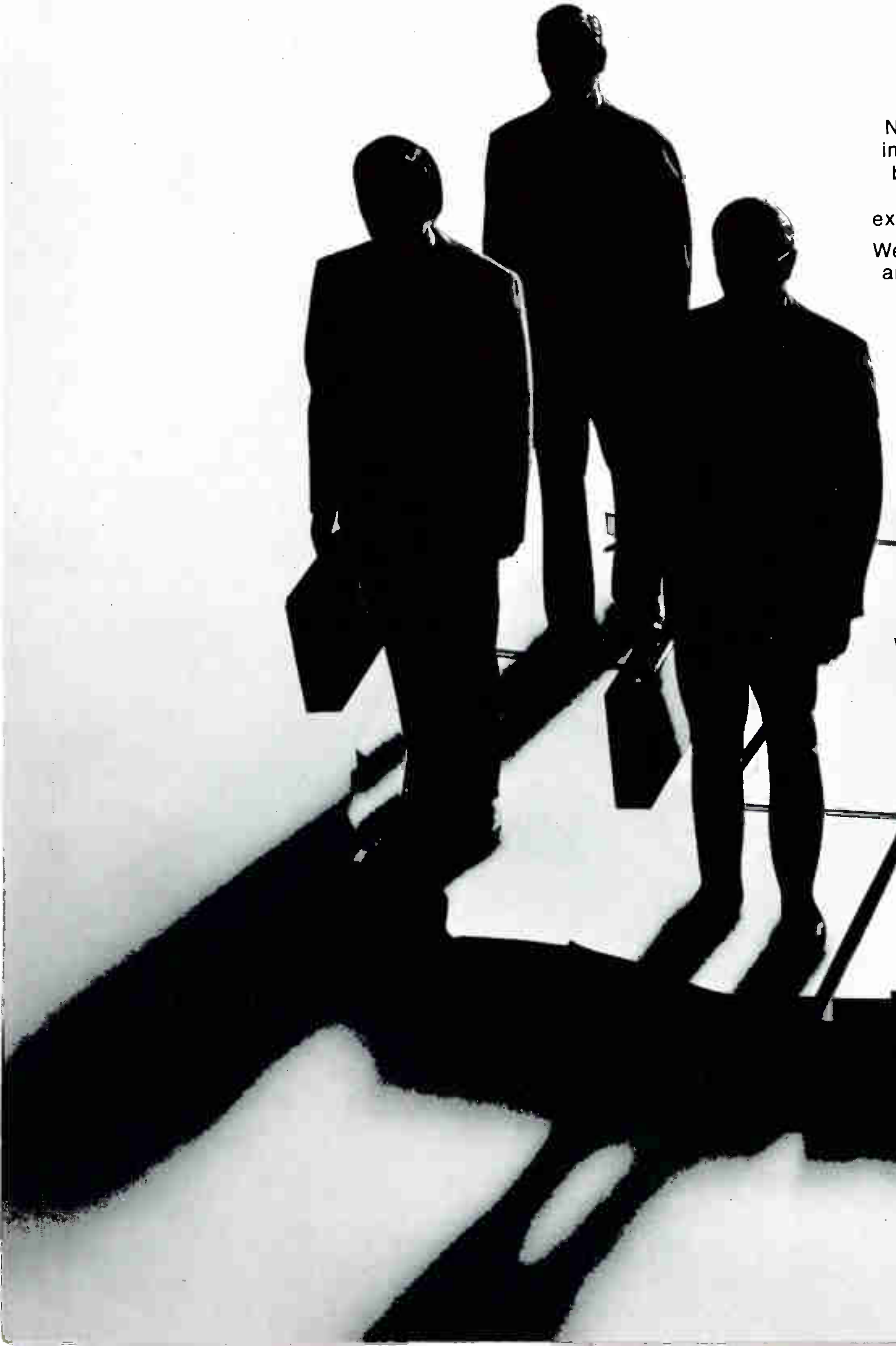

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Contents

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PEOPLE IN THE NEWS

WILLIAM HSIAO has joined the NCTA staff as assistant director of engineering. Mr. Hsiao was advanced research and development engineer for CATV operations for the Electronic Components Group of GTE Sylvania in Seneca Falls, N.Y. Before that, he was a senior electronic engineer and a group leader with Entron, Inc.

Mr. Hsiao holds a B.S.E.E. degree from Catholic U. in Washington, DC, and has completed the Master of E.E. course at that school.

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ALAIN ONESTO has been appointed program director of "CV7," the local origination operation of Empire Cable T.V. Co. in Binghamton, N.Y. Prior to joining Empire Cable, Mr. Onesto was with Penn State Closed Circuit Television Institute.

• • •

CARMINE D'ELIO is now director of operations of Gridtronics, Inc., a subsidary of Warner Cable Corp. Mr. D'Elio was chief engineer for Warner Cable and before that, manager of cable television engineering for the General Electric Co.

• • •

DR. THOMAS M. STRAUS has been appointed senior scientist for Theta-Com of California. Dr. Straus has been with Hughes Aircraft Co., parent company of Theta-Com, since 1959 and was program manager at Hughes in the development of AML microwave equipment.

• • •

EARL AKE, who was manager of Cox's The Dalles cable TV system in Oregon, has been transferred to the Atlanta headquarters of Cox Cable Communications. He will join the corporate engineering staff in that location.

• • •

WILLARD S. TRUCKENMILLER has been named to the new post of customer service manager for C-COR Electronics, Inc. He has been with the firm for eight years in production testing, product development and field engineering.

• • •

J. ROBERT BIRD, who was chief staff engineer of Cypress Communications Corp., is now vice president-engineering of Cable Media Corp. At one time, Mr. Bird was regional manager for Cablecom in California and manager of that company's Colorado Springs system.

Highlights of the
NCTA TECHNICAL EYE OPENER SESSIONS
Sponsored by the SCTE

The Society of Cable Television Engineers sponsored three well-attended early morning sessions, at the annual NCTA convention in June, which focused on technical subjects of great current interest. These topics were:

Stand By Power—What Price Reliability?, The Relationship Between Federal/State/ Municipal Control in Technical Standards, and the Elusive Subscriber Terminal—How Much and When?

The national organizer for the sessions was Robert Bilodeau of Suburban Cablevision in East Orange, N.J. Mr. Bilodeau is also the President of the SCTE and served as reporter for the sessions. Herewith are synopses of these sessions, including the question and answer periods.

Stand By Power — What Price Reliability?

Moderated by Loyal C. Park
T-V Transmission Inc, Lincoln, Neb.

Panelists:

A. Robert LeServe
Interstate Telephone & Electronics, Dallas

Robert Schultz
Glentronics, Glendora, Calif.

Selig Lenefsky
Coral Communications, Hoboken, N.J.

Robert Cowart
Gill Cable Inc., San Jose, Calif.

E. Harold Munn, Coldwater, Mich.

The session convened with a statement by chairman Loyal Park comparing the traditional cable situations with their emerging large system requirements to a need for greater emphasis on system reliability and specifically stand-by power. Following introductions, panelist R. Cowart, representing the operators' viewpoint, delivered a paper* that focused on the gap between available solutions (hardware) and the operators' real needs. Drawing from his extensive use of stand-by power units in San Jose, Mr. Cowart cited experiences with battery incompatibility, local power failure patterns, subscriber attrition caused by outages and system design considerations of cost, layout and powering techniques. In addition, he described the pros and cons of switching vs. floating systems and the elapsed time switching interval as it relates to amplifier output levels, data carriage and switching circuits. Improvements in SCR switching and power handling capacity were noted. All new stand-by units in San Jose feature SCR switching.

Mr. Cowart concluded his remarks with an excellent statement on battery types, chargers and their relationship to battery characteristics, trade offs vs. costs per volt amp/hour and a formula for selecting the right battery for each system's anticipated back-up requirements. An evaluation of data for the San Jose dual cable system yielded a 3600 VAH output requirement. This number was derived from:

1. An average 28 minute power outage duration.
2. The desire to protect for 1½ hours.

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*Reprinted in the July/August, 1973 issue of "Cablecasting—Cable TV Engineering"

3. A 60v cable powering voltage.
4. Power supply ampere ratings.
5. 60% inverter efficiencies.
6. Customary safety factors.

This system would provide back-up for 95% of power outages and has a life expectancy of 10-20 years. Outages of greater duration than design would be covered by utilization of gasoline-driven generators.

Selig Lenefsky described Coral's unique approach to reliability improvement. This twofold solution features redundant trunk modules and DC power packs with external battery back-up *per trunk location.* He emphasized that utilizing lower cost *DC systems* more frequently without inverter mechanics could have some engineering and economic advantages over the AC back-up technique. The Coral battery units are continuously recharged with a built in system energized from the normal cable AC. By choice this scheme provides trunk back-up—not associated distribution. At a cost of $100 per trunk location cost comparisons can be made with the AC system when related to system design, i.e. amplifiers per power supply.

A lively question and answer period revealed a substantial interest in this subject. Selected condensed versions of questions and their replies are listed:

Q. Mr. Munn: How does the operator of systems smaller and less densely populated than San Jose determine the value of and extent of stand-by power?
A. Mr. Cowart: Operators must determine their own requirements tailored to their system design and market strategy.
Q. During a power loss situation, does the AC side disconnect from local power and what visible indication to power company personnel appears?
A. Mr. Shultz: This did arise as a problem and the manufacturers unit was then equipped with a large relay physically observable as to switch position.
Q. What considerations must be given to the matching of charger voltages to battery voltages for optimum charge conditions?
A. Mr. Cowart: The operator must be sure that the charger used does not void the warranty of the battery due to incompatibility, etc.
Q. Is anyone considering a return to all DC powering?
A. Mr. Shultz: Yes, research is under way; reality some 5 years away. Dissimilar metals is a major problem.
Q. Mr. Hale: What about brown outs up to 15% instead of complete loss of power?
A. LeServe: What point to switch at and not lose useful power is a difficult decision. Light hum might be better than stand-by battery drain. Power companies could have severe problems at 15% with its own system and customer appliances. Brown outs don't usually exceed 8%. Power phase staggering can be used to minimize hum.
Q. Mr. Braun: How does the operator detect the status of stand-by power?
A. Mr. Shultz: Potentially with the use of two-way return capability, several manufacturers provide this capability via encode/decode technique.
Q. How generally do computer manufacturers protect against incoming transients and could these techniques be used for studio and amplifier protection.
A. Mr. LeServe: Via floating systems using battery stand-by, which provides the back-up *and isolation* from power company transients. Computer systems typically convert back to AC for general powering.
Q. Are flush mount (below ground level) stand-by units available?
A. Mr. Shultz: Not yet. Pedestal mounts are available.

The Relationship Between Federal / State / Municipal Control in Technical Standards

Moderated by Joe E. Hale
Cable Dynamics, Burlingame, Calif.

Panelists:
Sydney Lines
FCC, Washington, D.C.

Delmer C. Ports
NCTA, Washington, D.C.

Vic Nicholson
Cable Television Information Center, Washington, D.C.

Michelle Rosen
Cable TV Office, Newark, N.J.

Moderator/Organizer Joe Hale set the stage for this controversial issue with an analogy that dramatized the irreversible nature of government regulation. Vic Nicholson, on behalf of the municipal interest in the subject, advocated and encouraged the dualism between municipal authority and the Federal Communications Commission with regard to jurisdiction-to the exclusion of the state. Further the Center disagrees with the NCTA position that a single authority (FCC) can set up and administer standards that can universally apply to both the rural and urban situations. The Center recommends that local authorities accept or expand upon established FCC guidelines to adapt to their local requirements. The example of tighter standards specified by consultants and manufacturers alike in the urban markets supports this argument Mr. Nicholson contends. He singled out carrier-to-noise and intermodulation as two technical areas of genuine concern for local authorities plus the need for additional standards (not yet defined by the FCC) for echoes, color quality, etc. Citing anticipated delays of several years by the FCC to adequately provide all applicable standards Mr. Nicholson recommended that municipalities should step in and fill this void. Such factors as quality of construction, safety and component selection for the environment may be a matter of genuine concern for local authorities also, he said.

Mr. Sidney Lines next described the genesis of the technical standards and the role that the FCC intends to play to fulfill its obligations to the public. Mr. Lines pinpointed the opening of the doors to state and local regulation by quoting from an FCC statement issued in early 1972. "We see no reason why franchising authorities may not now require more stringent technical standards than in our rules." In retrospect Mr. Lines felt this an incredible naive position. The FCC is presently disturbed, he felt, by the expansive use of this implied license that local and state authorities have aimlessly assumed without a complete understanding of the delicate balance between cable economics and cable technology. Furthermore he suggested there is no evidence put forth of the expertise necessary to generate and enforce technical standards. On the other hand, the FCC is preceding as promised drawing from competent technical advice via the Technical Advisory Committee and will revise and augment its technical standards as requirements indicate.

Mrs. Michelle Rosen, representing the State of New Jersey CATV Cable Office, described the role of New Jersey in the development of standards. Opting to the state's rights posture, Mrs. Rosen said that states could expand on a set of federal standards as they saw fit if they acted in the public interest and such extensions were deemed economically and practically feasible. In her opinion the federal role would then be limited to the setting of *minimum* performance standards aimed at facilitating national interconnection capability. New Jersey's present standards she said are skeletal by nature and will be expanded with inputs from a task force to be set up within the state. She described in detail New Jersey's definition of public interest specifically as it differed from some popular definitions. "Public interest is not synonomous with strict standards . . . It is not a consumer item at minimum prices . . . It is not a CATV company's be damned credo . . . It does imply the existence of no special interest toward favored groups and must consider the financial character of CATV operators . . . By pursuing this definition the cable office of New Jersey is not structured merely to demonstrate its ability to promulgate rules." The advantages of *local awareness* and subscriber access, she felt, favored the State vis-a-vis the Federal government as the primary regulatory body pointing out that present New Jersey State law *limits* the role of the municipalities in the area of technical standards. Mrs. Rosen summarized the position of the New Jersey cable office as one which is coincident with FCC comments and the direction of the Federal/State Advisory Committee.

Delmer Ports stated the position of the NCTA which is one often stated by operators concerned with regulation. The optimum situation, he felt, was one that compares the best possible performance consistent with the public interest and economic viability. "How to arrive at that point is the real issue." Mr. Ports differentiated between the broadcaster (who functions to serve his customer, the advertiser), and the CATV operator (who functions to serve his customer, the viewer). This distinction, in his opinion, places more directly the onus of *quality-of-service* on the cable operators back, and uniquely preempts the need for strict standards. Citing the four variables of public interest, competition in the market place, the economics of viability and state-of-the-art, Mr. Ports suggested that control of any one individual element will not suffice—that proper control and balance of all four must logically take place at a *national* level instead of piece meal fragmentation on a town-by-town basis.

A variety of other opinions were then put forth from the floor during a question and answer period. Hub Schlafly (TPT) brought the definition of "minimum standards" into focus by stating that the FCC minimum standards are not those for the norm of the system but for the extremities and that the majority of subscribers would logically receive higher quality than the standards imply. He also expanded on the quantitative and qualitative make up of C-TAC and its obvious ability to perform as charged.

Bob Bilodeau queried aloud the noble purpose of regulation and cited examples of its absence in areas of broadcasting, manufacturing, etc. that also confront the "public interest." Citing the lack of performance by non-CATV interests to adequately serve the viewer or "public interest" on a substantial scale throughout the country he pointed out that regulation should have approached *these* "public interest" problems. To support this argument he noted widespread co-channel interference and powerline interference that the viewer has no control over and more importantly no recourse—except to the FCC.

Warren Braun spoke of the voluntary co-operation that should exist between the successful franchisee and its community and the right of self determination over minimal standards that should belong to the cable operator. At the same time he punctuated the obligation of the community to become involved in whatever regulatory scheme develops.

Ken Simons described the difference between a simple regulatory situation of a clear cut situation like a power company vis-a-vis the CATV situation which is extremely difficult even for the most qualified persons attempting to do so.

Bo Lessa of Video Cable cited the inability of the typical home receiver to deliver cable TV product and was quickly rebuted by Ed Chalmers of Zenith Radio.

Sruki Switzer (Canada) described possible situation based on statistical delivery of service and measurement techniques that would lead one to conclude that at best a *percentage reliability* is the ultimate situation and that this compared to the generally poor condition of home TV sets is perhaps out of perspective.

Sid Lines responded that the FCC standards in the U.S. were *not* based on a *statistical* approach but were incumbent upon *every* outlet. He confessed to an inability on the part of the FCC at present to effectively enforce its own and additional future standards.

Delmer Ports suggested that local regulatory agencies can play a very useful role in assisting smaller systems that lack internal capability to meet the present FCC standards and provide better service. Joe Hale closed the session with a reminder that it is quite important to understand just *who* is wielding the instrument of regulation and what force motivates their action.

The Elusive Subscriber Terminal —How Much and When?

Moderated by Steven Dourdoufis
Vision Cable, Ft. Lee, N.J.

Panelists:
Caywood Cooley

Jerry Crusan
Television Communications, Pennsauken, N.J.

Mike Paolini
St. Petersburg Communications, St. Petersburg, Fla.

Pat Nettles
Scientific-Atlanta, Atlanta, Ga.

Abe Reiter
Athena Communications, N.Y., N.Y.

John Sie
Jerrold Electronics, Horsham, Pa.

Gene Walding
Oak Electro/Netics Corp., Crystal Lake, Ill.

Jerry Crusan set the stage with a chicken and egg analogy to the arrival and definition of software vs. hardware for the complete home terminal picture. The decision to purchase any specific hardware should be evaluated in terms of the overall capability of the supplier to maintain back-up at the same time keeping the cost factor in perspective, he said. Some of the key features to look for are "human engineering, reliability, availability, electrical performance, and field adjustment ease."

Dr. Pat Nettles directed his question to the market place—"Just really what terminal do you want?" Confronted with abundant technology the question he felt appeared to be one of marketing. He added the additional considerations for terminal hardware selection of *actual* two-way systems capability and output compatability of the device.

Caywood Cooley spoke of the absence of demonstrated services upon which to build the two-way network, citing pay movies as the vehicle upon whose back the other services would have to be ushered in.

Abe Reiter illustrated the difference between the economic model for home terminals and the basic CATV system from the standpoint of its industry and user alike to strive for standardization of reverse and forward channel assignments, bandwith, etc. Divergent energies, he felt, diluted the overall effort of inexpensive hardware.

Mike Paolini stated his position as one which places the operator dependent upon the development of a *business* around each phase of hardware—that in the absence of a specific use the hardware could not or would not be developed. He felt it was incumbent upon the manufacturer to develop hardware in such a manner as to accommodate each incremental requirement as it became viable. Dr. Nettles supported this approach more specifically by replying that pay TV would of itself be able to carry the freight for the initial terminal investment that could provide the basic building block up front with smaller proportional costs required of the add-ons.

Dr. Sie brought the title of the program back into focus by demonstrating and describing the hardware that his company had developed assuming the role of the chicken and not the egg. Extrapolating the concept of the home terminal through its potentially ultimate configurations reveals not only video services but places a minicomputer in the hands of the subscriber, he explained. He described how with the use of MOS/LSI techniques his company was able to bring the price and size of this terminal within a reasonable range. The design objective he stated were four in number—to preclude rapid obsolescence, provide flexibility of service, insure reliability of operation, and maintain low cost. The most reasonable approach to the fourth is through the use of LSI with its inherent cost and size reduction. Dr. Sie pointed out that no application in the computer field required one terminal to talk to many, many thousands of others but suggested that this type of problem had been resolved at a lower numerical level.

Gene Walding described a more immediately available kind of (addressable one-way) terminal that in his opinion is needed now to deliver software that is available now. In Mr. Walding's opinion the three most important design features of his terminal are a high degree of security, head-end control and minimum degradation due to signaling. While he recognized the ultimate development of the full interactive terminal he emphasized that the quantum leap in that direction was not justifiable at this time.

A question and answer period ensued. Paul Kagen asked the panel to describe what hardware was available for *purchase* considering the almost nonexistent two-way market conditions. Several panel members responded by describing their "available" one-way scramble, de-scramble addressable hardware. Mike Paolini estimated about 40,000 single channel converters and 5,000 one-way addressable devices were in actual use. An attempt to buy anything more sophisticated would meet with failure, he felt. Responding to a question on standardization of scrambling techniques, Paolini stated there were at least five to his knowledge with no cross-reference to each other and none in sight.

Dr. Sie injected a personal opinion with regard to the ultimate viability of two-way services. His belief is that merchandising in its various forms is going to be the significant revenue generating feature of the two-way cable system of the future. A second and very interesting aspect of the two-way interactive system is in the field of education, he said.

One Q/A exchange described the capability limitations on telephone lines as an upstream input vehicle resulting in a concensus that ultimately wideband CATV type networks would provide the upstream growth requirements.

The soft security aspects of some of the one-way pay schemes was illuminated by discussions vis-a-vis multichannel converters and recent availability of 24, 25 channel TV sets (RCA, Magnavox). The conclusion, assuming the proliferation of these multichannel devices, would be a more expensive delivery system.

Crosstalk and

By Henry B. Marron
Jerrold Electronics, Horsham, Pa.

This paper will examine the problems of crosstalk and isolation in dual cable two-way systems. The major question I will attempt to answer is: What kinds of crosstalk can occur in a dual cable two-way system, and what isolations are needed to ensure that such crosstalk causes no degradation to the quality of signals passing through the system?

In this context, crosstalk is defined as any unwanted energy falling in either system from the other. There is a distinct difference between crosstalk from the outgoing system into the return system and crosstalk from the return system into the outgoing system, which I will examine in detail later.

Figure 1 shows a dual cable system with one-way performance on the trunk of cable "A" and two-way performance on the feeders of cable "A" with crossover for the return signals on those feeders to the two-way "B" cable electronics. The objective of the transmission system is to send signals down cable "A" to the home, and to return signals from the home subscriber back to the head end via two-way performance on the "A" cable feeders with crossover to the "B" cable at trunk locations. You will notice the extra bandwidth on the "B" cable return and the bandwidth available on the "B" cable outgoing. These bandwidths can be used for special kinds of subscribers.

Assume now that the electronics above the line across figure 1 is in housing no. 1 and that below the line is in housing no. 2. The only form of crosstalk which can occur in this case is via the electronic connection from housing no. 1 to housing no. 2. The cable should have very good isolation so that signals from cable "A" should not be able to get into cable "B" via that path. The housings also should have good isolation which prevents signals from cable "A" getting into cable "B". The only path left is that connection from housing 1 to housing 2 and possibly power supplies, if they are used to feed both cables simultaneously.

Now, consider all the other products to be contained in one housing. There are economic advantages in this mode of operation. For example, a

Isolation Requirements In Dual Trunk Systems

single power supply may be used instead of two. One housing instead of two. One connector chassis instead of two. The module and electronics count remains the same. What crosswalks can occur in this single housing?

You will notice that there are common frequency bands used on the different cables. For example, 174-300 mHz is used on both cable "A" and cable "B", shown going in the same direction in the diagram. The frequency band 54-108 mHz is common to the "A" cable downstream and the "B" cable upstream. Obviously, if energy from either system falls in the other in these common frequency bands, interference can be caused. This is undesirable and must be guarded against. The question is, What isolation is needed in order to give satisfactory performance?

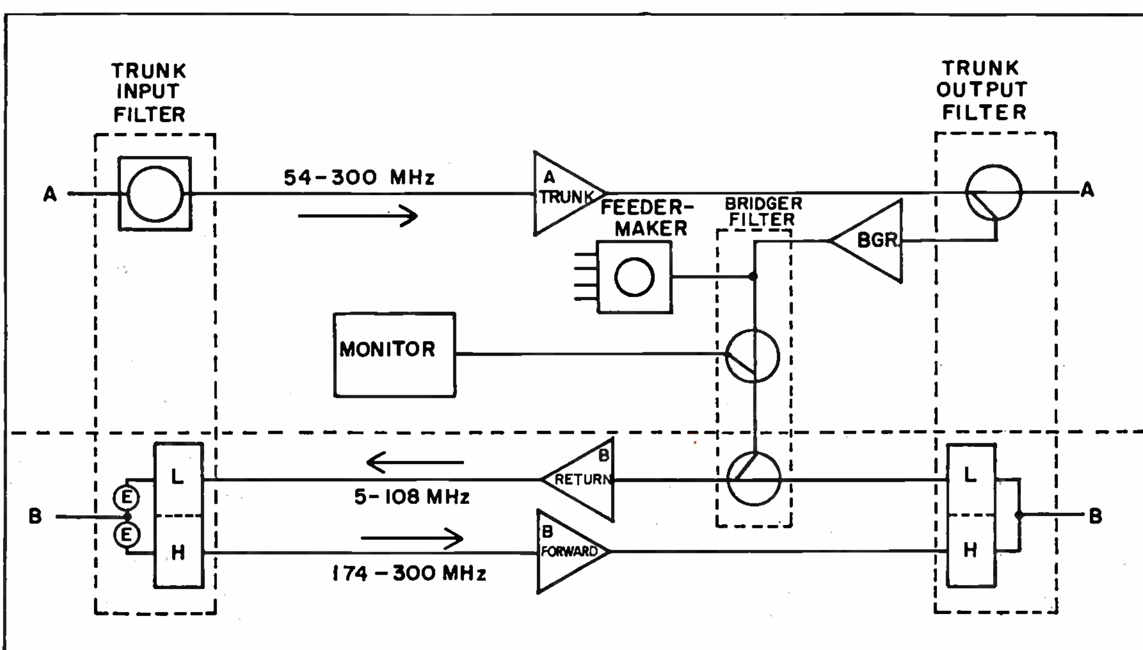
Another form of crosstalk which can occur in the system is crosstalk due to distortion products from either direction falling into the frequency band of the other direction and leaking into that other direction. It will be shown later that if the system uses high quality CATV amplifiers operated within the specified limits, this form of crosstalk is negligible. Incidentally, this form of crosstalk occurs in both single housing and dual cable systems.

Let us now consider common frequency crosstalk.

Outgoing to outgoing—that is, "A" cable outgoing crosstalking into "B" cable outgoing, or "B" cable outgoing crosstalking into "A" cable outgoing. The range of frequencies in which this can occur is from 174 mHz to 300.

Consider a signal starting at the head end going down the "A" cable to the subscriber, and assume a cascade of 30 amplifiers. If energy from the "B" cable appears in the "A" cable at each station, it will occur on 30 different occasions. The question is, How will the increments of energy from each station add? If all stations are uniform in the phase and amplitude of the crosstalk, the power should add on a voltage basis. However, the transmission time is different on cable "A" and cable "B" due to the high/low split filters used on the "B" cable. This time difference will tend to dis-

Fig. 1.



perse the voltage addition, but for the purposes of this paper, voltage addition will be assumed in order to define an isolation limit which should be achieved for good performance.

The appearance of the interference we are discussing should be that of co-channel interference. Let us set a target of greater than 60 dB signal-to-interference ratio for the system. This measurement is made by terminating the input of cable "A" and observing the output of the station of cable "A". A signal is then injected at the correct level into the cable "B" input and the cable "B" output is terminated. The station, of course, is set to nominal gains such as would be used in a typical system. Cable "B" interference due to cable "A" is exactly the same as that just discussed, and requires the same isolation number.

Cable "B" return crosstalking into Cable "A" outgoing in the band 54-108 mHz. The worst case for this kind of interference is where a signal is injected in cable "B" at a system extremity and flows back to the headend with crosstalk at each intervening station.

In the 30 amplifier cascade system, the maximum number of stations which can be affected in this way is 30 in cascade. However, the addition of this kind of distortion is different from the previous example. There is significant time delay between stations in the system, and the signal which is causing the interference is flowing in the opposite direction to that which is being interfered with.

Assume that channel 2 is injected at the system extremely on cable "B" and is observed at the same extremity on cable "A". Assume also that there is about 1 microsecond time of transmission between stations so that the "B" signal takes 30 microseconds to get to the headend and the "A" signal takes 30 microseconds to get to the extremity from the headend.

Consider now the channel 2 signal leaving the headend. At station 1 it will pick up some crosstalk which originated 29 microseconds before at the system extremity. At station 2 it will pick up crosstalk which originated 28 microseconds before at the extremity, and so on down the system. If, now, channel 2 on the "B" system is, say, a video signal, with changing information, each of these increments of crosstalk will contain different information. They will, therefore, tend to add more like power than voltage. Furthermore, the visible effect of such interference will tend to be more like noise than co-channel interference. If, however, the signal injected into the "B" cable is a CW signal, the interference will tend to add more like voltage, and its effect will be that of a beat.

Setting a desirable limit of better than 60 dB for signal-to-beat ratio, the isolation required between the "B" cable return and the "A" cable outgoing is set at 90 dB for a 30 amplifier cascade.

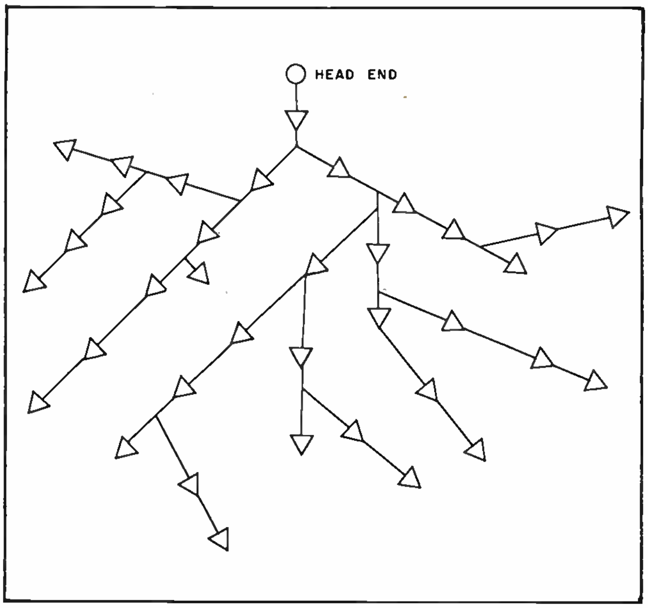


Fig. 2. "Tree" type distribution system.

"A" outgoing to "B" return. Assume a 30 amplifier cascaded system. In round figures, such a system would contain approximately 300 stations spread out in the tree fashion shown in figure 2. Consider energy in the 54-108 mHz range flowing out from the head end of the "A" cable. Assume crosstalk occurs. It will occur in each and every one of the 300 stations in that system. This energy flowing in cable "B" will return to the headend. Assuming that the system has unity gain in both directions and that the crosstalk is uniform from station to station, at the headend there will appear, due to the "A" cable signals, 300 samples of crosstalk information. These samples, we will assume, will be uniform in level but will have originated at different times in the system. What is the subjective effect of a distortion of this type, and what is the signal-to-interference ratio required for satisfactory performance?

It was theorized that there would be a difference in subjective effect depending on whether the "A" and "B" channel frequencies were exactly the same as in a phase lock situation, or were different by some few kc's as in the more normal type of situation. It was thought that, in the phase lock situation, the subjective appearance would be of a multiplicity of ghosts due to the time delays involved in the round trip for the "A" signal interfering with the "B". In the case of the non-phase lock situation, it was thought that the subjective effect would be more like a beat effect.

In order to check out these two theories, a system was set up in which 52 separate echoes could be superimposed upon a video picture and subjective judgments made. The results of the subjective testing were as follows:

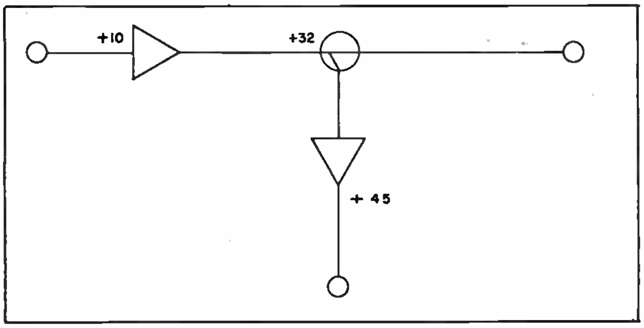


Fig. 3. One way trunk station.

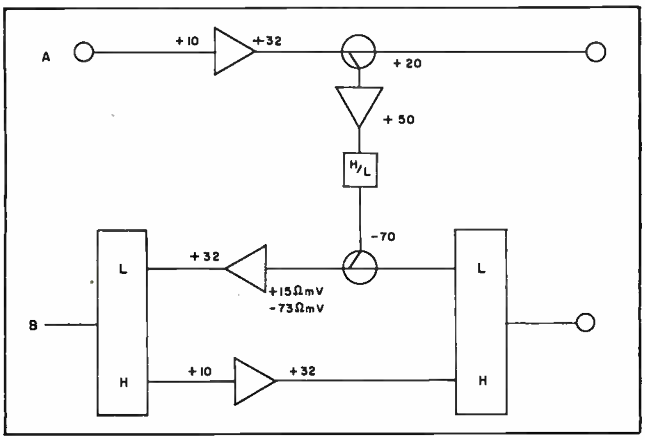


Fig. 4. Level diagram.

In the phase lock case, the subjective effect was indeed one of multiple ghosts. Measurements were made of levels for barely perceptible interference. These measurements showed a much greater tolerance to the interference than in the non-phase lock case.

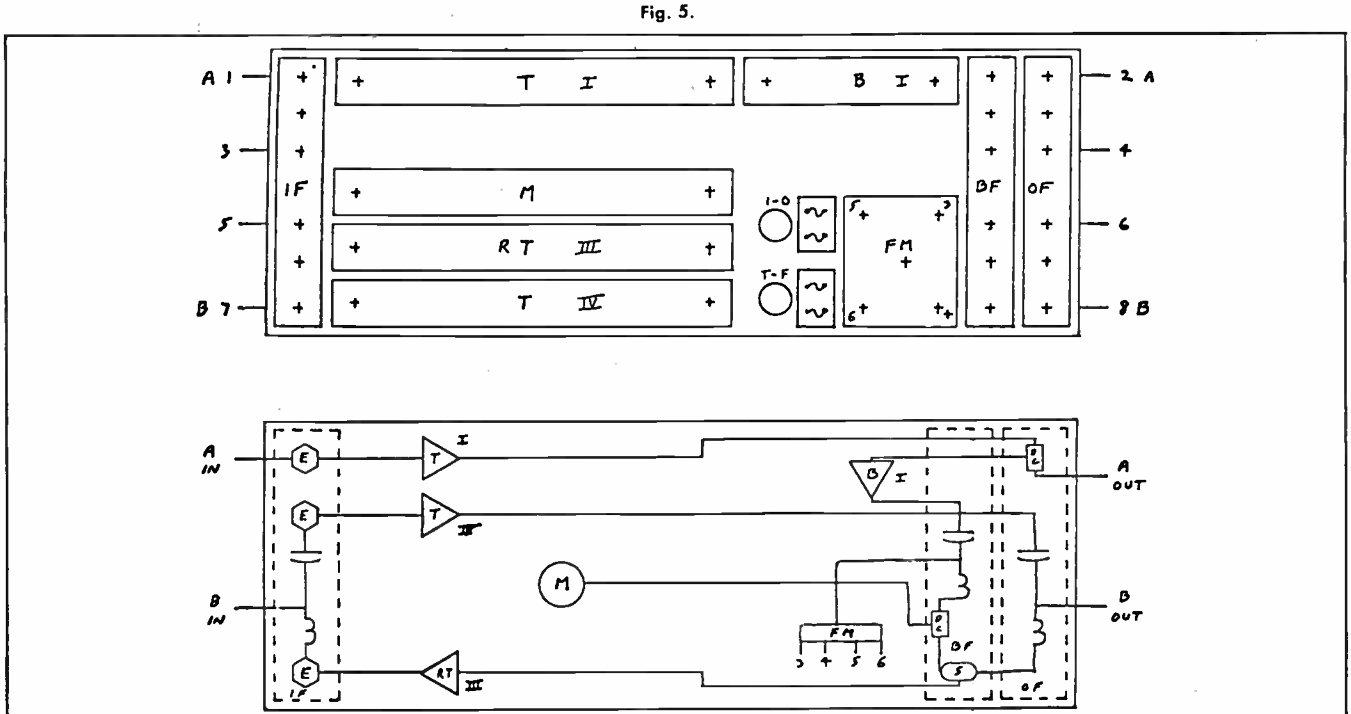
In the non-phase lock case the interference effect was indeed a beat effect and was dependent on the difference in frequency between the two television carriers.

Measurements were made of barely perceptible interference at that frequency which gave the worst case results. In round figures, the phase lock system was 20 dB more tolerant of crosstalk than the non-phase lock system. The isolation required for the non-phase lock case was 80 dB for 50 interfering sources. That is, at each station the interference was 80 dB below the desired signal. Furthermore, tests also showed that the addition was on a 3 dB per double basis; that is, when 25 of the interfering sources were removed, the ratio needed was now 77 dB below the desired signal so that for 300 stations, the ratio would be 80 dB + 10 log $\frac{300}{50}$, that is, 88 dB. This ratio can be measured by injecting a signal into the "A" cable input at such a level that the bridger is operating at system level and measuring the output in the 54-108 mHz band of the "B" cable return amplifier, and referencing this to the nominal output level of the desired signal at that station.

To summarize, then, the isolations required on a per station basis for the three cases are "A" cable to "B" cable outgoing, 90 dB; "B" cable outgoing to "A" cable outgoing, 90 dB; "A" cable to "B" cable return, 88 dB, for a maximum cascade of 30 amplifiers with a total of 300 amplifiers in the system. It is instructive to compare these isolations with the kind of isolation required in a one-way system.

In figure 3 the station is shown consisting of the trunk amplifier feeding a bridger with one feeder being driven. The levels are as shown on

Fig. 5.



the diagram. The output level of the bridger is set at +45, the input level of the trunk amplifier is set at +10 dBmV.

What isolation is required between the trunk output and bridger output in order to obtain satisfactory frequency response performance? If the isolation were 80 dB between trunk in and bridger out, the station would have a total loop gain of −45 dB. This could give a frequency response ripple of .05 decibels. This would add to .5 dB in ten stations, and would probably be very hard to spot in a single station measurement of gain vs. frequency. In contrast, the isolations required for dual cable operation in a single housing are at a ninety dB level except for the bridger filter which has to have isolation of 124 dB to allow for the effect of the high output level from the bridger vs. the low input of the return amplifier.

Figure 4 shows the levels in the two-way station and the required interference level in dBmV in order to meet the 88 dB ratio previously specified. It can be seen that the rejection of 54-108 mHz information which is accomplished in the bridger filter needs to be 124 dB or greater.

Are these isolations feasible in a single housing?

They are definitely realizable using good engineering practice. Figure 5 shows one realization of a dual trunk single feeder system contained in one housing. The module arrangement is outgoing trunk and bridger at the top of the housing with the return amplifiers in the bottom left hand corner. The input filter is vertically on the left, the output filter is vertically at the far right with the bridger filter next to it on the left. The housing has eight ports for dual cable operation and the ability to feed four feeders from the one housing.

In order to obtain the isolations discussed, the philosophy used was to make each module a very well shielded enclosure, to maintain coaxiality and integrity of ground throughout the housing, to use very careful routing of signal cables in the connector chassis keeping high level cables as far away as possible from low level cables.

One other aspect should be mentioned. Great care was taken in power supply decoupling to prevent any kind of crosstalk between modules via the power supply. All the precautions taken to ensure isolation were aimed at not only obtaining the correct isolation with comfortable margins, but also making the isolation obtained independent of whether the housing was open or closed. In fact, the isolations obtained are independent of whether the housing is closed or not, and the modules are so tight that signal ingress with the housing open is of extremely low level.

There is a subtle bonus for this kind of construction. During the operation of a two-way system,

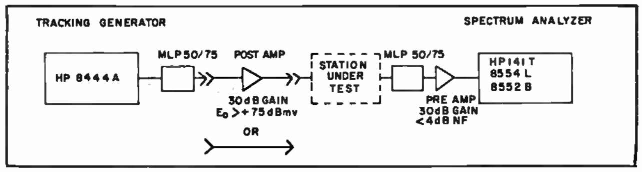


Fig. 6. Isolation test system.

whenever a housing is opened to perform maintenance or adjustment, there is a possibility of ingress. Where careful attention has been paid to module isolation, for example, in order to meet the specifications outlined previously, the ingress is greatly reduced to almost unmeasurable levels with the housing open.

Measurements have been made on this type of station using the test equipment shown in figure 6. The test equipment as shown is capable of a system floor better than 150 dB which makes measurements of 130 dB down quite accurate. Figure 7 shows the system gain flatness and system floor for the test equipment.

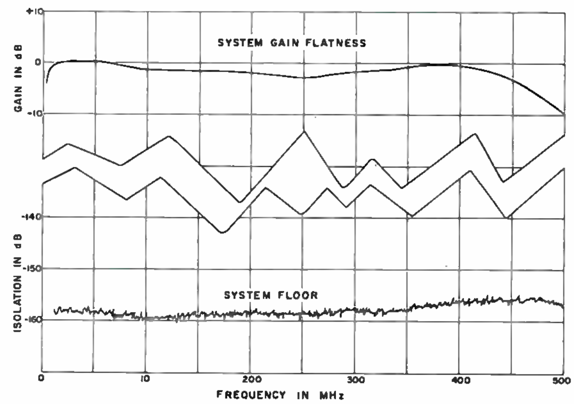


Fig. 7. Test system response and isolation.

Figure 8 is a plot of the common frequency crosstalk, outgoing to outgoing, "A" cable into the "B" cable. The specification per station for this should be 90 dB, as discussed previously, and it will be seen in figure 8 that this is met with margin up to and indeed above 300 mHz. The very noticeable fall-off below 150 mHz is due to the high/low mid-split filter in the station.

Figure 9 shows the isolation obtained for common frequency crosstalk, outgoing to outgoing, "B" cable to "A" cable. Again, you will notice, the 90 dB specification is comfortably met over the whole frequency of interest.

Figure 10 shows the common frequency crosstalk "A" outgoing to "B" return. The band of interest is from 54 to 108 mHz and the specification set previously was 88 dB. This is comfortably met over the range 50 to 130 mHz, and then is exceeded. Again, this rapid drop above 130 mHz is due to the mid-split high/low filters.

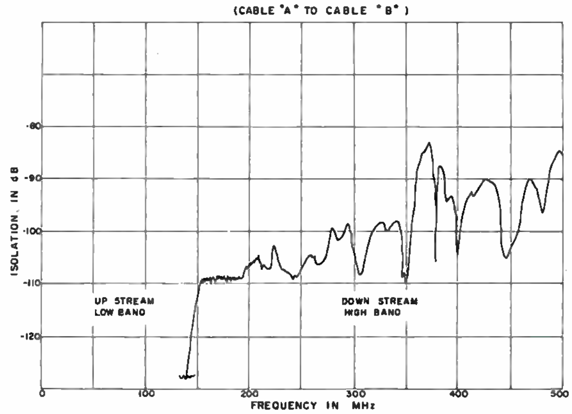


Fig. 8. Mid-split station output isolation.

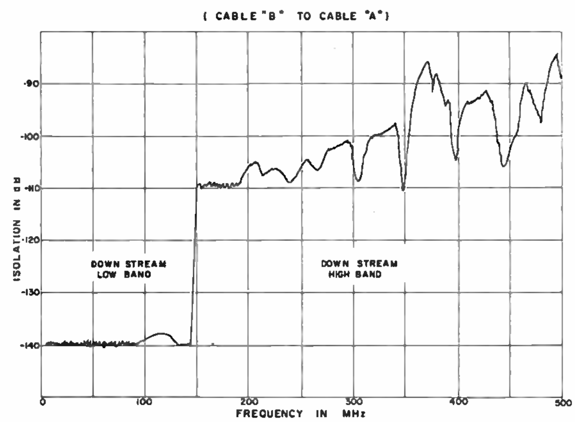


Fig. 9. Mid-split station output isolation.

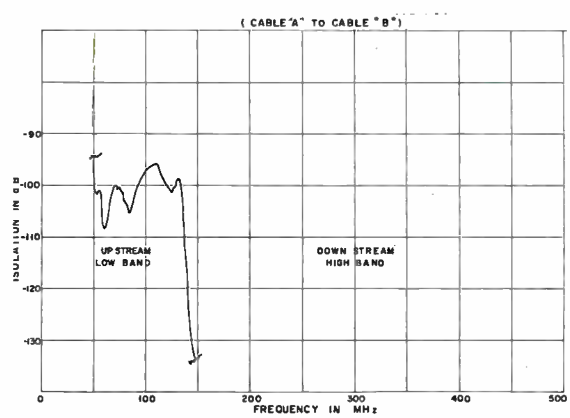


Fig. 10. Mid-split station input isolation.

The cable "B" return crosstalking into cable "A" outgoing in the band 54-108 is not shown, but is of the same order of magnitude, that is 110 dB or better across the band.

Crosstalk due to distortion

Figure 11 is a block diagram of a dual cable two-way system with crosstalk. The output levels of all trunk amps are set at +32 dBmV. The input level to the return trunk is set at +15 dBmV and the output of the bridger amplifier is set at +50 dBmV per channel. The performance of the bridger amplifier gives second and third order products down 75 dB at +50 dBmV per channel output level. Let us assume that the trunk amplifiers perform in the same manner, whether they be "A" or "B" cable trunks.

The worst case distortion producer is, of course, the bridger since this has by far the highest level. The number below the output level in the bridger's case is −25 dBmV and represents second or third order distortion products level at that point. The ones of interest as far as the return direction are concerned lie in the range 5-30 mHz and 54-108 mHz. In the 5-30 mHz direction, the high/low split filter has 90 dB floors so that a signal input of −25 dBmV to that high/low split filter will come out of the low port 90 dB down, at a level of −115 dBmV. The 3 dB coupler places the signal at −118 dBmV at the input to the return amplifier. With a specified input level of +15 dBmV at that point, the ratio of desired signals to undesired is 133 dB for either second or third order products due to the bridger.

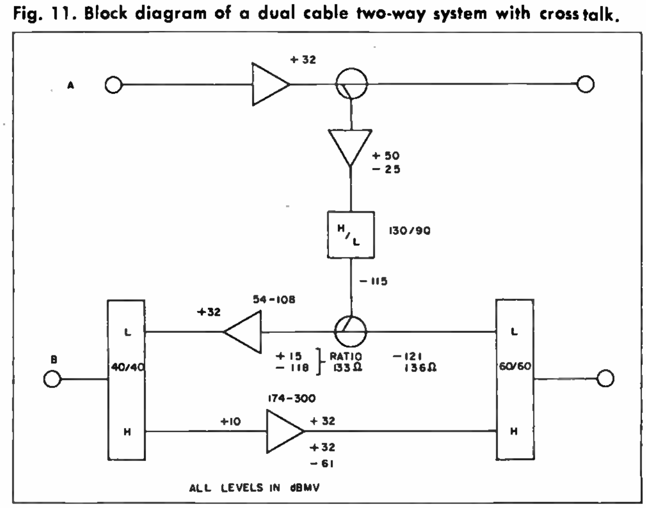
The signals in the "B" cable outgoing also produce distortion and the arithmetic there is shown in figure 11. Second order products are down −61 dBmV at the output of the "B" cable outgoing amplifier, and after passing through the high/low split filter at the output of the station are reduced a further 60 dB by the filtration action to arrive at the input of the return amplifier at −121 dBmV which is a ratio of 136 dB desired-to-undesired signal.

The distortions falling in the return direction caused by the "B" outgoing system will add on a total number of amplifier basis, that is, if there are 300 outgoing "B" amplifiers in the 300 stations there will be power addition of 300 sources of distortion. Why power addition?

Consider the distortion arriving at the headend at some instance in time TO. In our system model there will be 300 separate signals arriving at that

(Continued on page 21)

Fig. 11. Block diagram of a dual cable two-way system with cross talk.



SCTE

SOCIETY OF CABLE TELEVISION ENGINEERS

SOME THOUGHTS FROM THE PRESIDENT

Bob Bilodeau, President of the Society of Cable Television Engineers, has some thoughts about increasing the membership and services of the SCTE which he would like to share with all members.

"Towards the end of increasing the nationwide membership of the SCTE, we are proceeding to establish a Pennsylvania chapter and are lending whatever help we can in expanding the existing South Central, North Central and California chapters. In order not to limit this expansion, I suggest that we keep the membership as open-ended as it has been in the past as the *minimum* requirement. However, I would like to establish different classifications within the organization such that the more sophisticated and experienced cable TV people could be attracted. The SCTE, I feel, should be basically a pyramid-shaped organization, however we lack the membership proportionally at the top of the pyramid. If we can achieve this it will help balance the organization and lend it greater recognition from peer organizations.

"The second thought is that of insurance. I have already explored the possibilty of incorporating this membership role into the insurance programs that are used by the SBE, IEEE, and other similar groups. I need to know now whether the membership at large needs or wants this service.

"Third, I would like to poll the members on their feelings relative to the instituting of an awards program that would cover such subject areas as technical achievement and organization. In the absence of this we would continue to play our part in the NCTA technical achievements awards program, perhaps on an expanded basis."

Members who would like to express their opinions on these matters may contact Bob directly, at Suburban Cablevision (134 Evergreen Place, East Orange, N.J. 07018), or write to the SCTE at 607 Main St., Ridgefield, CT 06877.

• • •

SCTE TO PARTICIPATE AT NORTHEAST EXPO

The Society will participate in several ways at the Northeast CATV Expo scheduled for October 15-17 at the Granit 2 Hotel in Kerhonkson, N.Y.

The SCTE is sponsoring a technical session to be held on Monday, October 15th. The topic of the session is System Reliability—Its Many Forms. Chairman for this event is Charles Snider. Panelists are Jim Stillwell of TeleSystems, Hans Sandager of Siemans, Francois Martzloff of G-E, Jack Easley of G-E, and Bob Bilodeau of Suburban Cablevision. This is scheduled for 2 to 4:30 in the afternoon.

A Central Atlantic Chapter meeting will also be held on Oct. 15th, from 10 AM to noon. There will be a brief business session and then a demonstration of a cross-mod test set by Dix Hills. John Oresic will outline a CATV technical training proposal at this meeting. There will also be a report on the SCTE-sponsored seminar on programmable computers, organized by Terry Crawford, to be held on Nov. 10th in Pennsylvania.

• • •

NORTH CENTRAL CHAPTER

The North Central Chapter of the SCTE held its Fall meeting on September 21 and 22 at Howard Johnson's Motor Lodge in Madison, Wis. Twenty-three engineers participated in the two-day program, which included a display of the new subscriber interactive terminals. Also the operation of the latest in automatic sweep equipment was explained and demonstrated.

The sessions for the second day included a videotape presentation on the reliability and environmental testing of cable connectors, followed by a paper on supporting loops, in fact, two per pole, for CATV cable plant. A paper on triple beat performance, and a talk on cameras, VTRs and lenses for small studios concluded the program. The next meeting of the chapter will be held in the Spring, in Indiana. John W. Gilbert of Rochester, Ind. will be in charge of arrangements.

• • •

SOUTH CENTRAL WEST CHAPTER

The Fall meeting of the South Central West chapter will be held during the Nov. 6-8 training seminar of the Cable Communications Training School at Texas A&M University. In particular, the SCTE chapter will throw a "Finger Lickin' Chicken" dinner on the evening of Nov. 7th. For more information on this meeting, contact Charles E. Swehla, at P.O. Box 1008, San Marcos, Texas 78666.

• • •

APPLICATION FOR MEMBERSHIP

in

THE SOCIETY OF CABLE TV ENGINEERS

(Please Print, fill in completely and mail to the SCTE, 607 Main St., Ridgefield, Conn. 06877)

Date..

First Name | Middle Initial | Last Name | Date of Birth

Home Address | City | State | Zip

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Company | Date Employed

Company Address | City | State | Zip

Your Title

Description of Duties

PROFESSIONAL HISTORY

(Give Company Name and Address and Brief Description of Duties)

From	To	

EDUCATION

College or School | Date Graduated

Degree or Certificate

College or School | Date Graduated

Degree or Certificate

Other Schools

(Turn Page Please)

REFERENCES

(Three Society Members Required as References for Grade of Member)

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(Please List All Fees Enclosed)

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TOTAL ENCLOSED ....$ ____________

I agree to obide by the Constitution and Bylaws of the Society of Cable TV Engineers if admitted to membership.

Signature ______________________________

Do Not Write Below This Line

Chapter ....

Admissions Committee Action .... Date ....

Membership Grade:

- ☐ Member
- ☐ Associate Member
- ☐ Sustaining Member

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26		

(Continued from page 17)
time. These signals have been caused by the outgoing signal and show a distribution in time proportionate to the round trip time for each single source. This time delay of the order of 2 microseconds per station out from the headend will destroy any coherence of distortion. The distortion, therefore, will add on a power basis.

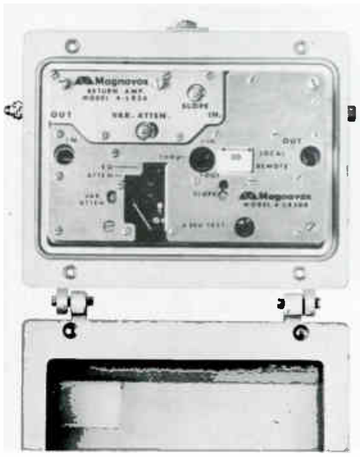
The summation factor for 300 amplifiers on a power basis is 25 dB so the figure shown on the diagram should be raised by 25 dB to give the total power observed at the headend to obtain a signal-to-interference ratio of 111 dB for distortion caused by the "B" outgoing amplifier falling in the "B" return and 108 dB for distortion caused by the "A" system bridgers falling in the return system. Distortions falling in the 54-108 mHz region caused by the "A" cable bridger will be −25 dBmV at the output of the bridger. These signals will undergo an attenuation of 130 dB through the high/low split filter to arrive at −158 dBmV at the input to the return amplifier. These are 40 dB below those distortions in the 5-30 mHz region and can be neglected for all practical purposes. The same thing applies to distortions in the 174-300 mHz region caused by the "A" cable bridger. These distortions at the same −25 dBmV at the bridger output before they are injected into the "B" cable outgoing amplifier suffer an attenuation of 170 dB minimum and would therefore appear at a level of −195 dBmV at the input to the "B" cable amplifier. Again, they can be disregarded for all practical purposes.

There remains one more distortion to be considered which is, distortion products produced by the "B" return amplifier falling in the "B" outgoing amplifier. At an output level of 12 dBmV per channel on the return amplifier, distortion products would be at that point −61 dBmV for second, −76 dBmV for third order products. These would undergo 40 dB of attenuation due to the high/low split filter and appear at the input of the "B" outgoing amplifier at −101 dBmV and −116 dBmV respectively. That is a ratio of signal-to-interference then would be 81 dB and 96 dB for second and third order products.

From the foregoing it can be seen that the crosstalk due to distortion in all amplifiers in this system is very low and can be disregarded.

NEW PRODUCTS

HIGH GAIN LINE EXTENDER



The Magnavox Company, CATV division (100 Fairgrounds Dr., Manlius, N.Y. 13104) now has available a new high-gain, output line extender. The two-way version is designated Model 4-LER, while a one-way version is the Model 4-LE. The units claim 28 dB gain with an output capability of 50 dBmV. They use dual hybrid IC's. Slope and gain controls are provided in both paths, while plug-in attenuator and equalizer cards are used on forward. The power supply offers 30 or 60 volts AC, local and remote operation via a power program plug. Current drain is ½ amp at 60 volts AC.

• • •

DISTORTION ANALYZER

Dix Hills Electronics, Inc. (25 North Mall, Plainview, N.Y. 11803) has introduced the Model R-12 signal strength and distortion analyzer designed to measure cross mod, 3rd and 2nd order products, and signal strength. These measurements can be made to operating levels of +20 to +70 dBmV output, and down to −110 dB for cross modulation. Internal AGC compensates for variations in signal level during distortion measurements. Second and 3rd order intermod products are measurable down to −90 dB.

MINI SCOPE

Dynascan Corp. (1801 W. Belle Plaine Av., Chicago, IL 60613) has added the model B & K 1403 Mini-Scope to its line of solid-state oscilloscopes. This unit has a bandwith of DC to 2 mHz and direct-deflection terminals for viewing waveforms to 150 mHz. It contains DC amplifiers on both horizontal and vertical axes and a new wide-angle CRT to reduce case depth. Overall size is 5¼ × 7⅜ × 11¼ inches. Weight is 8.5 pounds.

Vertical sensitivity is 20 mV/cm; maximum input is 600 volts, peak-to-peak. There are four time base ranges from 10 Hz to 100 kHz, continuously variable between ranges. Selling price of the 1403 is $179.95.

• • •

PROGRAMMED SWITCH CONTROLLER

Theta-Com of California (AML division, 9320 Lincoln Blvd., Los Angeles, CA 90045) is now marketing the Model PSC-200 Programmed Switcher Controller which features control of 20 separate channels at programmed times as close as one second apart. The PSC-200 stores over 1,700 switch instructions on magnetic tape cassettes. Other features include integral output relays and automatic standby operation in case of power failure.

Program instructions are entered using a standard numeric keyboard; each instruction is visually previewed on a front panel display prior to recording. The front panel also contains alarm functions, an accurate digital clock, plus a display showing the status of all output relays.

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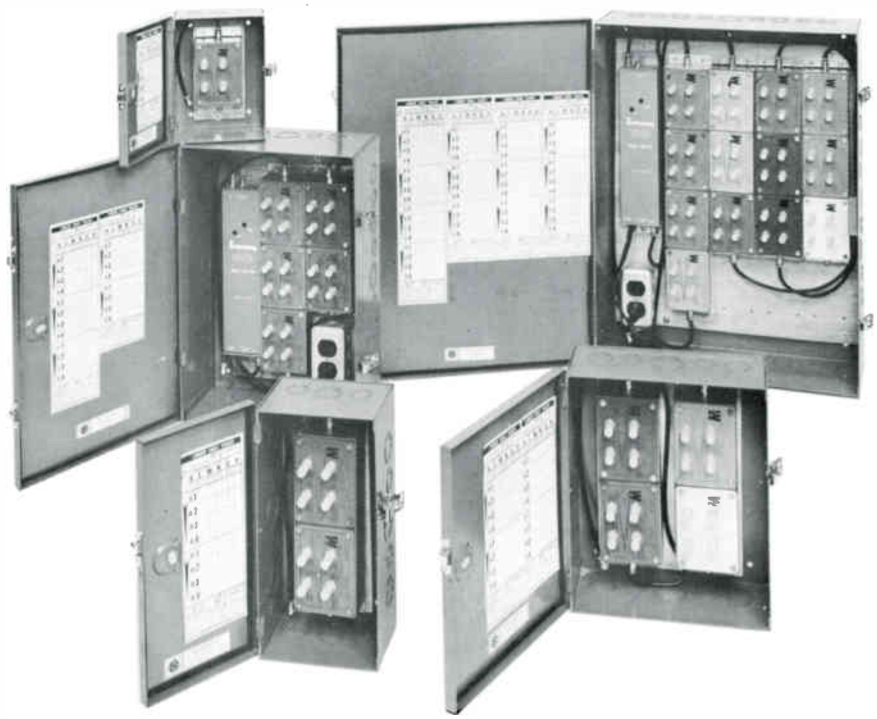

LOADED STATIONS (shown)

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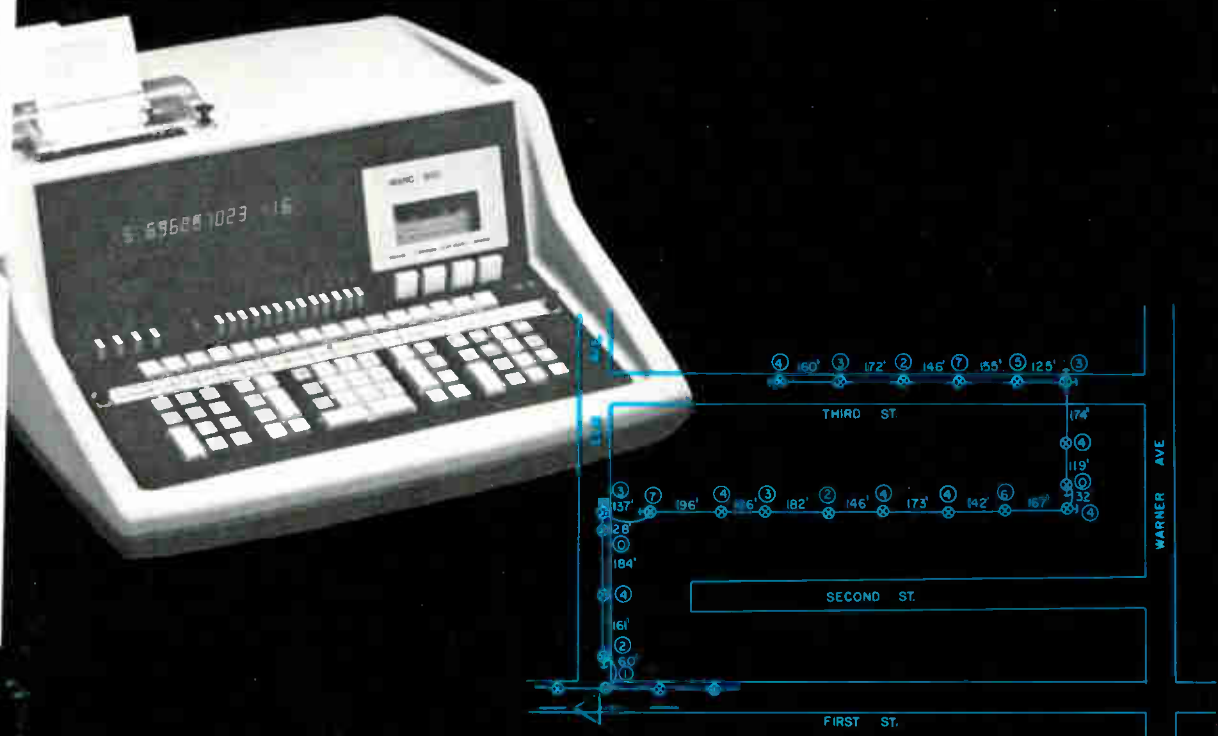

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PEOPLE IN THE NEWS

WILLIAM H. SCHNEIDER has been appointed Director of Operations for Cable Communications Corp. of Jackson, Tenn. Mr. Schneider has a ten-year background in system construction, operation and marketing.

• • •

WILLIAM F. KARNES has been named vice president—systems by TOCOM, Inc. His responsibilities in this new post will be cover the management of TOCOM cable subscriber response systems and the marketing of the company's new line of bi-directional amplifiers.

Prior to joining TOCOM, Mr. Karnes was v.p. operations and later president of Sammons Communications. He is a former national president of the Society of Cable Television Engineers and was Chairman of the Engineering Advisory Committee of the NCTA.

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DONALD J. ELLIS has been appointed Director of Engineering for General Communications Inc., a construction and engineering service organization in Arlington, Texas. Mr. Ellis was formerly with Warner Cable as Project Manager and Southeast Regional Engineer.

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GERALD L. BAHR has been named Manager of Field Engineering for the AML division of Theta-Com of California. He comes to the company from TelePrompter, where he was regional engineer in the Northwest area. Mr. Bahr has an extensive background in microwave work.

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RON HAMMAKER is now system manager for Warner Cable of Brockton, Mass. Mr. Hammaker was with TelePrompter where he was in charge of Cable TV systems in Danbury, CT and Newburgh, N.Y.

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HENRY B. MARRON has joined Scientific-Atlanta, Inc. as Director of Engineering for the Cable Communications division. Mr. Marron was previously Director of Engineering for Jerrold Electronics. He has over twenty years experience in telecommunications and is originally from England.

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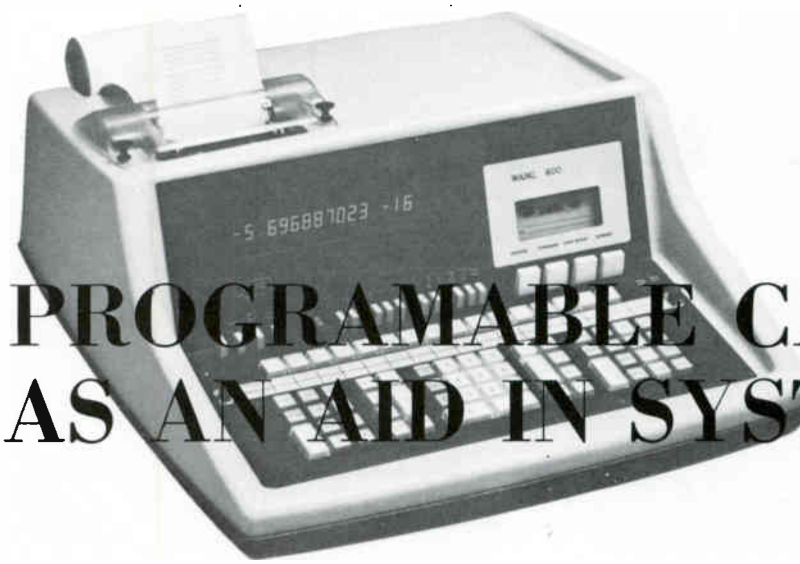


PROGRAMABLE CALCULATORS AS AN AID IN SYSTEM DESIGN

W. Richard Thompson
Warner Cable Corp., Pennsauken, N.J.

An accurate layout in a cable television system has become an absolute necessity, now that CATV involves a highly sophisticated communications network. We now have to consider all FCC rules; we are talking about carrying 30 channels; and, we need to allow for return signal considerations. In short, we can no longer do the electronic design as we proceed with the actual construction. The "best guess" method of system design worked when we were only carrying low band channels or even up to 12 standard channels, but those days are over.

Now that we are talking in terms of 20 channels and up, cable design should be done by a knowledgeable and skilled engineer. Naturally, the more knowledgeable and skilled this person is, the more valuable his time becomes. He may also be running an existing system and have many other duties in addition to the layout and design, so time becomes more critical.

Even if the design is done by outside engineering concerns, the work should be checked. There will always be several changes required in even a correctly designed system; for example, there will be several field changes that a design company cannot be aware of, and of course, once the actual construction begins, there will be many field changes that could not have been anticipated. Sometimes these changes will require major reroutings. These design changes must be done quickly and of course, with complete accuracy.

The design itself is becoming very complex in terms of concepts, but the actual method of arriving at the end product is generally just a combination of simple mathematics, such as addition, subtraction and multiplication. Why not let a machine do the automatic and simple calculations for you?

Programable calculators can greatly increase the speed and accuracy of design or checking layout. Depending upon how large a machine you buy, you can increase the speed anywhere from 2 to 10 times over adding machines or non-programable calculators. The accuracy is also much improved, because more potential errors, such as those in human addition, subtraction or multiplication are eliminated, and the need to check charts or special attenuation slide rules is also removed. All attenuations can be figured by machine.

Basically, a programable calculator is a mini, or micro, computer that can closely resemble a standard calculator. It can be programed to follow a series of steps to perform many different mathematical functions. It can even interpret its answers and make logic type decisions.

The machine that we use at Warner Cable Corp. is a Wang 600/14. It is capable of following up to 1847 commands or have 246 data storage registers, or any combinations of the two as they are inter-tradeable. The printer and tape cassette units are optional. The peripheral memory is also an option, which doubles the size of the memory to approximately 3700 commands or 500 data storage registers. In comparison to computers, this would be considered approximately a 4k

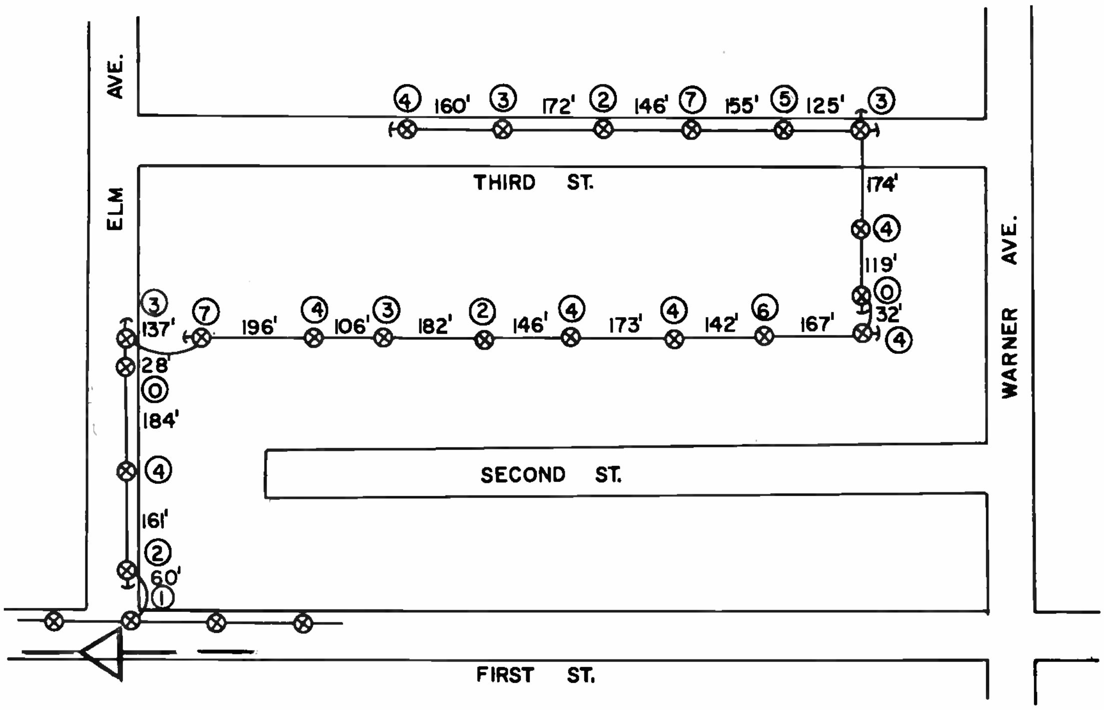
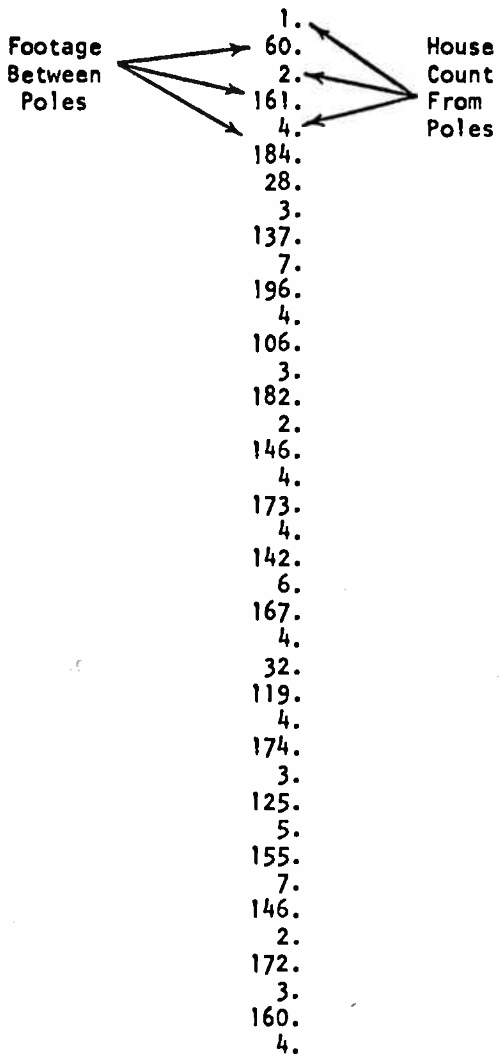


Fig. 1. The data is taken from a strand map like this one.

Fig. 2. House drops at each pole and the footage between.



memory. (An IBM System 3, a commonly used business computer, has an 8k memory.) The total price of this unit with options is $5,500.

The machine as described can do all layout in a cable system. It can do the trunk lines, feeder lines and power supplies. It can figure the optimum operating levels for any type amplifier. It can provide a complete bill of materials. It can also be used for checking layouts done by others. It can check anything associated with system design, and it can do it all in a matter of seconds.

Feeder Line Calculations

The calculations that are the most time consuming, because of the quantity, are those for feeder lines. The first step is to input the raw data from a strand map. (See Figure 1)

The data the machine will need will be the house drops required at each pole and the footage between the poles or pedestals. After this has been entered, (see figure 2), the machine will then start its calculations.

It will read the first number entered. It will determine if it requires a tap or if it is a footage. If it is decided that a tap is needed, it will then determine the type required to feed the homes from that pole. This is a fairly simple process. You can pick a number such as 12, and anything that is 12 or below, will be considered as drops. Anything 13 or above will be considered as a footage. If you get into a high density area, you can raise this number higher and still not interfere with your footages. You will very seldom have a footage less than 20.

When it is determined that the first bit of raw data is the house count from a pole, the calculator will decide what type of tap configuration will satisfy the requirements, a 2 output, 4 output, an 8 output or some combination of these. After this decision is reached, the machine will then determine what *value* tap is needed.

It will first try the highest tap available with the required number of spigots. If this will not provide the minimum output, the next lower tap

Fig. 3. Printout giving figures for taps.

Attenuation Per Foot of Cable-----	.0163	C
Bridger Output------------------	41.5000	A
Tap Value & No. of Outputs---------	27.2	D
Footage-----------------------------	60.	F
	27.2	D
	161.	F
	24.4	D
	184.	F
	28.	F
	20.4	D
	137.	F
	17.8	D
	196.	F
	11.4	D
	106.	F
Footage To Line Extender-----------	872.	F
	20.486	I
Line Extender Input & Output----	43.0000	A
	30.4	D
	182.	F
	27.2	D
	146.	F
	24.4	D
	173.	F
	20.4	D
	142.	F
	17.2	D
	17.4	D
	167.	F
	14.4	D
	32.	F
	119.	F
	11.4	D
	961.	F
	20.035	I
	43.0000	A
	174.	F
	27.4	D
	125.	F
	24.2	D
	24.4	D
	155.	F
	21.8	D
	146.	F
	17.2	D
	172.	F
	14.4	D
	160.	F
	11.4	D
Footage From L.E. to Termination---	932.	F
Termination Level--------------	20.30840	E

value will be tried, and so on until it finds the appropriate tap output level. After this is done, it will subtract the pre-programed insertion loss of that tap from the signal level, and proceed to the next piece of information entered with the raw data. It will then again go through the process of determining if a tap is required or if it is a footage.

Let's assume that the next number is a footage. All the machine does is simply multiply the footage by the attenuation per foot of cable and subtract this from the signal level. During this complete process, the machine has been making checks on the signal level. The machine has been programmed with minimum line extender inputs, and it is constantly checking the signal level for this input. If it finds that the input of the line extender will be too low, it will back itself up, basically just reversing the process that it has done before, until it reaches a point where the line extender input is above the minimum level. It will then total the footage to that amplifier, give the line extender input, raise the signal level to the pre-programed line extender output, and start on the next bit of raw data, again determining if it is a tap or a footage. It will repeat this entire process until it reaches the end of the line. (See figure 3.)

Throughout this procedure, each tap used is sorted in a memory. When it is determined that

(Continued on page 12)

Fig. 4. Information for bill of materials.

Cable Size-----------	.412	C
Amount In Feet----	147159.	F
Amount In Miles-----	27.87	M
	.500	C
	123456.	F
	23.38	M
Tap Value & Outputs--	30.2	D
Quantity-------------	175.	A
	27.2	D
	210.	A
	24.2	D
	265.	A
	20.2	D
	295.	A
	17.2	D
	317.	A
	14.2	D
	245.	A
	11.2	D
	210.	A
	7.2	D
	141.	A

SCTE

SOCIETY OF CABLE TELEVISION ENGINEERS

A MESSAGE FROM THE PRESIDENT

Dear Member:

June 1974 is an important milestone in the history of the SCTE.

At that time I expect that our membership will exceed 2,000! My expectations are based on the recent surge of interest in the SCTE —from within and from without.

New chapters are being formed. Existing chapters are revitalized. It didn't just happen! It required extra effort by members Bob Cowart, Steve Dourdoufis, Brian Lenhart, Don Johnson, Tom Straw, Terry Crawford, Loyal Park, Joe Gans, and the list goes on.

In addition to the regional activity, I have been evaluating several programs that have national significance:

- *A society insurance program for members and their families.*
- *Our relationship to similar societies, particularly the IEEE.*
- *The national campaign to increase membership and upgrade the technical strength of the SCTE.*
- *The expansion of membership grades.*
- *The areas where the SCTE can and should play a technical role, including state and federal technical standards and their implementation.*
- *An evaluation of the economic resources of the regional and national needs.*

I hope that you will take the time to express your views to me on these and other related matters. Your inputs can only serve to strengthen us.

In addition to your thoughts I have one simple request—USE THE APPLICATION BLANK IN THIS ISSUE TO ENROLL ONE NEW MEMBER.

The Presidency of the SCTE is a challenging and demanding trust. With your continued support the satisfactions derived from this effort can be mutually attractive.

Robert D. Bilodeau, President
Society of Cable Television Engineers

QUEBEC CHAPTER

At the last meeting of the Quebec Chapter of the SCTE, held in Trois-Rivieres on October 20, more than 50 members elected a new Board of Directors. The new officers and board members are: M. Jean Charles Dagenais (St. Jerome), president; Andre Lamarre (Montreal), secretary; Claude Morin (Sherbrooke), vice president; Michel Letourneau (Quebec), treasurer; and as directors, Lucien Caron (St. Hyacinthe), Henri Berthemes (Quebec), Walter Pundy (Baie Comeau), Real St. Laurent (Black Lake), Raymond Cousineau (Montreal), and Alcide Launier (Trois-Rivieres). The meeting also included a talk on antennas by experts from, Jerrold.

For more information on the meetings of this chapter, contact Andre Lamarre at 5215 De La Savanne St., Montreal H4P 1V4; tel: 514/341-7440.

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CENTRAL ATLANTIC CHAPTER

The last meeting of 1973 of the Central Atlantic Chapter of the SCTE was held on Dec. 8th in Jersey City, N.J. The first order of business, after lunch, was election of officers for 1974. Elected unanimously were Steve Raimondi, president; Earl Quam, vice president; and Ed Horowitz, Secretary/Treasurer. Mr. Raimondi is Division Engineer for UA Columbia Cablevision, Inc.; Mr. Quam is Chief Engineer for Brookhaven Cable TV; and Mr. Horowitz is Chief Engineer for Suburban Cablevision.

Steve Dourdoufis, Eastern V.P. of the SCTE, gave a report on the new chapter activities. He told about the new chapters forming in Pennsylvania, where there are two, one for the East and the other for the Western part of the state as well as West Virginia and Ohio. Other new chapters have been formed in Florida, South Central-East, and Washington, D.C.

There was a discussion about the advisability of getting type acceptance standards for cable television equipment, with several members arguing that this may impede the development of more efficient equipment at this time. The business meeting was followed by a presentation on dis-

APPLICATION FOR MEMBERSHIP

in

THE SOCIETY OF CABLE TV ENGINEERS

(Please Print, fill in completely and mail to the SCTE. 607 Main St., Ridgefield, Conn. 06877)

Date......................................

First Name | Middle Initial | Last Name | Date of Birth

Home Address | City | State | Zip

PRESENT EMPLOYER

Company | Date Employed

Company Address | City | State | Zip

Your Title

Description of Duties

PROFESSIONAL HISTORY

(Give Company Name and Address and Brief Description of Duties)

From	To	

EDUCATION

College or School | Date Graduated

Degree or Certificate

College or School | Date Graduated

Degree or Certificate

Other Schools

(Turn Page Please)

REFERENCES

(Three Society Members Required as References for Grade of Member)

Name _______________ Company _______________

Address _______________ City _______________ State _______________ Zip _______________

Name _______________ Company _______________

Address _______________ City _______________ State _______________ Zip _______________

Name _______________ Company _______________

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DUES

(Please List All Fees Enclosed)

Annual Dues ($10 per year) .... $_______________

SCTE Pin ($3.) .... _______________

SCTE Tie Clasp ($3.) .... _______________

TOTAL ENCLOSED .... $_______________

I agree to obide by the Constitution and Bylaws of the Society of Cable TV Engineers if admitted to membership.

Signature _______________

Do Not Write Below This Line

Chapter ....

Admissions Committee Action .... Date ....

Membership Grade:

- ☐ Member
- ☐ Associate Member
- ☐ Sustaining Member

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26		

tribution and channel response measurements using noise generators, by Robert G. Geissler of Vitek Electronics. Robert Toner, of Toner Cable Equipment, then gave a demonstration of the application of shrink seal tubing which is activated by contact with the air and does not require heat.

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WESTERN SOCIETY OF CABLE TELEVISION ENGINEERS

The semi-annual meeting of the Western Society of Cable Television Engineers was held at the Plaza 500 Hotel in Vancouver, B.C. on October 27, 1973.

A business meeting was held prior to the technical session, the main purpose being the election of officers and directors. The results were as follows: President, R. S. Ferguson (Merritt Cablevision Ltd.); Vice President, B. Q. Mui (Canadian Wirevision Ltd.); Secretary, F. G. Peacock (Canadian Wirevision Ltd.); Treasurer, G. E. Lavery (Community Cable Communications Ltd.); Technical Director, E. Ackerlind (consultant); Program Director, J. Foss (Victoria Cablevision Ltd.); Directors at Large, T. A. W. Sinclair (Western Cablevision Ltd.), and L. Nelson (Rocky Mountain CATV Ltd.); Immediate Past President and Director, L. L. Charlish (Victoria Cablevision Ltd.).

The technical session consisted of five presentations. The first speaker, M. Jervis of the B.C. Telephone Co., discussed various present and future aspects of broadband CATV systems. Topics covered included switching of coaxial cables systems, bi-directional systems, digital systems, and use of fibre optics.

The second speaker, D. Liddell of Canadian Wirevision's Cable 10, described the recently implemented 24 hour weather, time and message channel using M.S.I. equipment. Many possible applications of this type of display were discussed.

G. Prither of Premier Cablevision Ltd., presented a report on the results of the use of a Phasecom headend by McLean-Hunter for the 12,000 subscriber CATV system at St. Catherines, Ontario. In the Phasecom system, each picture carrier is a harmonic of a 6 MHz master oscillator. Hence, all the intermodulation products are also harmonics of 6 MHz and will zero beat on the picture carriers. G. Prither mentioned some of the problems which presented themselves and how these were overcome.

C. Williams of B.C. Telephone Co., presented a comprehensive paper on the theoretical and practical aspects of obtaining low resistance grounds for telephone as well as CATV systems.

The last speaker was F. Kaiser of Canadian Dynamics Ltd. He described his company's power supply in which the voltage and current regulated battery charger provides optimum recharge for the battery and simultaneously supplies power to the CATV amplifiers.

The next semi-annual meeting of the Western SCTE will be held in Victoria, B.C. during the first half of 1974.

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SOUTH CENTRAL-WEST CHAPTER

The South Central-West Chapter of the SCTE held their fall meeting in conjunction with the Cable Communications Seminar presented by the Technician Training School at Texas A&M University at College Station, Texas.

The meeting started with a "finger-licking" chicken dinner. This was followed by a business meeting which included a discussion of the possibility of the local chapter sponsoring the technical presentations during the state cable television convention. A committee was appointed to set this up for the Texas convention in February.

For more information on this, and other Chapter activities, contact Tom Straw at the Engineering Extension Service at Texas A&M.

Attendees at the South Central-West Chapter meeting.

Join the SCTE

NOW!

Use Application Form

on page 9.

Programable Calculators
(Continued from page 7)

the feeder line method is the way it is to be built, the calculator then takes the taps used from the memory and records them on a cassette tape. At the end of the job, this information is read off the cassette tape and a bill of materials can be made from this. The machine will automatically read its tapes, tally up all taps used, and count them at the rate of hundreds per minute. (See figure 4.)

The Program

Programming is really not as complicated as some people believe. What it requires is a high degree of logic and common sense. The machine will do exactly what you tell it to do, no more, no less, and I do mean *exactly*. To be effective, the program must be well thought out and well planned. However, with a good program, the machine can do almost anything you want it to do.

Computers make decisions by comparing data to each other. For instance, if X is greater than Y, then proceed to step 25. If X is equal to Y, then proceed to step 30. If X is less than Y, then proceed to step 50. Is X positive? Is X equal to 0, or is X unequal to 0? Each of these logic decisions would be followed by a command to perform a certain function if the preceding condition was met. Generally, these commands would be to go to a sub-routine.

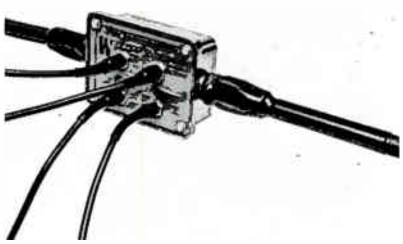
A sub-routine is basically just a program within a program. It will be a series of steps in one program run which may be run through several thousand times. For instance, selecting the tap value is basically a sub-routine of my main program. So, although the machine is capable of 4,000 steps, in order to accomplish just one feeder line it may actually run through more than 10,000 steps or calculations by repeating some sub-routines several hundred times.

There are many other programable calculators on the market in addition to the Wang. In fact, there are approximately half-a-dozen manufacturers that make machines with basically the same capabilities. There are machines available in all price ranges with all memory sizes. Again, the Wang as I use it costs $5,500. You can get machines ranging from 100 steps to 10,000 steps, and costing from $1,000 to $10,000. The optimum price range is probably somewhere between $4,000 to $7,000.

Regardless of the machine chosen, anyone who is involved in large amounts of system design should be aware that a programable calculator is not a luxury but rather a necessity, and the more design work being done, the more of a necessity such equipment becomes.

NEW PRODUCTS

SELF SHRINKING TUBING



Toner Cable Equipment, Inc. (418 Caredean Dr., Horsham, PA 19044) now has available the new Dana "Chem-Seal" self-shrinking tubing for the protection of cable splices and connectors. Unlike the normal heat shrink tubing, this new product does not need heat to shrink down over connectors, etc. The tubing comes in an air-tight packet and begins to shrink when exposed to the air and after it has been pulled over the cable connector. The tubing comes in a variety of sizes.

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BATTERY-OPERATED MINI SCOPE

Telonic Industries, Inc. (21282 Laguna Canyon Rd., Laguna Beach, CA 92652) now has available a 4 lb., portable oscilloscope with a 1½-inch CRT screen (that can be enlarged to 2¼ inches with a snap-on magnifier). The unit covers a frequency range from DC to 5MHz and has a sensitivity of 10 mV per division. It is available in a single trace version, the Model 9601A, and a dual trace unit, the Model 9602A. It is completely solid-state, except for the CRT, and may be AC powered or used with a battery pack that permits up to 5 hours of continuous operation. Prices start at $595, with delivery promised for 30 days.

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WATERPROOF BOX FOR SPLITTERS

Communications Technology Corp. (2237 Colby Av., Los Angeles, CA 90064) is now offering a waterproofing enclosure specifically designed to protect CATV splitters for direct burial. The new "Box Boy" is an hexagonal shape, which provides a more convenient body mold for encapsulation. It is provided in a complete kit with all components needed for an absolutely watertight encapsulation, we are told. One of the components is "Echo Gel" compound, which sets fast and remains clear.

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VIDEO DELAY TRIMMER

Television Equipment Associates (Box 1391, Bayville, N.Y. 11709) is offering Matthey's new "Rubber Coax", the video delay trimmer UN3/9, which provides an infinitely variable delay of 3 to 9 ns. by screw adjustment. The unit comes in a small metal box with BNC connectors on each end for in-line use. Price in small quantities is $40.

• • •

NEW TIME & TEMPERATURE GENERATOR

Datavision, Inc. (15932 Shady Grove Rd., Gaithersburg, MD 20760) has announced a new rack-mounted video time and temperature generator, the Model TT-1, which mixes temperature and real time information with any black & white or color video signal.

Information appears in a one line format than can be positioned anywhere on the TV raster. Character height is adjustable. The unit accepts a variety of sync or video sources.

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Jim Webb, Manager of Comm/Scope Manufacturing

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