



Al Roedy KCOP-TV 104
1962 S. Stearns Dr.
Los Angeles, Cal.

October 1964

TV & Communications



IN THIS ISSUE

- CATV SUCCESS STORY
- CABLE SYSTEM ECONOMICS
- CC TV USED IN MINING

THE NEW QUALITY STANDARD FOR CATV



... one of the thousands of new JERROLD transistorized units now being shipped

Your route to the finest picture quality and system capability is through Jerrold's new solid-state CATV gear—the most advanced, most reliable transistorized equipment ever offered to the community-antenna industry.

Here at Jerrold we've greatly expanded production facilities in the middle of our biggest CATV year yet. We're rapidly filling all the advance orders for new solid-state mainline cas-

cadors (like the one I'm holding), channel pre-amplifiers, bridging amplifiers, and line extenders for CATV operators throughout the country who demand the very best in performance and versatility from their systems.

Cordially,
Lee Zemnick, Manager
Community Systems Division



TURN TO THE CENTER PAGES OF THIS ISSUE FOR THE STORY BEHIND
JERROLD'S SOLID-STATE EQUIPMENT—THE NEW QUALITY STANDARD FOR THE CATV INDUSTRY



is choosing CATV components a game of chance?

quality		service
	uniformity	
dependability		economy

NOT IF YOU BUY viking . . .

Viking leaves nothing to chance.

All yours to expect and receive whether it be the smallest fitting, the most expensive aluminum cable or the most intricate equipment. Viking insists on top quality construction without skimping on production or engineering cost.

Be sure to get the finest for your system . . . buy **viking** . . . you will be glad you did.

**TO ENGINEERS AND
TECHNICIANS
IDEAS WANTED!**

VIKING CABLE CO.

Will pay for ideas for new items or improvements on present products to better serve the CATV industry. Submit your ideas to us for immediate evaluation.



Manufacturers of Quality Coaxial Cables and Television System Products

830 Monroe Street, Hoboken, New Jersey • Call Us Collect: New York: (212) WH 3-5793, Hoboken; (201) OL 6-2020

TELESYSTEMS is people ...



Charles Wigutow, Manager: Community Systems-East, combines the rare talents of manager, writer and human relations expert. In addition to his duties as Manager of TeleSystems Corporation's Eastern CATV systems, "**Charlie**" finds time to write the "Cable TV View" which is read by more than 100,000 readers in thirty CATV communities throughout the country. Under his able management TSC subscribers have risen 30% in the past year. Many unique management techniques have been initiated as a result of this creative leadership.

When you want successful management patterns to follow, then **Charlie Wigutow** is one more excellent reason why it's smart to work with TeleSystems Corporation.

PERSONNEL PLACEMENT SERVICE

TeleSystems Corporation offers a Personnel Placement Service to the CATV industry. This personal and confidential service offers both the applicant and employer the benefit of years of personal evaluation and industry "Know-How."

Whether you want a job to match your potential, or you are seeking the right employee—you'll profit by a call to TeleSystems Corporation.

Serving CATV Systems in Engineering, Construction, Equipment, Promotion and Management.



TELESYSTEMS CORPORATION

113 South Easton Road, Glenside, Pennsylvania • 215 TU4-6635

viking



FALL "TAP" FESTIVAL

A HARVEST FOR FALL CONNECTIONS

Taps for all cable and all sizes: 412, 480, 500, and 655 O.D.

- VIKAL ALUMINUM • COPPAFLEX • STRIP BRAID
- STRAND BRAID • MESSENGER CABLES

THE GREATEST SELECTION OF TAPS FROM ANY MANUFACTURER IN THE CATV INDUSTRY

A tap for all applications

- SINGLE TAPS • DIRECTIONAL TAPS
 - MULTIPLE TAPS • BACK MATCHED TAPS
- SPLITTERS — Hybrid and regular
RG59U — Foam, solid, polyethylene and vinyl

A rainbow series of colors for all connections. Call us today for all your special needs.

A happy thanksgiving from
viking



viking



Manufacturers of Quality Coaxial Cables and Television System Products

830 Monroe Street, Hoboken, New Jersey • New York: (212) WH 3-5793, Hoboken: (201) OL 6-2020

TV & COMMUNICATIONS



OCTOBER 1964
Volume I— Number 10

Published By Communications Publishing Corp., PO Box 63992, Oklahoma City, Okla.



Microwave is our speciality!

AnSCO's capability of long haul multi-hop transmission is now demonstrated day after day. The technical standards of performance in engineering, technician and equipment are of true Common Carrier standards

★Common Carrier Microwave Systems

★Microwave Engineering & Path Studies

★Maintenance of Your Systems

★Turnkey Business Microwave Systems

Antennavision Service Co., Inc.

2949 W. Osborn Rd.
Phoenix, Arizona

A MICRO-WAVE COMMUNICATIONS
COMMON CARRIER

To: ANTENNAVISION
2949 W. Osborn Rd.
Phoenix, Arizona

I am interested in a "No obligation" microwave estimate ...

Reply to
Name _____
Address _____
City _____

TABLE OF CONTENTS

Local Newspapers for CATV Public Relations Charles Wigutow, TeleSystems Corporation	22
CATV — A Success in Sedona Jim Geary Rebuilds CATV System	26
The Economics of Cable Television R. L. Cowart, National Trans-Video, Inc.	28
CCTV in Mines Copper Mine Saves Money with CCTV	31
TV&C Visits Etron Staff Report on Visit to CATV Equipment Manufacturer	33
Editorial	9
News Spectrum	10
Focus on Progress	16
Products	37
Letters to the Editor	38
Classified Advertising	38

STAFF

Stanley M. Searle
Editor

Sherrill D. Dunn
Managing Editor

Leo G. Sands
Charles Wigutow
Lon Cantor
Contributing Editors

Jean Schaefer
Art Director

Patrick T. Pogue
Business Manager

Robert A. Searle
Advertising Sales

Rita Corona
Circulation

GENERAL OFFICES

1839 N. W. 16th

(P.O. Box 63992)

Oklahoma City 6, Oklahoma (405) JACKSON 8-3523

CIRCULATION: TV & Communications is circulated through United States and foreign mails on the tenth day of each month, to individuals and firms dealing in products and services for closed circuit and community antenna television, television broadcast, and microwave. Circulation is both paid and controlled. A detailed circulation breakdown by reader occupation is available upon request.

SUBSCRIPTIONS: TV & Communications subscription rates in the North American continent is \$5.00 per year for surface mail. Subscriptions outside continental North America are \$7.00 per year, remittances to be made by bank money order or check, negotiable in United States banks. TV & Communications is published 12 times per year.

ADVERTISING: Commercial display advertising is accepted from manufacturers and suppliers of electronics equipment and allied services, at the discretion of TV & Communications management. Advertising rate card and circulation breakdown are available upon request.

COPYRIGHT: Contents of this publication are copyrighted by Communications Publishing Corporation. No material, either written or graphic, may be reproduced without the written permission of the Publishers.

TV & COMMUNICATIONS (title registered at U.S. Post Office). Second-class postage paid at Oklahoma City, Okla. Subscribers should allow six weeks for change of address.

PUBLISHERS: Patrick T. Pogue and Stanley M. Searle.



ATM-20C



No Contest



THE "AMECO-MASTER-60"

**BETWEEN
AMECO
AND ALL THE REST
OF THE CATV
EQUIPMENT
MANUFACTURERS
COMBINED!**

Many manufacturers are now striving to get in the solid-state race . . . but it is "no contest." Ameco is already three years and 20,000 solid-state amplifiers ahead of the field! When you deal with Ameco . . . you deal with the company that *originated* all-band solid-state. When you deal with Ameco . . . you deal with the company that sets the pace in CATV. When you deal with Ameco . . . you deal with the company that cares enough about you and your cable system to call on you once a month with parts and service. When it comes right down to it . . . it's kinda' foolish to deal with anyone else . . . isn't it?



**SALES
SERVICE
SUPPLIES**

DALLAS, TEXAS
George Henderson, Ed Dart
& Paul Clark
6111 Harry Hines Blvd.
AC 214 FL 1-1567

DECATUR, ALABAMA
Bill Bryant & George James
1622 5th Ave. SE
AC 205 353-1185

CINCINNATI, OHIO
Clifford Beyersdoerfer
P. O. Box 1335
AC 513 321-8060

HARRISBURG, PENNSYLVANIA
Bob Vandegriff, Dick Yearick
& Lloyd Tate
P. O. Box 3343
AC 717 236-1001

ALBANY, NEW YORK
Joe Choquette
P. O. Box 229
AC 518 434-9758

PORTLAND, OREGON
Charles Dieterich
1460 S. E. 58th
AC 503 232-7051

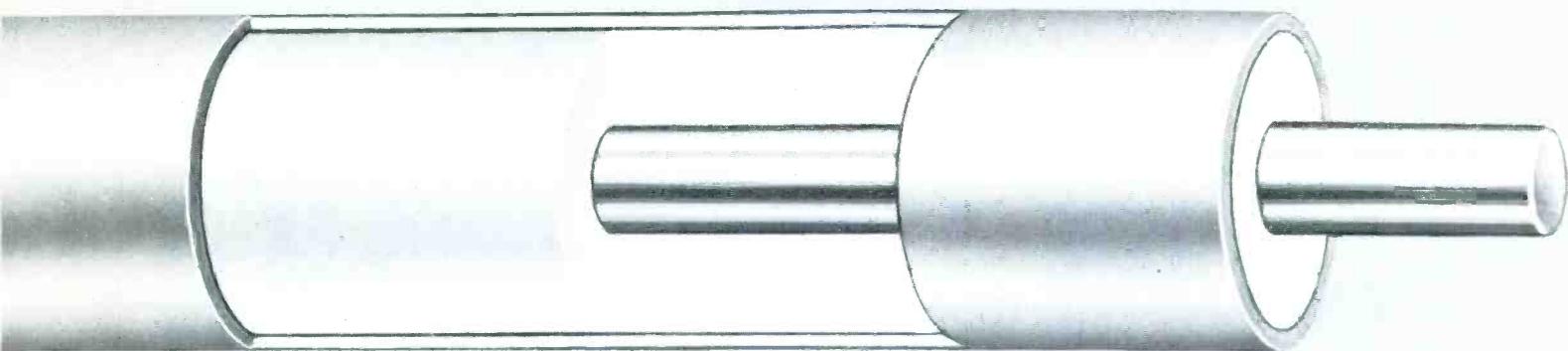
MINNEAPOLIS, MINNESOTA
Bruce Frazier
P. O. Box 1203
AC 612 332-0666

SAN FRANCISCO, CALIFORNIA
John Bryant & Joe Murphy
P. O. Box 34023
AC 415 PR 5-4566

FOAMFLEX

SEMI-FLEXIBLE, ALUMINUM SHEATHED, AIR DIELECTRIC
COAXIAL CABLE

FIRST... TO MEET ALL THE NEEDS OF CATV



■ Now, the availability of 75 ohm Foamflex coaxial cable in four diameters — .412", 1/2", 3/4" and 1 5/8" — fills the needs of all-band CATV systems for rugged, high-performance cable in all required sizes. Foamflex, the original foam polyethylene dielectric cable, offers unequalled low loss for superior operation in community antenna and closed circuit television. Foamflex has a proven record in demanding applications in telemetry, missile guidance and microwave in addition to CATV.

Excellent uniformity of impedance with an average VSWR of 1.05 over all channels, and low attenuation, result in remarkably good video reception for tomorrow's color TV and auxiliary service. Surprisingly, this semiflexible, air dielectric cable is competitively priced with cables covering only the low-band frequencies.

Construction consists of a copper inner conductor, foamed polyethylene dielectric, and thin wall aluminum outer conductor providing a permanent moisture vapor barrier. Foamflex is superior on the basis of operational characteristics over long use and under extreme environmental conditions. For underground use, a Habirlene jacket can be furnished.

■ average VSWR of 1.05 on all channels ■ uniform electrical properties over wide temperature variations ■ low loss, no radiation, high phase stability ■ stable attenuation at high band frequencies ■ lighter weight for easy installation ■ modified pressure taps or multi-tap distribution may be utilized ■ long term operating life

NEW!

Send for new Foamflex CATV Bulletin CA Issue 1 with full engineering data.

PHELPS DODGE ELECTRONIC PRODUCTS
NORTH HAVEN, CONNECTICUT



STV: An Uphill Battle

According to Sylvester L. (Pat) Weaver, Subscription Television "is destined to become the great new industry of our country." Weaver, who is president of Subscription Television, Inc., cites more than 40,000 hook-up orders in the first 90 days' operation as proof of the cable pay-TV potential.

The fact that STV was able to raise \$25 million to finance pay-TV systems for Los Angeles and San Francisco seems to fortify Weaver's view. The statutory recognition of subscription TV by the State of California (A.B. 3066), which was signed into law this year, would also indicate validity of the STV position. And then there's the terrific pool of talent, both "live" and on film, that STV has lined up for its subscribers' viewing pleasure. In full perspective, subscription television looks like a tremendous entertainment and cultural break-through that would be widely acclaimed and happily received by most families in the areas served.

. . . But it's not that simple. A group of motion picture chains and executives, backed by certain broadcasters, have bitterly opposed the new television enterprise. The big-money theatre interests have, in fact, managed to get a million signatures on a petition placing an initiative referendum to outlaw subscription TV on the November 3 California ballot.

In view of the concerted, well-coordinated efforts of the motion picture interests, it is rather amusing to hear the Crusade for Free TV Committee calling Subscription Television, Inc., a "monopoly"! If there is any attempt underway to monopolize the field of pay television we frankly doubt that STV is the guilty party!

The "Crusade for Free TV Committee" in a so-called "Facts Booklet" claims that "The California Pay TV promoters are attempting to bypass and circumvent the Federal Government policy by leasing telephone company cables. Thus the Pay TV monopoly threatens to kill Free TV in California now UNLESS the people respond with overwhelming numbers of 'Yes' votes to support the initiative outlawing Pay TV."

The "Crusaders" apparently fail to differentiate between FCC-regulated broadcast techniques, which utilize the radio frequency spectrum, a limited natural resource, and the cable service which is limited only by supply and demand. Thus, the unwarranted and unjust claim that STV is attempting to circumvent government policy.

We hope that it will never become "government policy" to allow an established industry to have a legitimate new competitor legislated out of business! Incidentally, it is worth noting that the folks who are making all the noise about preserving "Free TV" are not attempting to halt *theatre Pay-TV*.

The open entry of the three major San Francisco network television stations into the skirmish occurred when

KRON-TV (NBC), KPIX (CBS) and KGO-TV (ABC) refused to accept STV paid advertising. The STV commercials pertaining to Proposition 15, the referendum to outlaw STV, were subsequently refused by KABC, Los Angeles, which is owned and operated by ABC. The San Francisco Chronicle, which owns and operates KRON, had also reportedly refused STV's newspaper advertising. According to Weaver, when the publishing company's lawyers were informed that STV would protest the change in KRON's tower height to the FCC, the Chronicle relaxed its stand.

Unfortunately, even though the voters of California will probably *not* vote to kill home pay-TV, considerable damage has already been done to the STV cause. In addition to the expense of the political campaign, in excess of \$1 million, the cost to STV in manpower and time has been high. Regular sales and advertising efforts have been curtailed to concentrate on the life-or-death Proposition 15 issue.

Chances are, if the referendum is adopted it will ultimately be overruled by the U.S. Supreme Court as unconstitutional. But, in the meantime, STV and its stockholders would have a totally unproductive \$20 million television system on their hands.

Still on the dark side of the picture is the lethargic manner in which the California Public Utilities Commission has been treating STV. In February the Pacific Telephone and Telegraph Co. filed with the PUC a contract to provide transmission services in STV's Los Angeles Area One. After hearings were held, the approval was granted in June (on the day following the primary election). In July General Telephone Co., of California filed with PUC a contract to provide line facilities to STV in Santa Monica. There were no protests and no hearings—but approval was not granted by the politically appointed Commissioners until September 24.

These PUC delays resulted in postponement of starting dates in both Los Angeles and San Francisco and have caused STV to miss its original hook-up schedules by a wide margin. Presumably, the pay-TV firm can count on the same snail's-pace treatment in clearing telephone contracts for each new area it enters.

If Pat Weaver is disgusted with California movie interests and the inactivity of the PUC, we don't blame him. The inconsiderate slowness of the PUC has been an extremely expensive inconvenience to STV . . . while the interference by private theatre interests, under the pretense of "public interest," has been a flagrant intrusion upon American free enterprise.

If California outlaws subscription TV by cable, what lies in store there and in other states for other forms of free enterprise . . . such as CATV?

Stan Searle

News SPECTRUM

15586 EXTENSION

An extension for filing comments in FCC Docket 15586 asked by NCTA NAMCC has been approved by the Federal agency. The two petitions pertain to licensing of microwave stations relaying TV signals to CATV systems. The original deadline of October 1 was not adequate "to do a competent and complete engineering analysis of the problem, and obtain the necessary facts for meaningful comments will require an extension of six months."

The petitions requested an extension to January 4, 1965 for non-technical matters and April 1, 1965 for technical matters.

In granting the extension, the Commission did not establish a new deadline date but indicated that a new deadline will be established after further consideration.

The Microwave Communications

Section of EIA also submitted a request for an extension of the filing date. That group asked for a deadline of January 1 in order to properly evaluate the "field tests and related studies . . . necessary in order for us to file appropriate comments."

PNCTA ANNUAL MEETING HELD

The Pacific Northwest Community TV Association, Inc., held its annual fall convention at the Benson Hotel, Portland, Oregon on September 21 and 22, 1964. With 103 registered—regular members, associate members and guests—the organization "held one of its most successful meetings."

Featured speakers at the luncheons were Mr. Gerry Pratt, Financial Editor, The (Portland) Oregonian, and Mr. Hollis Dole, Geologist, Geology and Mineral Department of Oregon.

Monday's afternoon session was

given "grandfather" rights to continue to operate for a period of 120 days. If within such period, an application is filed with the FCC for an authorization to continue to operate, the grandfather right continues until a regular retransmission authorization is granted by the FCC or until such time as the Commission may specify in any order denying such application. A provision in paragraph (b) of this section would preclude any possible interpretation that the granting of grandfather rights is intended to give any right to a CATV system to retransmit the programs of any broadcast station without the prior consent of such station. In other words, if a CATV system is lawfully required to obtain such prior consent from a broadcast station, as a matter of private law, and it has not obtained such consent, the proposed amendments cannot be construed to eliminate the necessity for such consent or to legalize the CATV's unauthorized practice.

"The specific changes proposed in (Section 303), together with the definitions added to Section 3, would, with a few exceptions, give the FCC the same regulatory jurisdiction over

highlighted by a "Progress Report on CATV" given by Mr. Bruce Merrill, NCTA National Chairman. Mr. Merrill said that CATV will continue to grow and prosper as long as it gives the public "the things that the public wants."

Mr. H. W. McClure, PNCTA Secretary-Treasurer, Mr. C. W. Collins, PNCTA General Counsel, Mr. L. Stoner, NCTA Treasurer and Dr. Luke Lamb, Director Educational Media, Oregon State Department of Continued Higher Education also contributed to the afternoon's program.

Tuesday's technical session, chaired by Mr. D. J. Mackenzie, PNCTA Technical Vice-President, featured demonstrations of microwave test equipment, the newest in Tektronix scopes, discussion and demonstration of tube shields and the election of a Technical Vice-President for 1964-65, Mr. Earl T. Ake, The Dalles TV Co., The Dalles, Oregon. Tuesday afternoon, President J. H. Lenahan in his retiring President's Report stressed continued support of the Regional and National associations, having served four years as Secretary-Treasurer and two years as President.

TAME ASKS FCC TO LEGISLATE CATV

Television Accessory Manufacturers Institute has recommended the FCC ask Congress to pass legislation to establish regulatory jurisdiction over CATV. TAME noted that the legislation is necessary "to safeguard the American system of free broadcast television and to ward off chaos in the industry."

Detailing amendments to the Communications Act, TAME submitted copies of its proposal to the Communications Subcommittee of the Senate Committee on Interstate and Foreign Commerce and to the House Interstate Commerce Committee. The proposal would redefine existing terms in the Communications Act to cover Community Antenna Television and add further restrictions.

One such addition would be the establishment of Section 302. TAME explained: "This is a new section which requires that no person may construct or operate a CATV system without first obtaining authorization therefore from the FCC except that CATV systems in operation upon the effective date of the amendments are

CATV systems as the FCC now has with respect to radio and television broadcast stations. The changes would give the FCC the following jurisdiction:

"To classify CATV systems.

"To prescribe the nature of the service to be rendered by, and the location of, each class of CATV system and individual CATV systems.

"To regulate the kind of equipment to be used by CATV systems, including regulations preventing interference to radio reception and transmission.

"To establish areas or zones to be served by CATV systems.

"To make rules requiring CATV systems to keep records of programs, transmissions of energy, communications or signals.

"To inspect CATV installations for compliance with the Act, FCC rules, or treaties which might become applicable.

"To require the painting and illumination of CATV towers for safety of air navigation.

"To make general rules and regulations applicable to CATV systems including rules pertaining to the ownership of such systems, the filing of

contracts and accounts, *the terms and conditions upon which CATV service is rendered to the public*, obtaining the consent of originating broadcast stations for retransmission of their programs by the CATV system, duplication of programs of broadcast stations, direct origination of programs and sale of advertising time. Under this general rulemaking authority, the FCC would have the power (1) to require reports and public disclosure of information as to the owners of CATV systems; (2) to protect CATV subscribers against violations of the obligations assumed by the CATV system; (3) to prohibit CATV retransmission of programs of broadcast stations without prior consent for such retransmission; (4) to prohibit retransmission of programs duplicating those of local broadcast stations; (5) to prohibit the direct origination of programs and the sale of advertising time by CATV systems.

These amendments (Section 308) would make applicable to CATV applications the same requirements as those now pertaining to the contents of broadcast applications, including renewals, namely the required showing as to citizenship, character, financial, technical, and other qualifications and the ownership of the CATV applicant.

"These amendments (Section 309) would make applicable to CATV applications the same procedural provisions applicable to broadcast applications, including renewals, pertaining to the right of interested persons to object to a grant of the application, and the holding of hearings on such applications.

"These amendments (Section 310) would make applicable to CATV systems specified requirements as to citizenship which are applicable to broadcast stations and the same requirements to the effect that transfer of ownership and control of CATV systems cannot be made except upon applications to and approval by the Commission.

"The proposed amendment of (Section 312) would make applicable the provisions applicable to broadcast stations for revocation of authorizations, and for issuance of cease and desist orders to compel compliance with the Act, the terms of authorizations, and the rules of the FCC.

"Sections 313 and 314: The amendments of these sections would make applicable to CATV systems the anti-

trust laws of the United States, and the provisions of the present act for revocation of authorizations by the Court which has found the holder guilty of a violation of the anti-trust laws.

"CATV systems would also be prohibited, if they originate political broadcasts, from collecting charges from a political candidate or any other person in addition to the charges which it regularly collects from subscribers (under Section 315). It is also provided, however, that the Commission may prohibit the direct origination of any programs or the sale of advertising by CATV systems.

"Section 503(b)(1)(A) would authorize the FCC to impose monetary forfeitures (fines) upon CATV systems for violations of law or FCC rules, as it may now do in the case of broadcast stations."

UHF TO COMPETE WITH TEXAS BROADCASTING

Southwest Republic Corporation's executive vice president, Allen B. Heard, has announced that company's plans to put KHFI-TV on the air by the first of 1965. The UHF station will be located in Austin, Texas, the home of KTBC-TV, which is owned by President Lyndon B. Johnson's family through Texas Broadcasting Company.

KHFI-TV will challenge the apparent monopoly established by Texas Broadcasting when it recently signed an agreement to purchase competing CATV company TV Cable of Austin. KTBC-TV is the only commercial TV station in the Texas capital. Texas Broadcasting also has an option to acquire 50% of Capital Cable of Austin.

To be aired on Channel 42, KHFI-TV is under construction at this time according to Mr. Heard. Southwest expects to invest \$1,030,527 the first year with revenues of only \$289,000.

G-E TO ENTER CATV

Announcing plans to enter the CATV field is General Electric Broadcasting Company, Schenectady, New York. The firm released plans to invest \$7 to \$8 million in cable television for the Albany-Troy-Schenectady area.

In its franchise request for that area, G-E is competing with Capital District Better Television, Albany, headed by Harry L. Goldman. A subsidiary of General Electric. G-E Broad-

EMPLOYMENT SERVICE

An Employment Service for Cable Television?

It's here now!

Are you a cable TV operator looking for a man . . . or a man looking for a cable system job?

We can bring you together for both your mutual benefit. An employment service, exclusively devoted to the interests of the cable television interests, has been needed. TeleSystems Corporation is filling a genuine need in the CATV Industry by providing this service.

Many, many miles separate job seeker from the job opportunity. It would take great expense to pursue the opportunities that are now open. Similarly, much time and needless expense is lost in seeking the ideal person for the opening.

CATV has been growing fast. Ownership can benefit by the years of experience we have had in staffing our CATV systems. We have established significant criteria by which to judge whether a prospective employee is the right person for the job.

Often persons with good backgrounds in closely allied industries can make a successful transfer into CATV.

Or men with Manager or Chief Technician potential have pushed past the limits of their present opportunities and are seeking advancement in this exciting industry.

TeleSystems Corporation will help bring you together: System Owner—and job seeker.

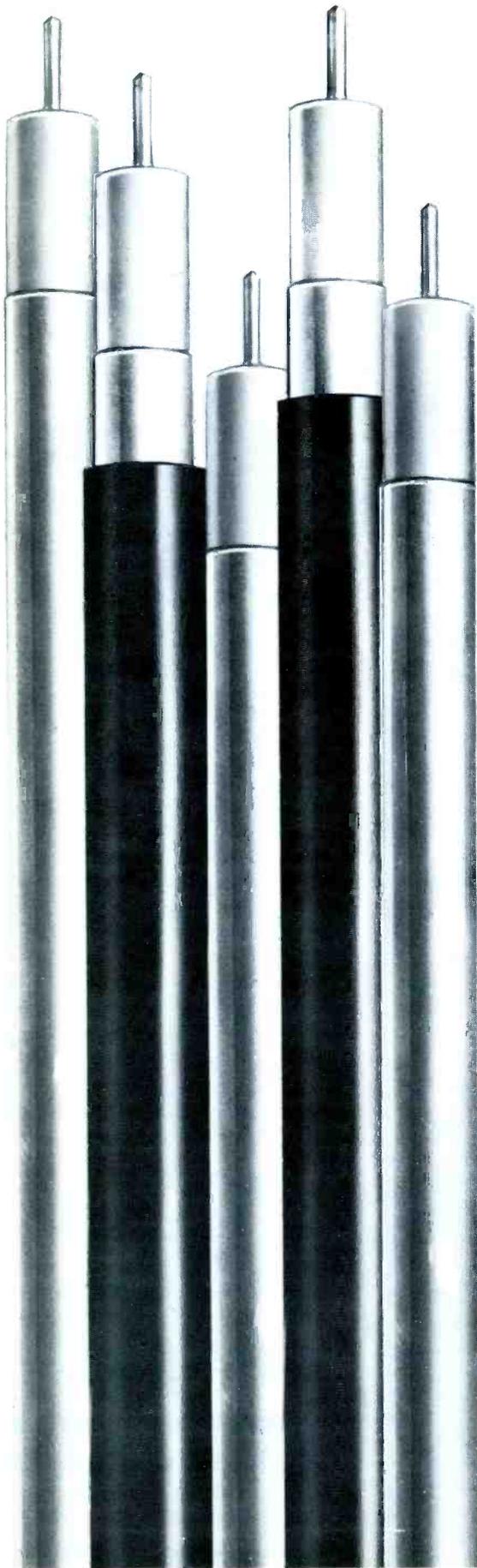
Write or Call:

**Manager
Personnel Placement Division
TeleSystems Corporation
113 S. Easton Road
Glenside, Pennsylvania
(215) TUrner 4-6635**

ALL INQUIRIES ARE HELD IN STRICTEST CONFIDENCE

TELESYSTEMS CORPORATION

113 S. EASTON ROAD
GLENSIDE, PA.



In a dilemma: whether to build your system for fast capital gains or for maximum operating profits?

*Before you install a so-called
economy cable system,
ask these 8 questions:*

1. Is it water & water vapor proof?
2. Is the cable self sealing when tapped?
3. What is the guaranteed maximum attenuation?
4. Will it produce an acceptable color TV picture?
5. Does it give 26 db minimum return loss guarantee (Required for minimum ghosting)?
6. Will the quality be the same 5 years from installation?
7. Will the cable be adaptable to all pay TV applications?
8. Will it give radiation protection when high power lever amplifiers are used?

If you install Times JT1000 seamless aluminum tube sheath cable, the answer will be yes to all the above.

Whether your objective is capital gains or long-term, high net profit, you should give careful consideration to installing a long-life, high-quality cable system—JT1000 series cable, your best profit insurance. Don't settle for a system that continually degrades from the day you install it, and which may prematurely require replacement in 3 to 5 years.

DON'T TAKE OUR WORD FOR IT.

Return loss measurement is a crucial determining factor. Through this one test alone, you can prove to yourself the return loss quality of standard JT1000 cables. Times will gladly lend you a Return Loss Measurement Adapter Kit. It's absolutely free of charge. Just write or phone our Sales Manager, and he'll send you the Kit.



**PROVE IT
TO YOURSELF
FREE TEST KIT**



TIMES

WIRE AND CABLE

Division of The International Silver Company • Wallingford, Connecticut

TRANSMISSION SYSTEM DESIGN AND ENGINEERING • STANDARD AND SPECIAL PURPOSE COAXIAL CABLE • MULTICONDUCTOR CABLE • COMPLETE CABLE ASSEMBLIES • TEFLON* HOOK-UP WIRE

*A DuPont Trademark

casting owns WGY, WGFM (FM) and WRGB(TV) in Schenectady.

When completed, the system would carry four TV signals including three from Albany and an educational station from Schenectady.

**GPL ANNOUNCES
COLOR DEVELOPMENT**

GPL Division of General Precision, Inc.'s Aerospace Group said it has developed a method of using standard black and white television cameras to provide multiple-color television pictures.

Named DataColor, the new system is expected to find many important applications in defense command and control, aerospace mission control, medical electronics, as well as industrial applications where the use of color would enhance product promotion, process control and scheduling functions.

Instead of viewing objects as black or white, GPL's DataColor system "sees" objects as different shades of gray. An electronic color reservoir, called a color discriminator, assigns various colors to different shades of gray.

The colors are pre-selected, and color assignment by the color reservoir is arbitrary. For instance, black can be assigned the color red; dark gray can be blue; light gray can be green. Or the system can be easily modified so that black is displayed on television as green; dark gray is red, and light gray is blue.

Any number of colors can be assigned by the electronic color reservoir, but assigned colors are generally limited to six colors, the number that can be easily identified by the human eye without reference to a color code directory.

In addition to its principal advantage of getting color from gray inputs, DataColor has two other strong points.

It uses a low-cost black and white vidicon camera instead of an image orthicon or three-vidicon color camera. Cost of a high quality vidicon camera is approximately \$3,000 compared to the \$45,000 price of a high quality color image orthicon camera.

DataColor colors are exactly the same at any number of television displays, receivers, or large screen displays, unlike standard color television,

which may display one scene in any number of shades and hues at various television display locations.

**ENTRON TO INSTALL
MILLION DOLLAR CATV SYSTEM**

Robert J. McGeehan, President of Entron, Inc., announced that Mohawk Valley Community Antenna TV, Inc., Utica, N. Y. has ordered Entron's broadband TV equipment for the installation of a CATV system in the Utica area.

The first of two construction phases will serve an estimated 18,000 homes in Utica and surrounding areas with potential subscribers numbered to be 60,000. It is expected that construction will be completed by January 1, 1965.

Mr. McGeehan noted that when completed, it will be one of the largest CATV systems in the country—exceeding over 300 strand mile.

AMECO DOUBLES FACILITIES

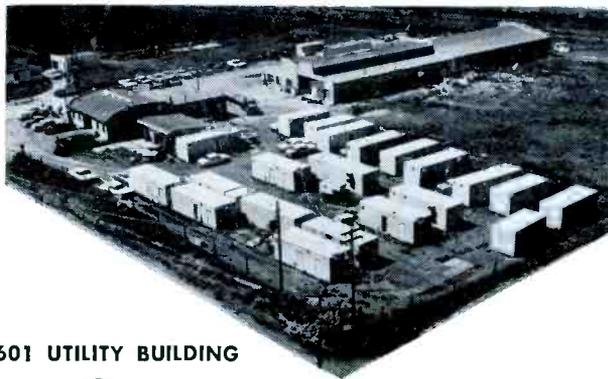
Bruce Merrill, President of Ameco, Inc., has announced the acquisition of a third building that will double present production facilities for the Phoenix plant.

Mr. Merrill noted that wide acceptance of the Ameco solid-state line,



**ARMADILLO ANNOUNCES NEW
FIBERGLASS UTILITY LINE**

Equipment for large microwave system being pretested at factory



SERIES 601 UTILITY BUILDING



FEATURES: Fiberglass Exterior Immediate Delivery Variety Of Sizes

- VHF STATION
- TELEPHONE BOOTH
- SIGNAL EQUIPMENT HOUSING
- CONTROL EQUIPMENT HOUSING
- HOT BOX DETECTION BUILDING
- METER HOUSE
- MICROWAVE REPEATER BUILDING
- CALORIMETER BUILDING
- INSTRUMENT SHELTER
- BEACON CONTROL HOUSING
- MISCELLANEOUS USES

ARMADILLO MFG. CO. • 847 E. COLFAX AVE. • DENVER, COLO.

KEEP GETTING AHEAD

In your profession
by reading
TV & Communications
Be a regular subscriber

MAIL THIS COUPON TODAY



TV & Communications

P.O. Box 63992

Oklahoma City, Okla.

Please start my subscription to "TV&C"

1 Yr. 2 Yrs. 3 Yrs.

Rates: \$5 a year, \$9 for two years, \$12 for three years.

Foreign: \$2 a year additional

Name _____

Address _____

City _____

State _____

Check here if this is a renewal CHECK ENCLOSED. BILL ME.

coupled with nationwide distribution through the Ameco "salesmobile" door-step delivery program, has resulted in several production growth phases during the past year.

A second building was acquired in February that tripled the size of production floor space and this necessitated tripling the size of the work force. And as of September 1, Ameco took over a third building in a growing complex that will double production capacity once more.

According to Merrill, Ameco has just completed the largest dollar volume year in the history of the company and will continue an expansion program geared to provide the prompt delivery schedules required by this fast-growing industry.

NETWORK CONSPIRACY CHARGED

A charge that San Francisco's three network television stations are engaged in a conspiracy to destroy competition has been made by Attorney J. W. Ehrlich.

The noted trial lawyer, who is chairman of a citizens' committee opposing efforts to outlaw subscription television in California, issued the charge after the three stations joined in refusing to accept commercial advertising time sought by Subscription Television, Inc.

The stations involved in the "conspiracy," Ehrlich said, are KRON-TV, local affiliate of the National Broadcasting Company; KGO-TV, the American Broadcasting Company's San Francisco outlet, and KPIX, a Columbia Broadcasting Company affiliate.

"These stations have simultaneously and for identical reasons refused to accept legitimate advertising offered by the subscription television people," Ehrlich said.

"This is a conspiracy under the law and under the moral codes that television, radio and newspapers share—to offer both sides in any issue the opportunity to be heard.

"The reasons given for refusing this advertising—because it is allegedly of a controversial nature—do not make sense and the management of these stations know it. All of them feature news programs concentrating upon controversial issues. Controversy makes news."

Ehrlich issued his statement after Sylvester L. (Pat) Weaver, Jr., president of the subscription television firm,

told the San Francisco Advertising Club in an address that KRON-TV, KPIX, and KGO-TV had all refused to accept STV advertising.

Weaver has asked the Federal Communications Commission to investigate the refusal.

JERROLD CORPORATION RETAINS PILOT

The Jerrold Corporation has announced that discussions with potential purchasers regarding the possible sale of Pilot Radio Corporation have been terminated.

Milton J. Shapp, President and Board Chairman of The Jerrold Corporation issued a statement that Jerrold has decided "to proceed with full force in the development of Pilot.

"Mr. Sidney Brandt has recently been appointed as General Manager of Pilot," continued Mr. Shapp. "Under his direction, Pilot is now moving forward with a complete engineering, production and marketing program geared for achieving the highest levels in the company's history."

SPRINGFIELD TV ANSWERS NCTA

Springfield Television Broadcasting Corporation has reaffirmed its position to the FCC that CATV is detrimental to the development and growth of UHF-TV service. The comments came in rebuttal to NCTA's charges that Springfield's earlier arguments were misleading and contained a double standard.

NCTA comments were filed on the FCC's proposed rules to regulate, under specified conditions, the grants to microwave operators who provide service to CATV systems. The association told FCC that CATV systems have no discernable adverse impact upon local television . . . and claimed that Springfield's double standard was evident in that company's printed literature. NCTA cited an advertising brochure from WRLP Greenfield, Mass. that proclaims additional coverage by being carried on 11 CATV systems—while, at the same time, the owners charge economic injury from the same systems.

Springfield's comments indicated that CATV systems in WRLP's service area have made it increasingly difficult to maintain local service and advertising revenue. That organization told the commission that prospects facing local television are "deluge, duplication, depreciation, displacement and destruction" as a result of the growth of CATV. □

TELEMATION TMW-2B *Weather Channel*



CHRISTMAS COMES EARLY AT TELEMATION

Someone between now and Christmas will take delivery on the 100th TMW-2B Weather Channel.

To celebrate this great occasion we are giving free a Samsonite V.I.P. Attache Case to everyone who takes delivery of a Weather Channel between now and Christmas.

In addition, the operator who receives the 100th TMW-2B will be given both a beautiful V.I.P. Case and a Bulova Accutron Electronic Wrist Watch.



TELEMATION INC.

2275 South West Temple
Salt Lake City, Utah 84115
Dept. VO



MATCHLESS OPPORTUNITY* to Increase your PROFIT Picture

If you are looking for the remote power supply that does the job which usually requires several different power supplies . . . then, look to CRAFTSMAN'S MODEL CPS-4 Remote Power Supply. (It's the only one you can get *FREE!)

The Craftsman Electronic Products Model CPS-4 Remote Power Supply is engineered to provide power for as many as 15 MD-2100 line extender amplifiers in cascade. Designed for installation at the distribution amplifier location where a remote 24-volt ac source is required to energize a Model MD-2100 line extender installed in the feeder line; it supplies a power source for a single MD-2100 unit in each of up to four feeder lines.

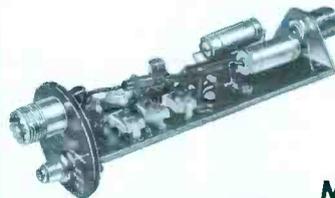


REMOTE POWER SUPPLY



MD-2100

LINE EXTENDER



MD-2100

PRINTED CIRCUIT BOARD

features of MODEL CPS-4

- 117-volt 60-cycle AC input
- 24-volt 60 cycle output at 2 amp
- Powers up to 4 MD-2100 units in 4 different directions (May power 15 MD-2100 units when in cascade)
- Model MF-61A Fittings on input and output
- Size 7" x 4 3/4" x 3 1/2"
- 3 1/2 lbs. shipping weight
- ONLY \$39.95 each
- Snap-on cover for accessibility
- Power indicator lamp
- Heavy-duty power cords

★ MODEL CPS-4 REMOTE POWER SUPPLY absolutely FREE . . . with the purchase of 5 MD-2100 Line Extenders!

That's right . . . with every purchase of 5 Model MD-2100 Line Extenders at \$62.50 each, we GIVE the Model CPS-4 Remote Power Supply * * * FREE * * * A genuine savings of \$39.95. You can't beat the price . . . and you can't beat the combined MD-2100 and CPS-4 performance.

LOOK—5 MD-2100 @ \$62.50 each=\$312.50

1 CPS-4 @ \$39.95 each

BUT—You pay ONLY \$312.50 . . . saving \$39.95!

This offer may be withdrawn at any time.

Manufacturers of a Complete Line of
Community Antenna Equipment and Accessories

You're always 'way out in front' when your community antenna equipment bears the Craftsman Electronic Products, Inc. signature.

WRITE TODAY for complete catalog and price lists . . .

CEP

**CRAFTSMAN
ELECTRONIC PRODUCTS, INC.**

133 WEST SENECA ST.

MANLIUS, N.Y. 13104

Area Code 315

Phone OVerbrook 2-9105

FOCUS

... On Progress

IRA KAMEN OPERATING AS KAMEN ASSOCIATES

Electronics executive, *Ira Kamen*, is now directing Kamen Associates, a New York City consulting firm.

Mr. Kamen, formerly Executive Vice-President of Teleglobe Pay TV Systems, Inc., is now serving clients in the broadcast and communications fields.

Mr. Kamen has been issued twelve major patents which have been licensed and/or assigned to RCA, General Bronze, McFadden-Bartell Corp., Teleglobe and others. His kudos include citations for outstanding performance from the United States Air Force, the United States Navy and Western Electric for his design of the DEW Line Communications Antenna System. He has served as President of Portland Industries; Vice-President of the General Bronze Corporation; and as a consultant to RCA, Paramount Pictures Corporation, Jerrold, TEMCO and a host of others.

JERROLD SCHOOL TEACHES MASTER TV

Engineering contractors and technicians from all over the country attended a recent Master TV antenna school in Philadelphia.

The one week course covered all aspects of Master TV antenna system design, installation and maintenance techniques.

According to *Jack Beever*, Jerrold National Training Director, this was "one of the most productive training courses we've ever run."



CATV VETERAN JOINS TELEPROMPTER

Caywood C. Cooley, Jr., a pioneer in the development of community antenna television and microwave systems and equipment, is joining TelePrompter Corporation as General Manager of its CATV Division, it was announced by *Irving B. Kahn*, Chairman and President.

Mr. Cooley has for the past 14 years been associated with Jerrold Electronics Corp., most recently as Vice President and General Manager of its Industrial Products Division.

He has been instrumental in the development of much of the equipment and the engineering techniques now in use throughout the CATV industry and helped to design and install the first professionally built system at Lansford, Pa., in 1951.

Subsequently, he was involved directly or in supervisory capacities in the design and installation of several hundred CATV systems.

Mr. Kahn said: "Mr. Cooley brings to our rapidly expanding CATV operations a background that is virtually unparalleled in the industry. We expect him to be a great asset as this division continues to grow."

SCHNEIDER IS NAMED TO STAFF

The appointment of *Raymond V. Schneider* as Vice President and General Manager of Meredith-Avco, Inc. has been announced by *Frank P. Fogarty*, President of the community antenna television (CATV) firm. Mr. Schneider previously was Vice Presi-

dent and General Manager of TelePrompter Corporation.

Mr. Schneider has been in the community antenna television business since 1952, starting as manager of the Williamsport Cable Co., later part of National General, with whom he remained until 1961. He then became eastern regional manager with TelePrompter, and was named general manager in 1962.

Mr. Schneider will headquarter in New York. He is a resident of Springdale, Conn.



HORNE SALES MANAGER FOR ARMADILLO

Frank C. Walz, Jr., President of Armadillo Manufacturing Co., manufacturers of engineered package equipment buildings and systems, recently announced appointment of *Mel A. Horne* as Sales Manager.

Horne will be based at the general offices of the company at 847 E. Colfax Ave., Denver. He will be responsible for sales of all Armadillo products.

A naval veteran of both World War II and the Korean conflict, Horne spent eleven years with AT&T in Kansas City, El Paso and Denver before joining Fab-Electric Engineering Corp. of Dallas, Texas in 1960. Fab-Electric Engineering is associated with the Armadillo Manufacturing Co. As manager of Fab-Electric, he was responsible for Armadillo sales in the Southwestern and Southeastern regions.

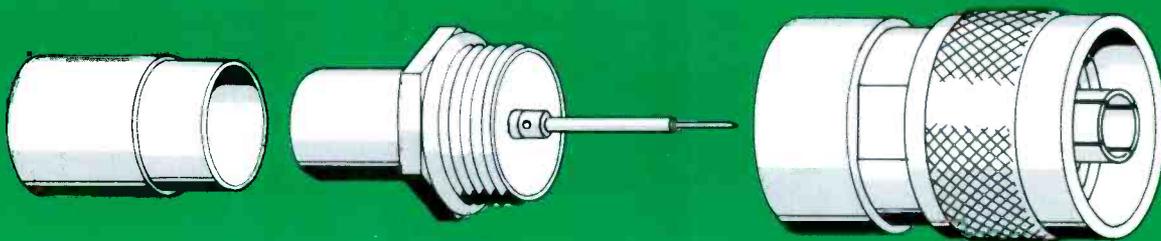
BCS NAMES BUSH

The Broadcasting Company of the South (BCS) announced recently that it has named *Leonard M. Bush* as Manager of its Sumter (S. Carolina) community antenna television (CATV) operations.

For the past two years, Mr. Bush

SUPERIOR

CAPTIVE CONTACT CONNECTORS



Eliminate pull-outs that cause blank screens

These new connectors make positive contact to eliminate any and all "pull-outs" that interrupt service and put out the picture. Designed to mate electrically and mechanically with

#4920 and #4930 "Cell-O-Air" coaxial cable with "Coppergard" shield. Superior's captive contact connectors assure full-system compatibility.

Both cable and connectors have been designed exclusively by SUPERIOR for the CATV Industry.

FULL CRIMP TYPE 75 OHM CONNECTOR

CABLE DESIGNATION	PLUGS		JACKS		SPLICE
	TYPE "N"	TYPE "UHF"	TYPE "N"	TYPE "UHF"	
4920	SC2CRN	SC2CRU	SC2CRNJ	SC2CRUJ	SC2CRS
4930	SC3CRN	SC3CRU	SC3CRNJ	SC3CRUJ	SC3CRS



Manufactured by
SUPERIOR CABLE
 Superior Cable Corporation • Hickory, North Carolina

has served as National Sales Coordinator for WIS-TV in Columbia, which in addition to community antenna systems in Florence, S.C.; Ocala, Fla.; and WSFA-TV in Montgomery, Ala., is owned and operated by BCS.

Mr. Bush will be in charge of the overall development of CATV in Sumter for BCS. When completed, the Sumter CATV complex will deliver multi-channel, all-network television service to residents of Sumter on a subscription basis.

Mr. Bush has served in various marketing capacities with the General Electric Company in Bloomfield, New Jersey. He was area manager for G. E. Supply Company in South Carolina with offices in Columbia. Mr. Bush left G. E. to become a sales engineer with the General Wholesale Distributing Company in Greenville, S.C., and joined BCS in 1961 following the FCC announcement that it was proposing to do away with wide-range VHF television channel ten in Columbia.

JERROLD APPOINTS GERARD WHITE

Gerard J. White has been appointed Regional Manager of the Jerrold Distributor Sales Division's Northeastern territories.

According to *Sanford Berlin*, Sales Manager of the Jerrold Division, Mr. White will be responsible for the sales of TV and FM antennas, antenna pre-amplifiers, and other home TV reception aids in the entire northeastern

area. The territory includes all of New England, Metropolitan New York, New York State, Ohio, Western Pennsylvania, West Virginia and Michigan.

When The Jerrold Corporation acquired TACO, in 1961, Gerard White was a TACO Regional Sales Manager. He then became a Regional Product Manager for The Jerrold Corporation, a position he held until his present promotion.



Salter



Bapp



Rollason

AMECO ADDS PERSONNEL

Bruce Walters, Director of Production for Ameco, Inc., announces personnel changes in the production department.

Farrell B. Salter has joined the company in the capacity of production department personnel manager. His background includes nine years with Boeing Aircraft and three years with Bell Aerosystems. Salter is currently an instructor in the Phoenix Adult Night School teaching "Supervisor Training" courses.

Another change in the production department is the advancement of *Floyd Bapp* who has moved from production supervision to the newly created position of production analyst

and expeditor. Bapp has been with Ameco for six and one-half years, preceded by four years service in the Air Force, stationed at Williams Air Force Base in Chandler, Arizona.

Robert H. Huston, Director of Public Relations & Advertising for Ameco, announces the addition of *Thelma M. Rollason* who joins the company in the capacity of commercial artist. Mrs. Rollason will assume the duties of *Jej Noble* who is returning to Arizona State University where he plans to continue studying commercial art.



BLONDER-TONGUE NAMES NEW REPRESENTATIVE

George Pettitt Company, Inc., Chicago has been appointed as manufacturer's representative for Blonder-Tongue Laboratories, Inc., it was announced by *Richard B. Helhoski*, director of marketing.

The new representative will cover northern Illinois, eastern Iowa and all of Wisconsin with the full line of Blonder-Tongue products — closed-circuit TV, master antenna and home UHF and VHF reception equipment — which will enable Pettitt to provide products for complete systems.

George Pettitt, president of the company bearing his name, has been in the electronic distribution field for 30 years. Prior to forming his own organization in 1948, he served as general sales manager for Drake Electronic Soldering Iron Co. □

DO YOUR PART . . .

Help us make *your* industry magazine more interesting and more useful to every CATV operator across the land. Send news items to TV&C. Include photos if possible. Address: *TV & Communications, Box 63992, Oklahoma City, Oklahoma.*

BURIED TREASURE!!

DIG OUT THE BEST BUYS POSSIBLE FOR YOUR CATV SYSTEM

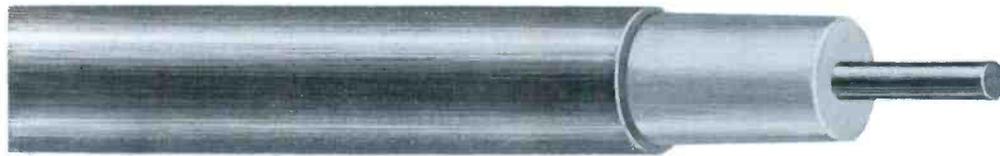
HIGH - QUALITY, **FAST** DELIVERY

Actually, there isn't much digging necessary, because we took the time to index all our items very carefully. As soon as this catalog is in your hands, you have, at your fingertips, every conceivable item necessary to build, operate, and maintain a CATV system. The highest quality, coupled with the fastest delivery service, makes TVC the leader in CATV supplies. Write today for your FREE Catalog!

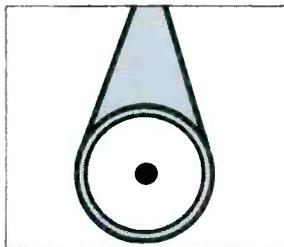


TV CABLE SUPPLY CO.
BOX 38 • CARLISLE, PENNA.
 PH 717-243-4918

NO SPLICES

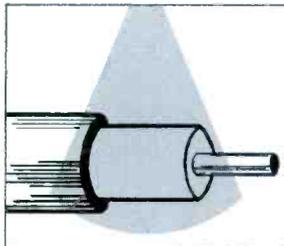


**...yet the other end of this
Plastoid Aluminum Sheathed Cable
is a mile away!**



Plastoid goes to great lengths for better CATV transmission. Cable lengths up to one mile mean fewer splices, less chance for moisture penetration.

Every inch of aluminum sheath is electronically inspected for uniformity and integrity during manufacture, then sweep-tested before shipping.



Special hydrostatic tests prove the Plastoid aluminum sheath stronger than conventional seamless. Neither seam nor sheath burst at pressures over 1,000 lbs. And why not? Seams are actually stronger than parent metal as proved by ASTM Cone tests.

In every length you get top notch frequency response. Low attenuation: Channel 6, .79 DB/100 ft; Channel 13, 1.26 DB/100 ft. No radiation. Excellent concentricity; non-sliding core. Yet this cable is competitive in price for both trunk and distribution lines.

PLASTOID



For more data,
call collect or write Plastoid today.

42-61 24TH STREET / LONG ISLAND CITY 1, N. Y. / ST 6-6200

THE STORY BEHIND

THE CATV INDUSTRY'S FINEST

Thousands of units now coming



SOLID-STATE EQUIPMENT

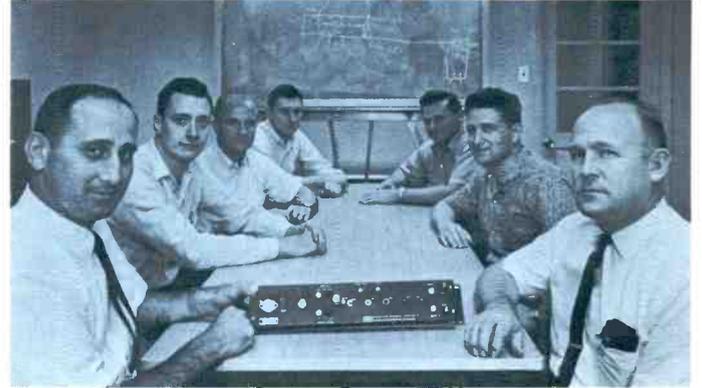
off the JERROLD production lines!

Three years ago, we firmly determined *not* to rush on the market with transistorized CATV gear until we developed the highest-quality, most reliable equipment ever offered the community-antenna industry.

Between 1961 and 1964, our top engineers devoted 50,000 manhours of hard, relentless design work to this program, always insisting that Jerrold solid-state channel preamplifiers, super-cascader mainline amplifiers, bridging amplifiers, and line extenders *must* possess 12-channel capability, with picture quality beyond compare . . . *must* perform day-in and day-out without interruption . . . *must*, in short, guarantee you the most solid foundation on which to build subscriber satisfaction and expanded system services in the years ahead.

Jerrold is now producing and shipping the equipment that meets these stringent performance requirements. Production facilities, already expanded to meet the demands of Jerrold's biggest CATV year in history, have been increased to accommodate the very heavy advance orders for transistorized units. The largest production runs ever undertaken by Jerrold will fulfill both present and future requirements of the CATV industry.

The scenes on these pages are a small example of current CATV activity at Jerrold. Each department—sales, engineering, production, shipping—is ready to meet your needs for the most advanced solid-state CATV equipment.



Twenty-one man-years of solid-state CATV design work are climaxed as seven Jerrold engineers examine a new TML-1 transistorized mainline amplifier.

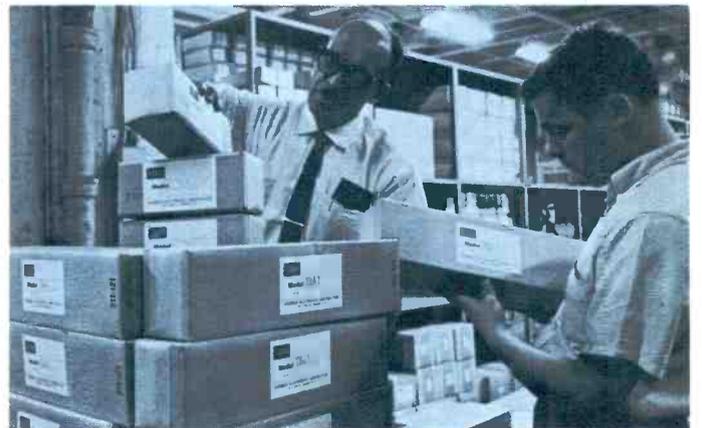


Jerrold production workers put the finishing touches on new solid-state CATV equipment.

New transistorized Jerrold CATV equipment ready for shipment throughout the country.



Maury Betchen, Production Mgr.; Robert Beisswenger, VP-Gen. Mgr.; Frank Ragone, Engineering; and Lee Zemnck, Mgr., Community Systems Div., inspect solid-state units off production line.



ORDER THE QUALITY YOUR DOLLARS DESERVE—GO JERROLD SOLID-STATE NOW!



Community Systems Division • 15th & Lehigh Ave., Phila., Pa. 19132 • 215-226-3456

SHARON, MASS.
No. 40 Lantern Lane
617-828-0767

PITTSBURGH, PA.
1301 Highland Bldg.
121 S. Highland Ave.
412-441-3050

MEADVILLE, PA.
970 Park Ave.
6-2505

SAN CARLOS, CALIF.
1042 Terminal Way
415-593-8273

DENVER 22, COLO.
2110 S. Ash St.
303-756-6283

DALLAS, TEXAS
4924 Greenville Ave.
214-368-1911

YAKIMA, WASH.
Ward Building
1 N. First St.
509-248-1717

Utilizing Local Newspaper for CATV PR

By Charles Wigutow,
TeleSystems Corporation

Pictures are the end product of cable television. All our technical skills are devoted to one purpose; that is to bring to the subscriber better pictures and more programs than he can get economically with individual reception devices.

If we think of ourselves as merchandisers of the materials that are delivered by cable, then we should be authorities on our products. No one questions the need to be expert in the ways of transporting pictures to the customer. However, there may be some doubt about the need to be familiar with the substance of what is seen daily in the home of the subscriber.

After all, the customer has his own tastes, and probably knows what he wants better than you do. This may be true, but television is not his business. It is yours. The same customer with well defined preferences will still be seeking answers on what programs, what quality and where and when shown, from an authoritative source.

If yours is a competitive situation you will not question the value of being the sole source of television information. A principle of physics learned in high school illustrates this point. Two objects cannot occupy the same place at the same time. The more it is *you* to whom they look on television matters, the less they will turn to others. Filling this place early enough in the game is one way of forestalling potential competition, or opposition to the cable system.

But there is more to being the fount of television

knowledge than trying to beat or keep out competition. The plain fact is it helps you sell cable connections. Of course you can sell these because cable is a better value, or you are making a special offer. That takes care of those

The Cable TV View



by
Phillips C. Lothrop
Manager,
Montpelier Television, Inc.



Newspapers, radio and television have been getting a lot of attention from the professors who study the behavior of people in numbers.

This makes sense. Printed periodicals and broadcasts reach masses of people. A major program on television is often viewed by more than thirty million people at the same instant. If such methods of speaking to vast audiences have any special meaning it is important to find this out.

Sociologists are in general agreement that all of the United States is rapidly becoming one community. This is a process that began with industrialization and was helped along, in turn, by railroads, automobiles and airplanes.

Magazines and network radio have contributed to the spread of information on a national scale. But it remained for television, the most lifelike of all communication methods, to come up with the most effective appeal.

After a national broadcasting event, you can drop into any community, regardless of size or location, and you will be at home in discussing that program. No one need wait days before an event or a trend spreads around the country.

If television has earned this place in our way of living, then it is important for us to have as much of it available as the science of electronics can bring us. This is why cable television is so meaningful to us in our community.

It allows for more sources of entertainment, news and information. It gives the individual his choice of more stations. Often the smaller community with a cable system has an even greater selection of television stations than is available in the largest cities.

The balance has been adjusted, at least where there is cable television, in favor of the less massively populated towns.

who are subject to hard sell. Many more people, however, prefer to feel that they have sold the idea of subscribing to the cable to themselves. These are the subscribers who are generally most loyal.

Such people do not necessarily buy quickly. You will find that building a reputation with them takes time. One method of adding stature is to be frequently quoted in the news on your opinions of television matters. This is fine if the newspaper editor turns to you on occasions of unusual programs. It shouldn't be hard to offer newsworthy comments when the cable brings something of local interest, otherwise not available off the air; or when co-channel weather is playing tricks on reception, all over town.

If these appearances in the press are spotty, the effect



Charles Wigutow, Contributing Editor for this magazine, is a man of varied interests and experience. Prior to becoming the Manager of Community Systems for TeleSystems Corporation, he managed CATV systems in Flagstaff, Arizona and Southern New Jersey. Wigutow has served as a management consultant, part owner of a large TV and appliance service center, has worked for the New York Herald Tribune and also held a post with an advertising agency.

THE CABLE TV VIEW

By: **Glenn Heck, Mgr**
ROBINS TELECABLE CORP.

Cable television, the kind of reception we enjoy in Warner Robins, "is the only television service which grew up in the grass-roots." Cable TV grew out of the needs of home town America.

By contrast, "all other forms of television have been or are being developed in the great population centers." How true are these quoted words from an address by Federal Communications Commissioner Frederick W. Ford to the community television industry convention last week in Philadelphia.

Commercial television had to locate inside of huge concentrations of population to earn its keep. Cable television was an answer by American enterprise to a demand by unserved and fringe reception areas for equal television treatment.

Cable television has not only come up with equal reception, but in many communities, it has bettered metropolitan viewing by providing more channels than are available in the larger cities. "In the United States," said the Commissioner, "we have developed the greatest television system in the world." And, "this (TV) is perhaps the most dynamic, powerful and influential of all the means of mass media in existence today."

I continue quoting the Commissioner in this column since his words come out of living with the broadest picture of electronics communications. He further said, "I am concerned here only with satisfying the need for expanded television service over and above what can be provided by the present allocation (that is the number of television stations we could have at maximum here)."

As I view it, this expanding need can and should be satisfied by the use of the alternate means; namely, wire (which in Warner Robins means cable television).

"The cable television industry has demonstrated that it has the capacity, desire and ability to furnish that additional service in the public interest. They have done it and undoubtedly will continue to do it on an ever increasing basis."

I don't mind saying that these words filled me with a sense of pride in the job we in cable TV are doing by providing our people with more information, news and entertainment than could ordinarily be made available by other means.



of a news credit is likely to be lost by the time the next one appears. Writing a steady TV column which will appear week after week seems to be the solution to getting into print, often and authoritatively. Such a column can skip around the entire area of TV. Programs can be anticipated or reviewed. Performing personalities can be discussed. The place and meaning of television subjects in the United States and in your town are readable subjects. After all, what other leisure time occupation is voluntarily attended so many hours each day by so many people.

A column has the virtue of appearing when you want it to appear. You don't have to wait on the editor's whim as to how much of it will be printed, or whether it will appear at all. You buy the space; it is up to you to make

CAPITAL FOR THE Community Antenna Television Industry

- for: 1 Plant Purchase
2 Equity Purchase
3 Acquisitions



pennsylvania growth investment corporation
Two Gateway Center, Pittsburgh, Pa. 15222
A SMALL BUSINESS INVESTMENT COMPANY

THE EASIEST TO USE FSM AVAILABLE!

Sadelco's Model FS-2

The easiest and most accurate field strength meter for CATV use. Fully transistorized battery operated. Peak reading of carriers from minus 35 db to plus 60 db. Calibrated in 1 db divisions. Two ranges cover VHF-TV M bands (54-108 mc and 174-216 mc).

ORDER YOUR FSM FROM DAVCO

FAMOUS FOR QUALITY THROUGHOUT THE CATV INDUSTRY



IMMEDIATE DELIVERY! ORDER NOW

Just \$295.00
Carrying case & 3 sets batteries incl.

DAVCO ELECTRONICS CORP.

IN CATV SINCE 1949

P.O. Drawer 861 • RI 3-3816 • Batesville, Ark. 72501



WOW WOW WOW WOW
WOW WOW WOW

mature **MANAGER** available

QUALIFICATIONS

1. AGE Mid-30's - can relocate
2. BS Management, minor Law/Engineering
3. Broad Consulting engineering background to:
 - TV Broadcast & translators
 - CATV & OEM
 - Independent telephone industry
 - Radio common carrier
 - Microwave
 - State regulatory agencies
4. FCC and Amateur Radio licenses
5. Commercial Pilot
6. Extensive knowledge of:
 - Public Relations
 - Advertising
 - Electronics magazine publishing/writing
7. IQ 143 Blood type "O"
8. Fair politician in that I've got bills passed
9. Total background in Electronics sales—OEM - Wholesale - representatives - dealer
10. Some financial experience

I've a few investments here and there. I goofed a few times—and recovered. I'm currently broke and interested in \$\$, but only if it's worth it to you.

(Broke by my standards, but Shell, Hilton, Diners, C-B, et. al. still honor my credit.)

INTERESTED?

Short or Long term as you desire.

If you are looking for a capable imaginative man who can accept total responsibility and expedite your project -

WRITE IN CONFIDENCE - giving full details of what you want done - if you're not rated, financial data would be helpful.

ALL REPLIES WILL BE ANSWERED

Box 5522, Reno, Nevada

it interesting enough to keep a reader following. Once you have this, you can take time out to call attention to some praiseworthy qualities of cable television as they become timely.

The column, as a public relations tool has drawn some interesting responses. A column on The Munsters, recently resulted in a letter from a highly placed Georgia official expressing gratitude to the publisher of this article for pointing out, "that odd shape of frame or feature might be the result of illness or injury, and such a person seeks affection with greater intensity than others."

Television Today

Frontier's 'Idea' Aids Westerns

By CHARLES WIGUTOW

Nine out of ten top popularity rated programs on television are Westerns. I have been wondering what the significance of this could be. There comes to mind the Theory of the American Frontier by the historian, Frederick Jackson Turner, which says that a new kind of historical development was shaped for America because of its Western Frontier.

Into this frontier escaped those who were oppressed by the closeness of cities, its crowds and factories. Here came adventurous people who lived by codes fashioned from reed and the spirit of daring.

It seems to me that the love of the "western" does not merely lie in gun duels and galloping horses. There is contained in the better dramatizations the saga of an adventurous era. If it were not a frontier, our land in the past would have been peopled by ordinary work-a-day folk. Legends would not have developed; the folklore would not have been of

gigantic men who strode over impossible obstacles.

We might say that the frontier period represents the high pitched enthusiastic adolescence of America, and in watching a western, there is a certain amount of sharing in this age. Here, too, there are various levels of viewer participation. Of course there is the usual blood and thunder TV show in which the sheriff gets the bad man in the last minute. There is the program that deals with the west of the last century in terms of men and women as honest to goodness human beings of that time; and most spectacular are the pictured legends of the west carried out almost on the scale of Superman Paul Bunyan. A rich history is contained in these exploits which might excuse a sometimes too frequent repetition of a certain pattern. However, when the creative level is lifted as it is in the showing of an adult program on our open regions, there is a glimpse for those who will see, into the making of America and its peoples of today.

A New England dealer magazine, Dealerscope, spoke of the help Phil Lothrop of Green Mountain cable system was giving Burlington's dealers in publicizing the variety of programs for the coming television season. A Michigan banker wrote Richard Bur of Marquette commending him on his efforts by column to promote the worthwhile events that came by television.

How do you go about writing these periodic pieces? You can read up on television. There are plenty of fascinating books around on how programs are written and produced. There are research pieces on the effects of television, and the psychological uses to which the set is put by viewers. Soap Operas to ease one's own troubles; escape for relaxation; thrillers to bring excitement for the hour.

Why not study these social and dramatic aspects of the television set. It's fascinating because TV has become so much a part of most peoples' every day lives. It's a knowledge you can share with all your readers with surprisingly beneficial results to your cable system. □

TRANSISTORIZED

CATV All-Band Trunk & Distribution Combination Amplifier

Maximum output capability
exceeds by far all transistor
CATV Equipment now available



TRA - 220

\$325.00

The CAS TRA-220 transistorized CATV amplifier is designed for easy, economical mounting—NO CONNECTORS REQUIRED! The cast-aluminum housing is permanently mounted to the messenger strand and will accept any cable size from RG-59/U to 3/4" aluminum. A door that is hinged to open downward seals out dust and moisture and permits the transistorized module to be easily removed or adjusted.

A unique AUTOMATIC TEMPERATURE COMPENSATION (ATC) circuit controls the gain of the TRA-220 and compensates for cable variations due to temperature.

A built-in regulator that requires no adjustment- accepts cable-fed voltage from 20v. to 30v. a.c. and provides maximum protection from lightning and surges.

FEATURES

- COMPLETELY TRANSISTORIZED
- WIDE BANDWIDTH (40 - 220 MC)
- CABLE POWERED
- GAIN AND TILT TEMPERATURE COMPENSATED
- WEATHER PROOF STRAND MOUNTING ENCLOSURE
- FLAT STABLE RESPONSE
- TABS CONTROL FLOW OF CURRENT IN AND OUT OF AMPLIFIER
- TRANSISTORIZED CIRCUIT CUTS OPERATIONAL EXPENSE MANY TIMES OVER
- NO CONNECTORS REQUIRED
- ACCEPTS ANY CABLE FROM RG-59/U - 3/4" ALUMINUM
- DIMENSIONS - 12" X 4" X 3.5"

SPECIFICATIONS

TRUNK AMPLIFIER

GAIN 24 db plus 2 as temperature compensation.
BANDWIDTH 40 - 220 MC
INPUT V.S.W.R. 1.2
GAIN CONTROL 5 db
TILT CONTROL 4 db
RECOMMENDED INPUT LEVEL IN CASCADE.
Plus 12 db flat
RECOMMENDED OUTPUT LEVEL IN CASCADE.
Plus 34 High Band
Plus 24 Low Band*

* Figures shown are derated approximately 25 db! From maximum output capability.

TEST POINT Minus 20 db input and output
POWER SOURCE 25 - 35 volts A.C. or plus D.C.

DISTRIBUTION AMPLIFIER

USABLE OUTPUT LEVEL AFTER 4-WAY SPLIT
Plus 46 db.
GAIN CONTROL - 5 db.
TILT CONTROL - 4 db.
SINGLE OUTPUT FEEDS 2- or 4-WAY SPLITTER
SUPPLIES AC POWER TO OUTPUT FOR LINE EXTENDER OPERATION

NOTES

V.S.W.R.: An overall improvement in V.S.W.R. has been obtained by eliminating connectors and jumper cables in the trunk line.

CASCADING: High maximum output capability allows the TRA-220 to be cascaded and still maintain a safety margin from distortion.



P. O. DRAWER B • MINERAL WELLS, TEXAS • FA 5-5124

CATV, A Success in Sedona!



The view from the ivory tower offices high above Austin, Texas had lost its glamour. The martini circuit that meant long lunch hours and the expressway arteries flowing automobiles to the suburbs and rivaling the Indianapolis speedway had become too much. In short, Jim Geary was sick of the rat race.

Although already considered one of Austin's outstanding young attorneys and well established with a leading law firm, Jim decided that what he needed was a new view and a new field. He found both in Sedona, Arizona.

As the spectacular splendor of the red rock country at the foot of Oak Creek Canyon came into view through the windshield of the Aero-Commander, Jim Geary knew that this was it. Austin was six weeks behind and Jim had seen most of the West in his search for "the spot." Now he knew he had found it.

When Jim Geary decides on something, he moves fast. Within a month, the home in Austin was sold and the Gearys were comfortably settled beneath the towering rocks of Sedona.

As the sunlight splashed over the mountains surrounding Sedona and bathed the area in a riot of color each morning, the country club social pyramid of Austin became insignificant. The roots in Sedona grew deeper. And if there was ever any doubt during the day about the decision being the wrong one, it was quickly dissolved each evening as the sunset provided a perpetual ebb tide of color to close the day.

Jim's first business venture in the Sedona area was to establish "Sedona West." This real estate development would be familiar to anyone visiting Sedona because it has served as the back-drop for 40 western movies. For

two decades Hollywood had been turning to the rocks of Sedona for their technicolor spectacles. To name just a few of the movies that have been shot on location on the land purchased by Jim . . . "Rounders," "Johnny Guitar," "Pony Soldier," "Drum Beat," "Flaming Arrow," "Broken Arrow" and "Gun Fury."

Three years and many beautiful homes later found Jim Geary in need of a greater challenge than that offered by a subdivision. In a town the size of Sedona Jim wondered what further opportunities might present themselves.

Looking around for another business venture, he discovered the obvious in a very antiquated cable system. With Phoenix 120 miles away and several ranges of mountains blocking a good TV signal, television reception could be termed poor at its best. Due to the use of five different kinds of equipment and several miles of open wire, the cable picture at that time couldn't be classified as much better. Naturally enough, under these adverse circum-



The microwave dish, headend gear, weatherscan camera, "Today in Sedona" camera, and spare equipment are all housed in one compact building.

stances, the cable service was inconsistent; the cable company's public image none too bright. To make matters worse—for the cable owner—a translator also served Sedona.

Until his arrival in Sedona, Jim had never heard of cable television. But now he realized he had found an intriguing business and a great challenge. He set out to do something about it.

The first thing that Jim did upon purchasing the existing system was to make arrangements to replace all of the equipment and cable. Realizing he must learn the business from the ground up, Jim spent the next several months climbing poles as Ameco constructed a complete solid-state turnkey system. By the time the system was



As this picture indicates, a headend need not stick out like a sore thumb. The building and dish are camouflaged so that they in no way spoil the surrounding beauty of Sedona West.

finished, Jim truly knew community cable operation "from the ground up."

While an antenna on a mountain adjacent to Sedona with cable running down the side of the mountain to the town could have provided a better than average picture, Jim was determined to go "first class" all the way.

The population of Sedona was small but Jim still felt that the quality of a microwave conveyed picture would pay off in the long run. Time has proven him right because most of the 1,000 homes in the area are now clamoring for a cable hookup. Four Phoenix channels of television and two FM radio stations are being microwaved to Sedona by Antennavision Service Company at the present time. Three Los Angeles channels will soon be added to the attractive entertainment package offered the Sedona-Oak Creek TV Cable Company customer.

Many of the innovations introduced by Jim are living proof that a cable system need not be large to provide unique service. For example, the equivalent of the "long ring" of the old



Mrs. Geary explains the world of pleasure available on the cable to a prospective customer.

fashioned party line telephone is available for civil defense or public service use. With just the flick of a switch, all channels on the Sedona-Oak Creek Cable System can be preempted in case of an emergency to provide modern "party line." If there is a large fire or a child is lost in the area, the fire chief or sheriff can appear on all cable system channels to make an announcement and alert virtually the entire community.

This unusual and valuable service has made an immense improvement in public relations for the cable system.

Realizing that the prior cable company had a poor public image due to a poor and undependable picture, Jim undertook another important step to improve his system's public image. Although it was a long and tedious job, he personally started knocking on doors and calling on *every home* in the Sedona area to explain exactly what he was doing to bring them a new world of television entertainment. This kind of "shoe leather" public relations promotion has paid big dividends in cable hook-ups.

Since most of the people have come



As the citizens of Sedona drive down the one main street of the town, the sign above the cable company office makes it clear that there are seven channels of pleasure exclusively on cable.

to Sedona from large cities such as Los Angeles and New York, they were used to the very finest in television reception. They now have it with the combination of aluminum-sheathed cable, solid-state equipment, and dependable microwave service.

One of the new features that is surprisingly popular is the two FM radio stations being carried via microwave. Sedona, being in a mountain-trapped



Jim Geary is seen adjusting the slide projector in the headend building that is used for messages and to show some of the scenic beauty that surrounds Sedona.

area, lacked good radio reception prior to its being offered on the cable.

In the operation of the community television system Jim faced two obstacles. One was the reputation of the previous cable service; the other was the translator serving the area. Realizing that the best way to overcome competition is to give the public an opportunity to compare, Jim invited one and all to view television reception via translator side by side with cable reception. The television sets were set

up in an area that received the very best translator picture in town, but even then the cable television showed the translator picture to be inferior.

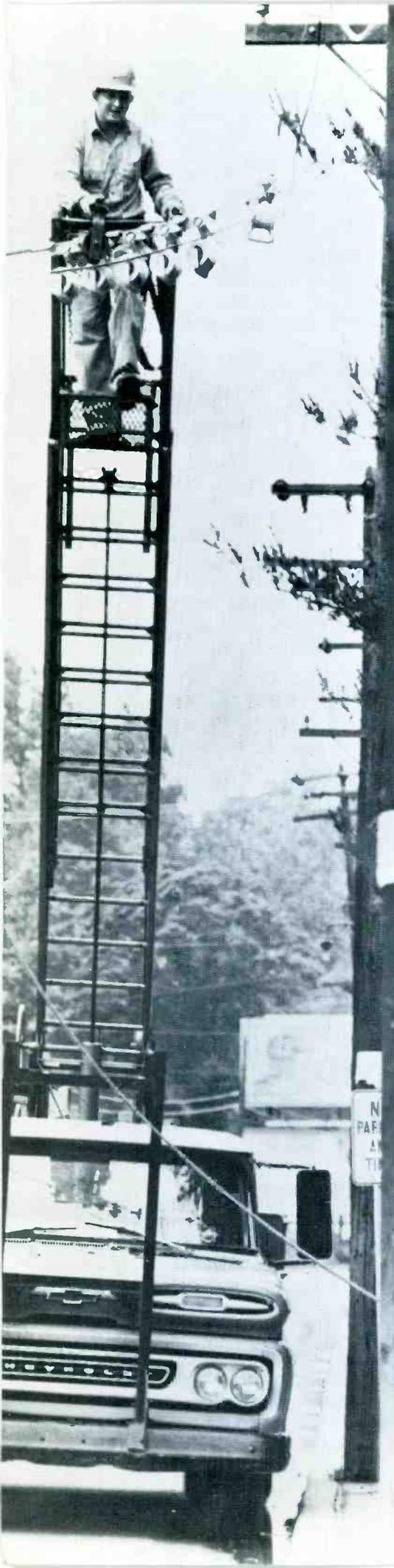
The seven monitors carrying the seven pictures available on the cable have proved to be an extremely popular addition to the cable office. Each morning it has become necessary to wash hand and nose prints off the cable company windows from prospective customers who were anxious to see for themselves the excellent pictures available on cable!

In addition to the regular weather-scan channel with FM background music, Jim offers a unique feature called "Today in Sedona." This channel serves as a community bulletin board for all community activities. Rotary, Kiwanis, Chamber of Commerce, schools, churches, etc. all take advantage of this channel and use it as a community bulletin board to publicize current activities.

Jim Geary has truly turned a poor public image into an excellent public image by updating his equipment and proving to one and all that a cable

system can be an important part of a community. With today's advanced television distribution technology to aid him, Jim delivers six entertainment and two auxiliary channels to his customers. Soon the cable subscribers in this remote town will receive *seven* channels of television entertainment, two FM stations, weather channel and a community service channel.

Jim Geary has met a big need in his beautiful community—and made CATV a success in Sedona! □



THE ECONOMICS OF CABLE TELEVISION

By R. L. COWART
*Vice President,
 National Trans-Video, Inc.*

One of the primary considerations in the construction and operation of a cable system is the initial cost and the accumulated operating cost over a five-year period. Our procedure is to analyze the various configurations of cable and amplifier as the first consideration when planning a new system.

We will discuss today a theoretical cable system of 100,000 ft. and see the various ways that this system can be built. We will consider only the trunk line for our purposes here, but this same procedure is applicable to the distribution portion of a system as well.

The goal of most modern systems is to accomplish transportation of signals from an antenna site to a distribution area with minimum deterioration of quality and for minimum initial cost and a minimum operating cost.

Because of the rapid changes in technology we normally assume that new and vastly changing techniques and materials will be available in periods of approximately ten years and, therefore, it makes better sense to design a system for efficient operation for a ten-year period instead of attempting to design one that will operate for fifty years. Surprisingly enough, we find that our design approaches to the system built for five years, or ten

years, is almost exactly the same system designed for the fifty-year life.

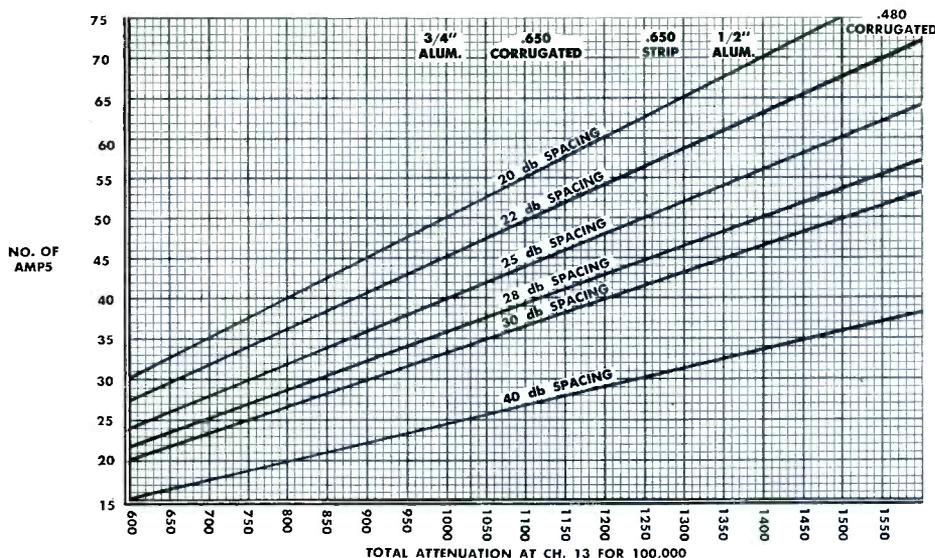
You often hear that various systems are being built with maximum quality. What this usually means is that the initial cost is extremely high and the operators are hoping to recover part of this cost by reduced maintenance in operation of the system. When you actually examine the systems that are built under this philosophy you almost invariably find that they have *not* achieved this goal and that their operating costs are far higher than had they chosen procedure other than the "Deluxe" approach. This can be so easily shown that I am somewhat at a loss to understand what method they used to reach their conclusion.

For the purposes of this discussion I shall refer to four typical cable types as follows:

- Type (A): .480" O.D. Corrugated
- Type (B): .650" O.D. Corrugated
- Type (C): .480" O.D. Strip Braid
- Type (D): 1/2" O.D. Foam Dielectric
- Type (E): 3/4" O.D. Foam Dielectric

Let's take, as an example, a 20-mile section of trunk, and use in our example the Type (A) and Type (B) as two possible cables for this system and see just what the difference in actual

	Broadband	Transistorized	Split Band	Transistorized Split Band/
No. Trunk Amps	37	22	15	15
No. Distribution Amps	57	74	39	45
No. Enclosures requiring Pole Mounting	67	27	25	23
No. Enclosures or locations requiring power	67	(strand mtd.) 7	25	23
No. Tubes	839	0	494	354
Total Power Required, Watts	5,781	1,400	4,550	3,550
System s/n degradation at end of trunk	-15.5 db	-14 db	-12 db	-12 db
Total Cost - Active Portion	\$18,182.00	\$13,053.40	\$12,810.00	\$10,876.00



cost would be with each of these cables. For the sake of simplicity, let's round it off to 100,000 ft. of each type. We will take the loss figures of 1½ db per hundred at Channel 13 for (A) and 1 db per hundred at Channel 13 for (B). Since this is to be a high quality system, let's use a broadband distributed constant amplifier and to give us a little reserve, we will use only 20 db of spacing. We find that the (A) gives us a total attenuation of

	Type (A)	Type (B)	Type (C)	Type (D)	Type (E)
Initial	\$33,000	\$29,000	\$33,225	\$39,750	\$47,610
5 years	30,750	20,500	26,650	30,750	20,500
Total	\$63,750	\$49,500	\$59,875	\$70,500	\$68,110

1,500 db versus 1,000 db for (B). At 20 db spacing this line using (A) will require 75 amplifiers and (B) will require only 50 amplifiers. If we can buy these amplifiers for \$300 each and install them on the poles for \$40 this will give us an installed amplifier cost of \$25,500 with cable (A) and \$17,000 with cable (B). We can immediately see that we have saved \$8,500 in amplifier cost if the system were built with (B).

Now the problem is to see whether the difference in price of (B) can be made up by our amplifier savings of \$8,500. This is not the only savings possible as we will see later. Let's assume the price for (A) is \$75/M and \$120/M for (B). We can buy 100,000 ft. of (A) for \$7,500, and (B) would cost us \$12,000. Our additional cable cost, if we were to use (B), would be \$4,500 but we have already saved \$8,500 in amplifiers so our net initial savings is \$4,000.

Now, let's look at the operating costs for a five-year period for these two

systems. We will assign some normal costs to each amplifier such as:

- Pole Space, Misc. \$12 per year
- Power \$30 per year
- Maintenance (incl parts) \$40 per year

The total for each amplifier is \$82 per year. With the Type (A) system we will be using 75 amplifiers and in five years can anticipate an operating cost of \$30,750. With the Type (B), we are only using 50 amplifiers and

our five-year operating cost will be \$20,500. You can see we have saved in operating costs alone \$10,250 in five years. When we combine the operating savings with our \$4,000 initial savings and combined five-year installation and operating costs we will show a \$14,250 savings if the system is built with trunk cable (B). This is the direct cash savings and is actually con-

	Type (A)	Type (B)	Type (C)	Type (D)	Type (E)
Initial	\$27,600	\$23,800	\$30,945	\$41,850	\$54,410
5 years	18,000	12,200	15,600	18,000	12,200
Total	\$45,600	\$36,000	\$46,545	\$59,850	\$66,610

siderably greater because we have not fully allowed for the original installation of the amplifiers, the labor and material costs for connectors, splicing, equalizing and so forth. We have accomplished greater reliability by a reduction of active components and our

	Type (A)	Type (B)	Type (C)	Type (D)	Type (E)
Broadband	\$33,000	\$29,000	\$33,225	\$39,750	\$47,610
Transistorized	30,610	27,335	32,780	37,360	45,945
Split Band	27,600	23,800	30,945	34,300	38,910

system signal to noise ratio is 2 db better than it would have been had we built the system with (A).

Let's suppose that we were one of the people who said we were going to build a quality system and use the best cable we could buy. We would probably agree that the best would be ¾" foam, Type (E), so let's take a look at this same system with the same type of amplifiers built with this cable, and compare it to other cables.

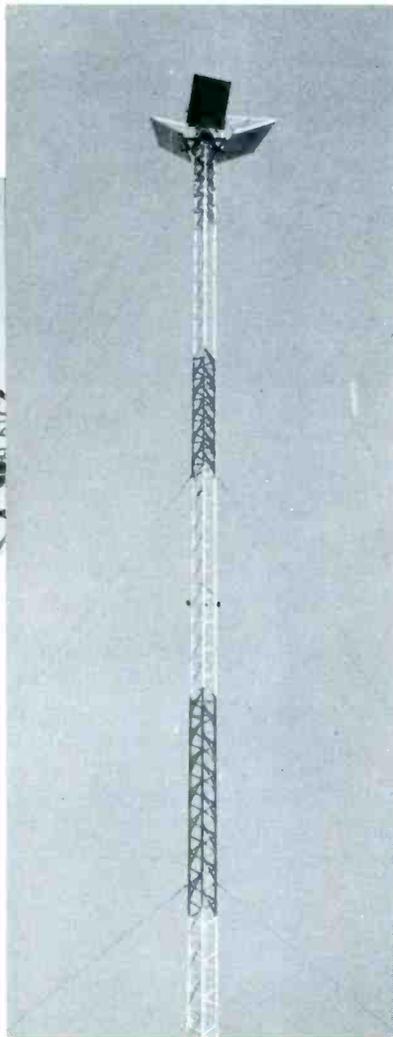
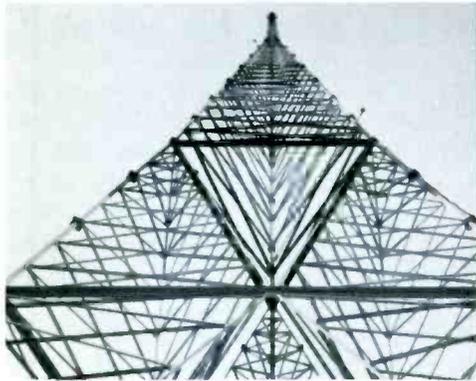
This set of figures is most interesting. It definitely proves that the man with the "Deluxe" system has not achieved his original goal. He has not been able to recover his excessive original cost through a decrease in maintenance. Furthermore, he has such an expensive system that he will be unable to take full advantage of any technological change that may occur in the future. The person with the (B) system, on the other hand, can afford to completely replace his cable in five years to utilize improved technique and still be thousands of dollars ahead of the "Deluxe" system. The big point of the user of the ¾" foam is that he would have virtually no cable replacement problems and he really has a reason for concern because of his huge original investment in cable.

Let's look again at the system with the trunk Type (B). This system has only \$12,000 invested in trunk cable. Were he to lose 50% of his cable plant due to moisture, increased attenuation and so forth, he can replace it and still be \$13,000 ahead of the ¾" foam system. This is the real key—the fact that the actual value of the cable is generally a small fraction of the total initial cost and that it is not realistic to consider a useful life in excess of ten years. It simply does not

make economic sense.

Someone might comment that these figures would be greatly different if "X" brand amplifiers were used. Let's see if this is true. There are three major techniques in the industry today: One is the tubed broadband dis-

CHECK ROHN FOR YOUR TOWER NEEDS FIRST!



- ✓ Full line of proved communication towers to fit every need . . . includes heavy duty broadcast, CATV, and microwave.
- ✓ Tower design and engineering is tested by thousands of ROHN tower installations.
- ✓ Complete installation service available to take care of the entire job—professionally and to save you money.
- ✓ Complete line of microwave reflectors and tower lighting equipment available.
- ✓ Deal with one of the oldest and largest tower manufacturers in the U. S.—representatives world-wide.

Write—Call—Wire for Immediate Service

ROHN Manufacturing Co.

P. O. Box 2000, Peoria, Illinois

Phone AC 309-637-8416

tributed amplifier (that we based our first figures on); the second is a broadband transistorized amplifier and the third is a split band type that uses separate amplifiers for the low and the highband portions of the TV spectrum.

For the second analysis we will consider a system using a split band technique. The only major difference in these three types of systems is the slightly higher gain available per amplifier and the fact that the number of tubes is reduced as only half as many lowband amplifiers as highband are required.

Upon examining these figures it is readily apparent that the proportionate costs are exactly the same but it is most interesting to note that they are all less.

The next obvious step in our analysis is to try a combination of various amplifier types with various cables in order to determine the best cable/amplifier combination. We will concern ourselves now only with the initial cost as it is somewhat difficult to acquire reliable operating histories on the transistorized type systems.

As certain types of transistorized amplifiers lend themselves well to low cost distribution, we have made a study of an actual system laid out four different ways. The first is a broadband distributed tubed amplifier; the second is a completely transistorized system; the third is a complete split band system and the fourth is a combination split band/transistorized system. In this combination other factors are also considered as shown in Table I.

We have demonstrated in the preceding discussion several important basic rules that guide cable system philosophies. We have discovered that a profitable system can not be built unless each item is analyzed as to how it fits into the total system operation. We have demonstrated that an item may be very satisfactory when compared to others of its kind but does not blend itself well into the composite system. We have also discovered that a few minutes' simple analysis of the various system equipment combinations can result in savings of thousands of dollars in over-all operation. We have destroyed some myths of the "Deluxe" approach.

We have pointed the way to vastly increased economic potential for the system operators. □

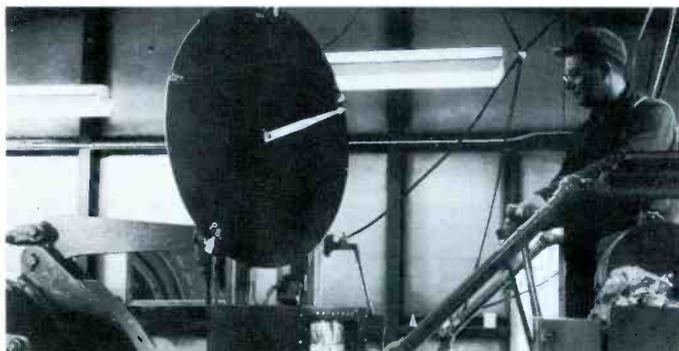
CONVEYOR SYSTEM MONITORED BY CLOSED-CIRCUIT TELEVISION

New, cost-saving applications for closed-circuit television (CCTV) are being discovered with increasing frequency. One of the hundreds of CCTV uses found in the mining industry. For example, closed-circuit television is reducing overhead expenses and, at the same time, helping to control ore movements for White Pine Copper Co. at Pine, Mich. The system has freed several men from watching critical transfer points along an extensive underground conveyor belt network. To achieve these benefits, the company uses three separate television systems comprising six cameras and six monitors.

In the ten-year old White Pine mine, the largest room-and-pillar copper mine in the country, two television systems monitor more than 15,000 tons of ore as it is carried to the surface each day. The third system is in the recently opened Southwest mine.

The largest television system uses three monitors located in a central control room overlooking a crusher. Connected to the monitors by coaxial cable are cameras 2,450 ft., 1,900 and 40 ft. away—at transfer points along the main conveyor line.

In daily operations, the man at the control point observes the flow of ore at the transfer stations pictured on



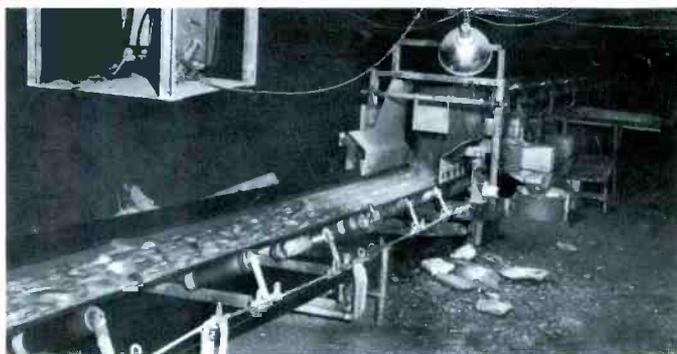
Cameras observing the main conveyor line are located 2,450, 1,900 and 40 ft. from the monitors. Illumination at the transfer points is provided by 400-watt mercury vapor lights.



Hoist operator at the Southwest mine watches dumping of skips by means of closed-circuit television system.

the monitor screens. If jam-ups occur at the transfers, the belts are stopped immediately and arrangements made to remove the obstruction.

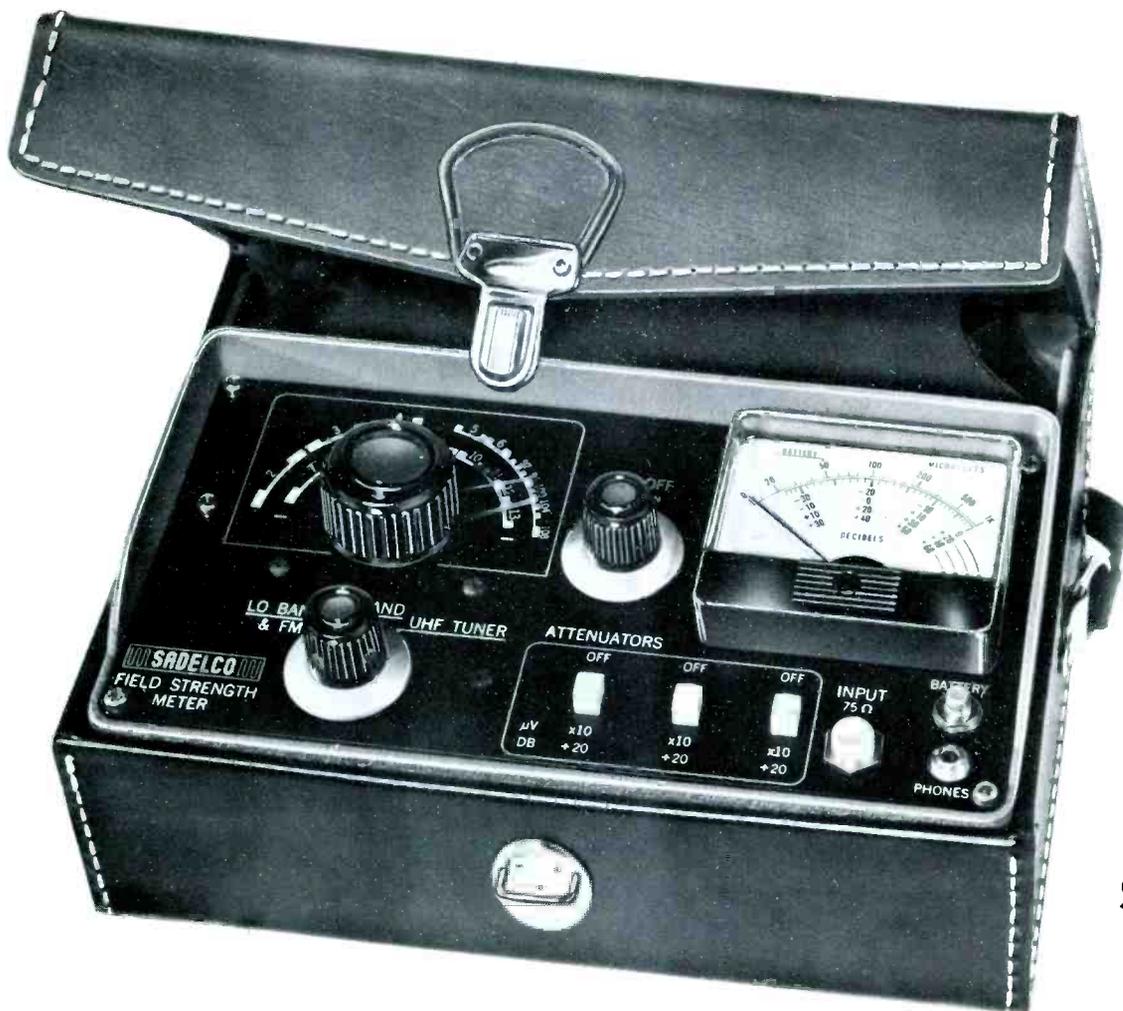
A second system at another crusher station, consisting of two monitors and two cameras, permits remote observation of two conveyor transfer points where ore is carried from the crusher to the main conveyor line. In this system, the cameras are 2,300 and 1,200 ft. away from the monitors.



Two conveyors and the crusher are started and stopped at a control station where television monitors permit remote observation of transfer points on the conveyor system.

Specially designed for operation in high humidity atmospheres, the television equipment is moisture-proof and dust-proof. The monitors are encased in heavy gauge steel housings, with the 14-in. picture tubes protected by laminated safety glass windows. To prevent damage by fine dust particles, the cameras are also enclosed in special metal cases, with lenses covered by safety glass. Illumination for cameras at transfer points is provided by 400-watt mercury vapor light.

The system at the Southwest mine uses one monitor and one camera, enabling a hoist operator to watch the dumping movements of two 5-ton capacity skips. The camera is connected by 250 ft. of coaxial line to the monitor on the hoist operator's platform.



\$295

Complete with
carrying case
and batteries

SADELCO'S NEW STANDARD IN VHF FIELD STRENGTH METERS

**THIS IS THE FASTEST, AND EASIEST TO READ FIELD STRENGTH
METER AVAILABLE TODAY**

All wiring printed on glass epoxy • Tuned circuits use small, shock resistant fibreglass coil forms or subminiature fully encapsulated fixed inductances • Latest semi-conductor diodes and transistors • Reduced battery current consumption lengthens battery life • Long term stability, temperature compensated • VHF TV FM in two ranges (54-108 Mc & 174-216 Mc) • Peak reading, Carriers marked • 75 ohm, F connector, matched input • Calibrated from minus 33 to plus 60 db in 1 db divisions and from 10 microvolts to 1.0 volts • AGC assures accuracy of plus or minus 1.75 db or better



formerly Telco

BOX 38, CARLISLE, PENNA.

PHONE 717-243-4918

"The place to buy EVERYTHING for your CATV system"

TV&C VISITS *entron* INCORPORATED



After a pleasant half hour drive from the Washington National Airport we arrived at Montgomery Industrial Park in Silver Springs, Maryland. This is the home of Entron, Inc., a pioneer CATV manufacturing and engineering firm.

We anticipated our visit with Entron, Inc., and its energetic President, Mr. Robert J. McGeehan, with high expectations, and we were not disappointed. The new Entron facility (occupied since mid-1962) is a splendid evidence of the CATV industry's dynamic growth. Located in a beautiful suburban industrial development, the Entron plant reflects careful functional planning. Every department is well lighted and spacious with bright, cheerful decor.

A thorough briefing was provided covering the company sales program, long-range objectives, and describing the Entron concept of community television for big cities. The idea of wiring large cities, even multi-station markets, dates back to 1960 in Entron thinking. Today we are witnessing the implementation of this concept on an industry-wide basis.

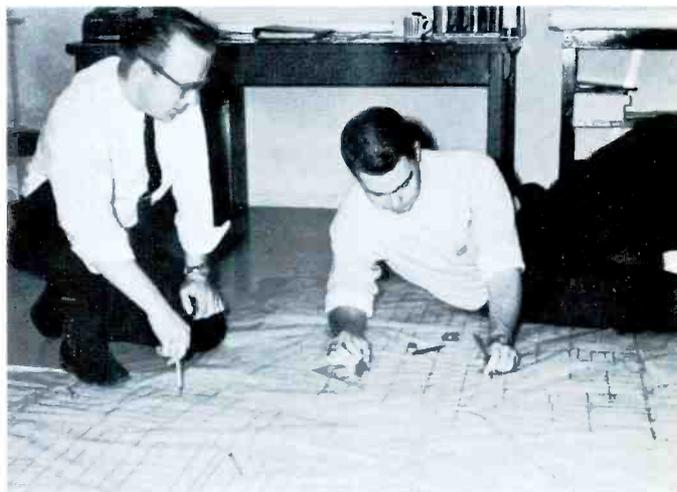
Since the eventuality of big-city CATV was clearly foreseen, Entron has been particularly conscious of factors affecting performance, reliability, and costs. In any system, losses and picture degradation are cumulative. Therefore, the larger the system, the higher the quality requirement for system components. Entron introduced the large scale use of highly reliable and premium quality 10,000-hour tubes as well as voltage regulating transformers in their electronic equipment, scoring another industry "first."



Robert J. McGeehan, President of Entron, Inc. and a company founder, has been active in CATV since 1951.

For specific details on Entron engineering approaches we went, quite naturally, to see Vice-President Heinz Blum, who heads the engineering department. He has been with Entron, in his present capacity, since 1953 and has more than seventeen years of electronic systems design and installation to his credit.

Heinz detailed the formation of key company philosophy relative to community antenna requirements. In 1960 two separate production programs were initiated: Plan (A) for construction of new all-band systems in large cities, and Plan (B) for conversions of existing low-band systems to all-band. The immediate need was for high-band amplifiers for addition to existing systems with intermediate amplifiers between two low/high-band stations. Consequently, the HRA series of high-band repeaters was introduced along with the LHB series of bridging amplifiers. Heinz pointed out that Entron had been the first to build



System layout plans are frequently too large for conventional drafting tables. Here, John Lehner (l) and Fred Link work in design for a large turn-key job.

Listed corporation wishes to acquire CATV systems or franchises in areas having potential of over 2,500 homes for cash, or tax free stock. Existing management desired where possible. Will deal with principals only. Completely confidential.

WRITE TODAY TO:

Dept. 102 - TV&C

P.O. Box 63992

Oklahoma City, Oklahoma

NOTHING BUT THE BEST



★ SUPPLY ★ ASSEMBLY ★ CONSTRUCTION

You can be confident of getting the most from your investment by consulting the established specialists in All Band CATV. The knowledge gained through a decade of successful system design and operation is now available to you. We feature the best of all major equipment lines—as well as complete layout and installation service. Call on the company that is truly “of CATV people—by CATV people—for CATV people!”

“From A Single Top To A Turn-Key System”

CATV

**EQUIPMENT
COMPANY**

144 Lakeside Ave. East 9-1798
Seattle, Washington 98122

a low-band bridging amplifier with gain; the same design concept was retained in the new high-band equipment.

To implement Plan (A) it was apparent that high output amplifiers would be necessary. In 1960 an average “big system” probably included 50 miles of plant. Entron was, of course, aiming for the capability of supplying the 1,000-mile system. Indications are that the “state of the art” has just about reached that point.

The new LHR low/high repeater series, introduced this year, and the LHD low/high distribution amplifiers brought out in 1963 are already in operation in several systems. Among them is the Utica, N. Y. system which anticipates growth to a 300-mile plant. Credit for implementing the Plan (A) high performance equipment goes to Mr. Irving Kuzminsky, Director of Advanced Engineering. Mr. Andy Silins and Mr. William Hsiao, design engineers, performed the necessary design engineering to provide the Plan A equipment.

Heinz is an authority on television distribution and a very personable gentleman. We would have enjoyed talking with him for many more hours—but we had a schedule to keep. So we reported back to our very gracious hostess and tour guide, Mrs. Joan Homa, Entron’s Advertising Manager. Next on the itinerary was an inspection of manufacturing and system design facilities.

Presiding over production, is Mr. Anthony Vendemia, Manager of Manufacturing. Typical of Entron’s well-schooled executives, Tony holds a law degree from the

University of Baltimore. A decade in electronics manufacturing experience well qualifies him for the direction of all manufacturing at Entron.

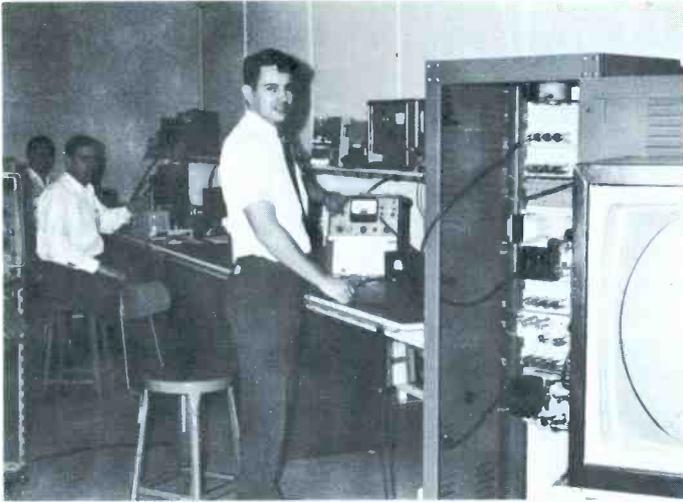
From the customer’s viewpoint, prompt delivery is high on the priority list. Essential to Entron’s timely product delivery is the efficient purchasing department which channels materials and components for manufacture. We had an opportunity to view tens of thousands of stockpiled components—and we can appreciate the complexity of Purchasing Agent John Paszkiet’s job.



Vice-President Heinz Blum shows TV&C reporter a five-channel head-end unit being checked out during final assembly.

An outstanding characteristic of Entron, Inc., is its emphasis on publications, both external and internal. A complete library is maintained by a full-time librarian, (our curiosity was well rewarded by the discovery of all past issues of TV&C neatly shelved) and a large department is devoted to the production and filing of internally produced publications, schematics, brochures and advertisements.

Climaxing our visit to Entron was a very enjoyable chat with President McGeehan. In answer to a question about the company’s beginnings he recalled that it was started back in 1951. Entron was organized in its present corporate form in February, 1953, in a consolidation of The Bellmore Company and The Entron Company. Bellmore had been engaged in master antenna installation and



Quality control is emphasized in every phase of Entron manufacture and assembly.

Entron had been manufacturing electronic and electro-mechanical components for use in coaxial cable television transmission systems. Founders included Bob McGeehan and Hank Diambra.

The MATV business was held in the summer of 1953 and Entron concentrated on CATV manufacture, engineering and installation. An immediate effort to build a marketing network throughout the U.S. and Canada resulted in the establishment of major Entron distributors such as



Entron's 250 feet of specially designed, well lighted assembly benches utilize air presses, riveting machines, air presses, miniature spot welders, induction beaters and drill presses. Special tooling is designed and fabricated in Entron's tool and die shop.

Davco Electronics, Batesville, Ark. among others. The year 1953 was also marked by Entron's move from the original Que Street location in Washington, D.C. to larger quarters in Bladensburg, Md.

The first products manufactured were the "Fastee" tapoff to which the first patent in the CATV industry was assigned, the RA-1 Broad Band Amplifier, the BA-4 Bridging Amplifier, and the "Acrasplit" and "Hyt" Line Splitters. Entron Inc. entered the coaxial field by introducing solderless connectors for RG-11 and RG-59 type cables. These are the well known "Shuvee" connectors.

In 1957 the firm initiated secured financing of Community Antenna Systems with the assistance of the Small

TV & COMMUNICATIONS



EXPERIENCE

**THAT PAYS OFF IN YEARS
OF EXTRA SERVICE FOR YOU**

Years of successful tower construction have given us the necessary experience to provide you with the best qualified engineering, the most reliable construction and the most economical purchase or lease cost in the CATV industry.

Steady progress in perfecting engineering and manufacturing processes, along with recent personnel and equipment expansions, give Ft. Worth an unprecedented capability. Take advantage of our experience . . . call for a quotation on your next tower requirement.



Since it costs no more to have the full assurance of the latest engineering and construction knowledge, call or write Fort Worth Tower Company, Inc., for a quotation on your next tower job. President Tommy Moore will personally assure you of excellent service and realistic, competitive pricing.

Write for Full Details

*Fort Worth Tower Co.
Inc.*

**P.O. Box 8597 — Ft. Worth, Texas
(817) GL 1-1281**

— Associated Companies —

Tommy Moore, Inc. — Big State Engineering, Inc. — Tower Construction Finance, Inc.

Business Administration, and local banking houses, and by 1958 Entron had entered the Turnkey System construction business.



Doug Burch is busily engaged with a layout drawing in Entron drafting department.

At about the same time the company formulated its long range plans (A and B) for conversions and new all-band construction; it also outgrew the Bladenburg location. Thoroughly committed to the community antenna industry, and involved in nearly every aspect of it, Entron management elected to build a single plant large enough to house

the entire operation. In August, 1962 the Montgomery Industrial Park headquarters were occupied. The new building was specifically designed for Entron's planned expansion programs as well as for its immediate needs. The steady growth of the company, subsequent to the move, has substantiated the need for growing room.

The exceptionally high demands for Entron products stemming from the unprecedented growth of the industry will undoubtedly necessitate an additional increase of production facilities.

Having analyzed CATV growth trends in advance, the company now has available a product line consisting of more than 225 products, including high-output amplifiers, new transistorized line extenders, coax connectors, tapoffs and a complete selection of other signal distribution equipment. Bob McGeehan pointed out the significance of Entron's versatility, which has enabled the firm to supply components for the pay-TV operations in California while engaged in several turnkey construction jobs. Meanwhile, the supply of Entron products direct and through U.S. and Canadian distributors continues at an ever increasing pace.

There is no doubt that Entron is now looking well into the future of CATV, perpetuating the engineering efforts that have solidly established the company as an industry leader. Some of the biggest systems in the country, such as Altoona, Pa. with an excess of 13,000 subscribers, and Kingston, N.Y. with more than 7,000 subscribers are Entron-equipped. We feel certain that the future will see the advent of even larger community antenna systems using Entron equipment. □

NEW LOW-COST BUILDINGS

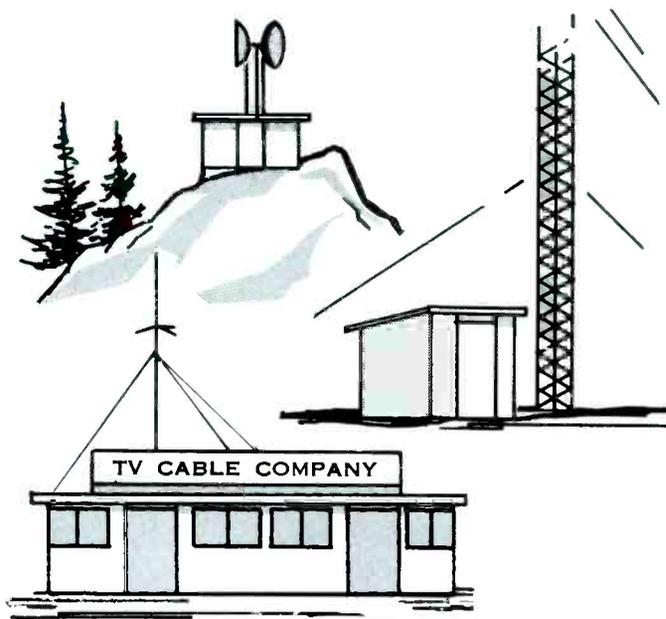
The development of Lustre-Span, a new high-strength rigid vinyl, has made it possible to produce extremely versatile pre-fabricated buildings at very low cost. Specifications of the new structures reveal their usefulness in dozens of applications, such as CATV Head-End equipment buildings, microwave relay stations, remote transmitters and commercial buildings. Modules are available as small as 4' x 4' with no limit on maximum size of structure.

Quickly erected, pre-fabricated units are constructed of rigid-vinyl corrugated panels with framework of extruded aluminum alloy. Simple, one-day erection requires only screw-driver, wrenches and drill. These lightweight buildings are secured to foundation by anchor bolts, per "South Florida Building Code." Roof will take a live load of 20 lbs./s.f. Tensile strength of vinyl walls and roof is 7,500 psi, with compressive strength of 9,400 psi.

LOW THERMAL CONDUCTIVITY

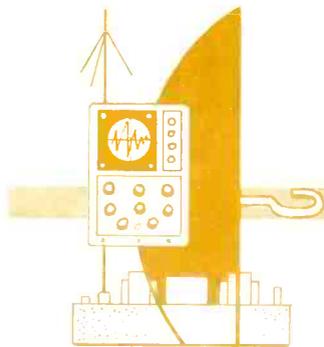
Ideal for extreme climatic conditions, the walls and roof have a thermal conductivity factor of only 1.3 BTU/s.f./hr./in. (Will not rust or rot and is not subject to insect attack or fading.) The glossy surface of the tough rigid-vinyl reflects the sun's rays, maintaining a low interior temperature.

All of these properties are equally valuable whether in a 4' x 4' transmitter shack or a 20' x 80' retail or service facility. And the savings are just as great, proportionately, in either type of application.



Intercontinental Industries Inc.

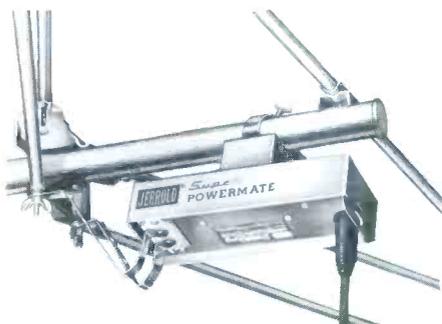
2241 NW 40 - SUITE 203-M OKLAHOMA CTY. OKLAHOMA



PRODUCT REVIEW

PREAMPLIFIER FOR TV INTERFERENCE AND FRINGE AREA COLOR RECEPTION

A 75 ohm coaxial cable TV antenna preamplifier, Model SPC-103, is being introduced by Jerrold Electronics Corporation. Manufacturer reports that the new Coaxial Super Powermate is primarily designed for locations where there are spurious signals or interference problems and for optimum color installation in semi-fringe and fringe areas.



In announcing the new unit, Walter Goodman, Manager of Jerrold's Distributor Sales Division, said that the SPC-103 preamplifier has coaxial output achieved by a built-in matching transformer. It is contained in a metal weatherproof housing and is usually mounted on the boom of the antenna or on the mast, although it may be mounted on any flat surface.

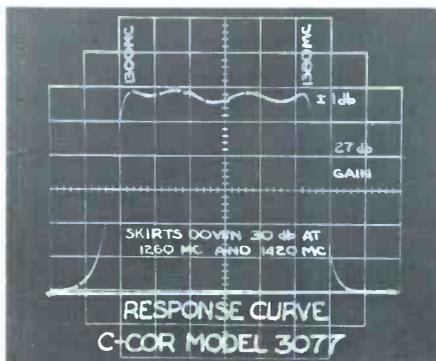
The accompanying remote power supply, Model 103, contains a choice of outputs—either 75 ohm or 300 ohm, selectable by a switch. It may be mounted on any flat surface, generally the back of the television set. The unit plugs into any 117v, 60-cycle ac source.

L BAND AMPLIFIERS

C-COR Electronics, Inc. announces a new technical capability in the design and manufacture of "L" band amplifiers. Band pass characteristics can now be controlled to a degree here-to-fore unavailable.

For example, band pass shapes similar to 60 mc IF strip results are possible with the new C-COR techniques. The accompanying picture shows the pass band from 1300 mc to 1380 mc, indicating sharp skirts and flat top response.

To achieve this capability, ceramic triodes, type 7768 and 7913, by General



Electric, are used. The same techniques can be extended to other tubes, including the 7077 and the 6299. Noise figures are low, meeting the tube manufacturer's best predictions. Power outputs, up to one watt depend upon tube type used.

Typical specifications for a three stage amplifier, C-COR Model 3077, are fc: 1340 mc, BW: 80 mc plus or minus 1 db, Skirts: down 30 db at plus or minus 80 mc from f, Gain: 37 db, Z in and out: 50 ohms P out: plus 27dbm (1/2 watt), VSWR out: 1.5:1, N.F.: 11db max.

For further information, contact James R. Palmer, President, at C-COR Electronics, Inc., P. O. Box 824, State College, Penna.

TRANSISTORIZED LINE EXTENDER

An all-band line extender is now available from CAS Manufacturing Company of Texas. Employing "the unique CAS distribution output," the CAS TRA-215 features solid state circuitry and can be used with either tube or transistorized trunk line equipment.

Wide bandwidth of 40 to 220 mc, the extender provides 20 db gain with a capability of up to 45 db. It can be used as a distribution amplifier and can be cascaded.

Full details and price can be obtained by contacting CAS Manufacturing Company, P.O. Drawer B, Mineral Wells, Tex.

76A2 MICROWAVE BROCHURE AVAILABLE

Lenkurt Electric Co., Inc. has issued an eight-page brochure describing its Type 76A2 Microwave System, which furnishes broadband radio transmission facilities in the common carrier frequency band of 5925-6425 mc.

Each RF circuit can accommodate up to 960 carrier-derived voice channels, or a black and white, or color TV channel with or without program subcarrier, or the equivalent in other forms of information.

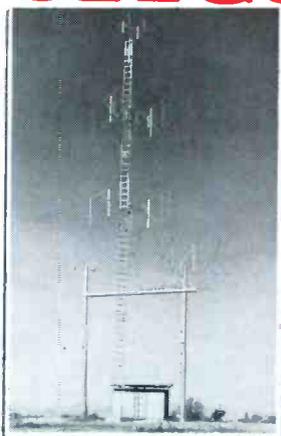
The publication includes performance figures, circuit description and photos of the system.

A free copy may be obtained by writing Department A134, Lenkurt Electric Co., Inc., 1105 County Road, San Carlos, Calif.

SITCO

Heavy Duty Quads and Yagis

Designed by SITCO for Translator off-the-air pickup, Community TV and extreme fringe area requirements.



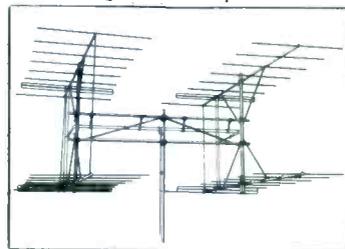
SITCO WEDGE SCREW FASTENERS



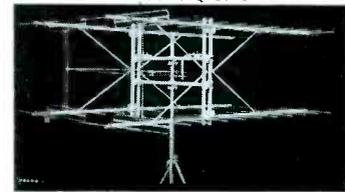
Write for Free SITCO Catalog

The SITCO Models 94 and 102 Quad Mount Antenna Arrays are designed to produce high gain, high front-to-back ratio and large aperture to weak signals. A completely balanced system which reduces noise pick-up and greatly improves the signal-to-noise ratio.

NOW, all SITCO element ends are machined to reduce static leakage. The signal-to-noise ratio is increased at sites where signal levels are low.



Model No. 94-HD 32-element Quad
Channels 5 or 6



Model No. 102-HD 48-element Quad
For all hi-band channels

SIMPLICITY TOOL COMPANY

2850 NORTH MISSISSIPPI • PORTLAND 12, OREGON



12 CHANNELS OF TELEVISION

Plus all the FM you want
including a weather channel, back-
ground tape music and off-air FM stations

Insure rapid system growth by providing a wide variety of entertainment for your subscriber. As the nation's established leader in CATV system design and supply, DAVCO is qualified to custom-engineer an All-Channel head-end to exactly meet your requirements.

The Davco Functional design Head-End delivers 16 channels of entertainment. 11 TV Channels, 2 tape channels, 1 weather channel and 2 off-air FM channels!

This is just part of hundreds of racks of custom Head-Ends that have been designed, assembled and delivered by Davco! Many of the most experienced CATV engineers across the country consistently choose Functional Design by Davco. There must be a reason! And that reason is the performance, reliability and economy of Davco's Functional Design systems.

CATV operators everywhere depend on Davco for fast delivery of *all* materials and equipment for their systems. You'll find the largest, most complete inventory of CATV equipment and supplies at DAVCO where you always receive prompt, courteous service. Reasonable prices, too!

NO ONE HAS A MORE VARIED INVENTORY THAN DAVCO

DAVCO ELECTRONICS

— IN CATV SINCE 1949 —

P.O. DRAWER 861 • Phone RI 3-3816 (501) • BATESVILLE, ARKANSAS

LETTERS

Gentlemen:

We are establishing a 50,000 watt Stereo FM installation here in Morgantown.

It is our hope that cable companies, within our coverage area, will offer our station to their customers. . . . The FCC "CP" gives us a seventy-five mile coverage radius; however, we hope, by utilizing cable companies, to go further.

Carl B. Haeberle II
Productions Director, WAJR-FM
West Va. Radio Corporation

• *Carl, we wish you much success in the operation of your new station, WAJR-FM. The cable television systems within your coverage area will undoubtedly be interested to learn of your station.*

CLASSIFIED

Rate for classifieds is \$1.00 per line or fraction thereof for advertising which, in our opinion, is obviously of a non-commercial nature. A charge of \$20.00 per column inch (2 1/4" col.) is made to all commercial advertisers. Deadline for receipt of copy, 1st of preceding month.

Viking Cable Company

Is seeking direct salesmen in the Southeast and New England territories. All applications will be kept strictly confidential. Forward applications to

Robert Baum
Viking Cable Company
Hoboken, New Jersey
830 Monroe Street



RICHARD D. OBARSKI & associates

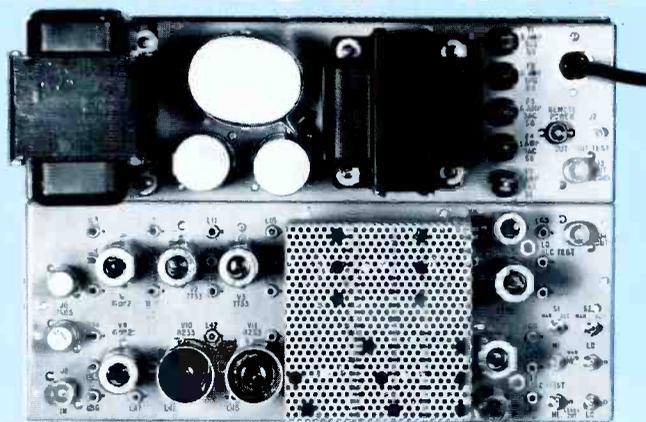
CATV consulting, management, engineering and construction. Complete microwave engineering and installation. Twelve years in CATV. 2441 Hillsboro Ave. Dallas, Texas 75228. Phone 214-328-2126

LIVE IN SOUTHERN CALIFORNIA

Large, expanding CATV needs men for maintenance and trouble shooting and for layout and electronic make-up. Good salary and opportunity for experienced men.

Write: Dept. 103 - TV&C
Box 63992 - Oklahoma City, Oklahoma

FOR THE HIGHEST POWER



entron's LHR-45 repeater amplifier is the ultimate.

This is the high gain, high output level amplifier of all future CATV systems. It has many superior characteristics compared to any other CATV repeater amplifier available. Automatic level controlled low and high bands, including full FM, are combined in the LHR in one single chassis. The LHR's high power handling ability extends the mileage of CATV systems and improves picture quality. Frequency response is flat (if aligned through cable); input and output are matched; there are separate high-low band gain and tilt controls, and input attenuators. The LHR is equipped with a regulating transformer for gain stability under varying line voltage conditions, and for the increase of tube reliability as it keeps filament and cathode temperatures constant. For complete information and specifications on this advanced amplifier, the LHR-45, write to:

entron
INCORPORATED

SILVER SPRING, MARYLAND. (301) 622-2000

SKL

A GREAT CATV TRANSMISSION ACHIEVEMENT!

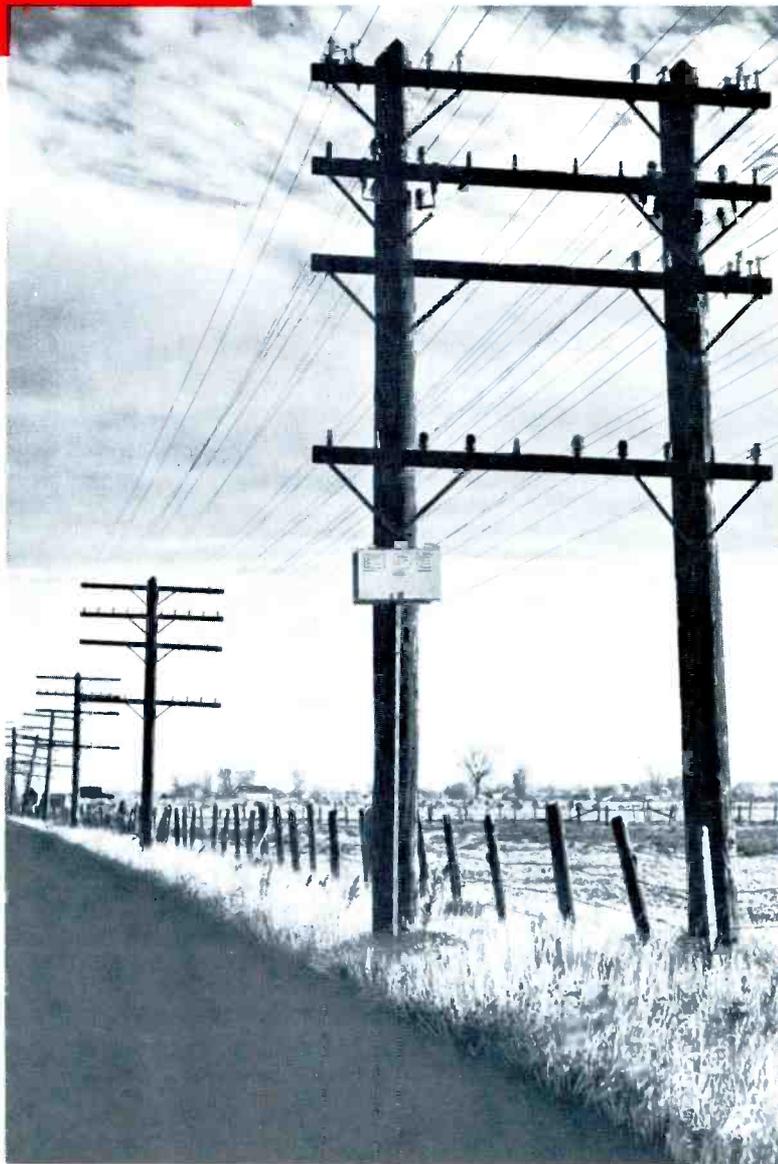


Now SKL's Model 215 Long Line Amplifier Opens New Markets Beyond the Horizon

When a signal pickup point 30 miles out makes the difference for a new project — when you want to feed your present signals to that town 20 miles farther away from your own distant signal source — when that small community a few miles from your system has been clamoring for your service . . . these are the times to look to SKL's Model 215 Long Line Amplifier.

With a capacity of up to 8 channels, and low noise and distortion characteristics that are a real engineering triumph, the Model 215 can deliver multi-signal service over great distances. After a point-to-point run of 40 miles, for instance, signal quality is of such a high order that a distribution network of 80 miles can be served throughout with pictures which meet very demanding criteria.

In those application problems where microwave for many channels is impractical, uneconomical or unobtainable, the Model 215 Long Line Amplifier system can be your ideal solution.



Are you looking at a new market presently lying "beyond the horizon"?

Let our Systems Engineering Department study your problem.

They may have the answer!

Call or write.

SKL**SPENCER-KENNEDY LABORATORIES, INC.**

1320 SOLDIERS FIELD ROAD • BOSTON 35, MASSACHUSETTS • TEL. 617-254-5400