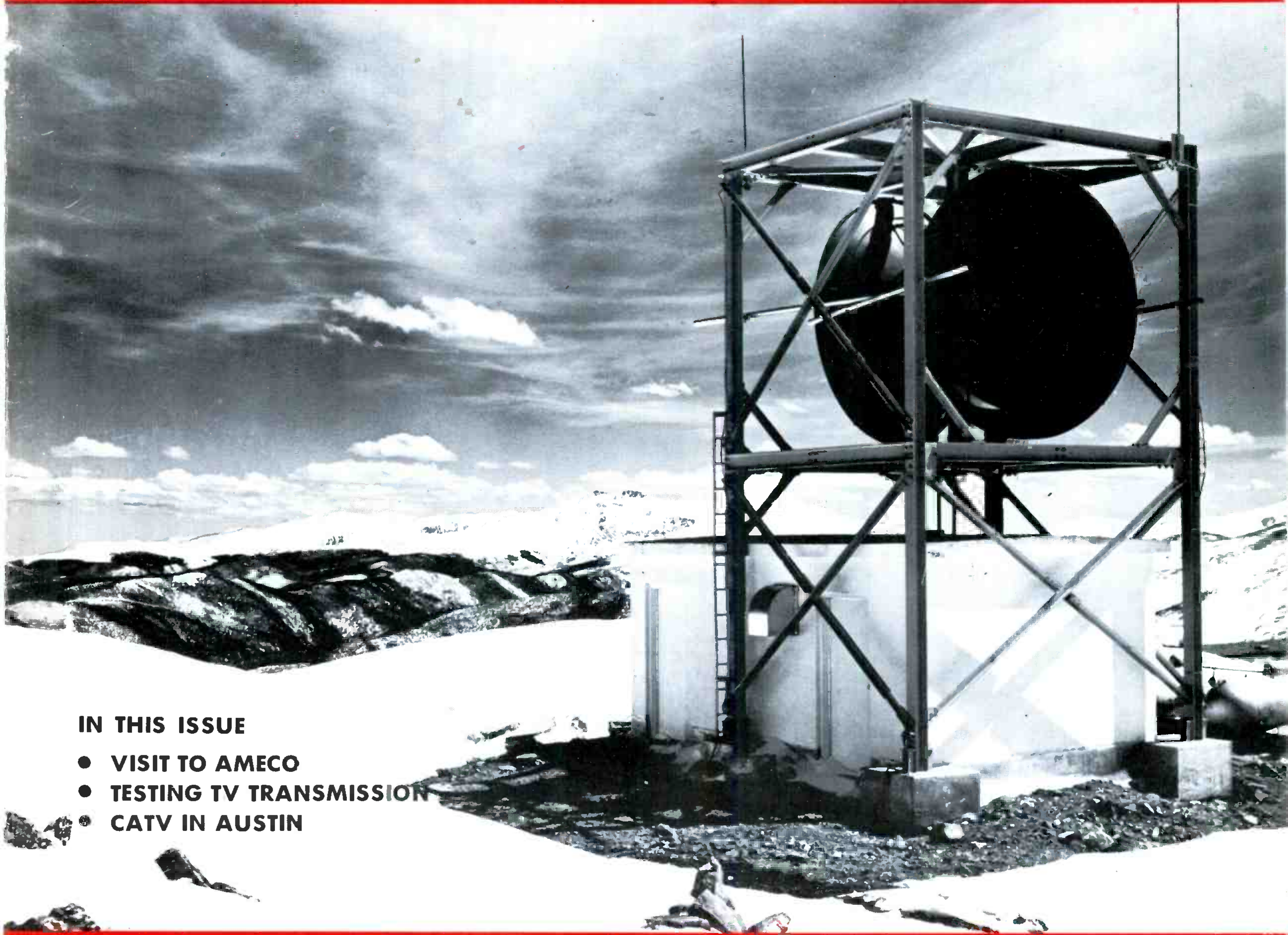
May 1964

# TV & Communications



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- VISIT TO AMECO
- TESTING TV TRANSMISSION
- CATV IN AUSTIN

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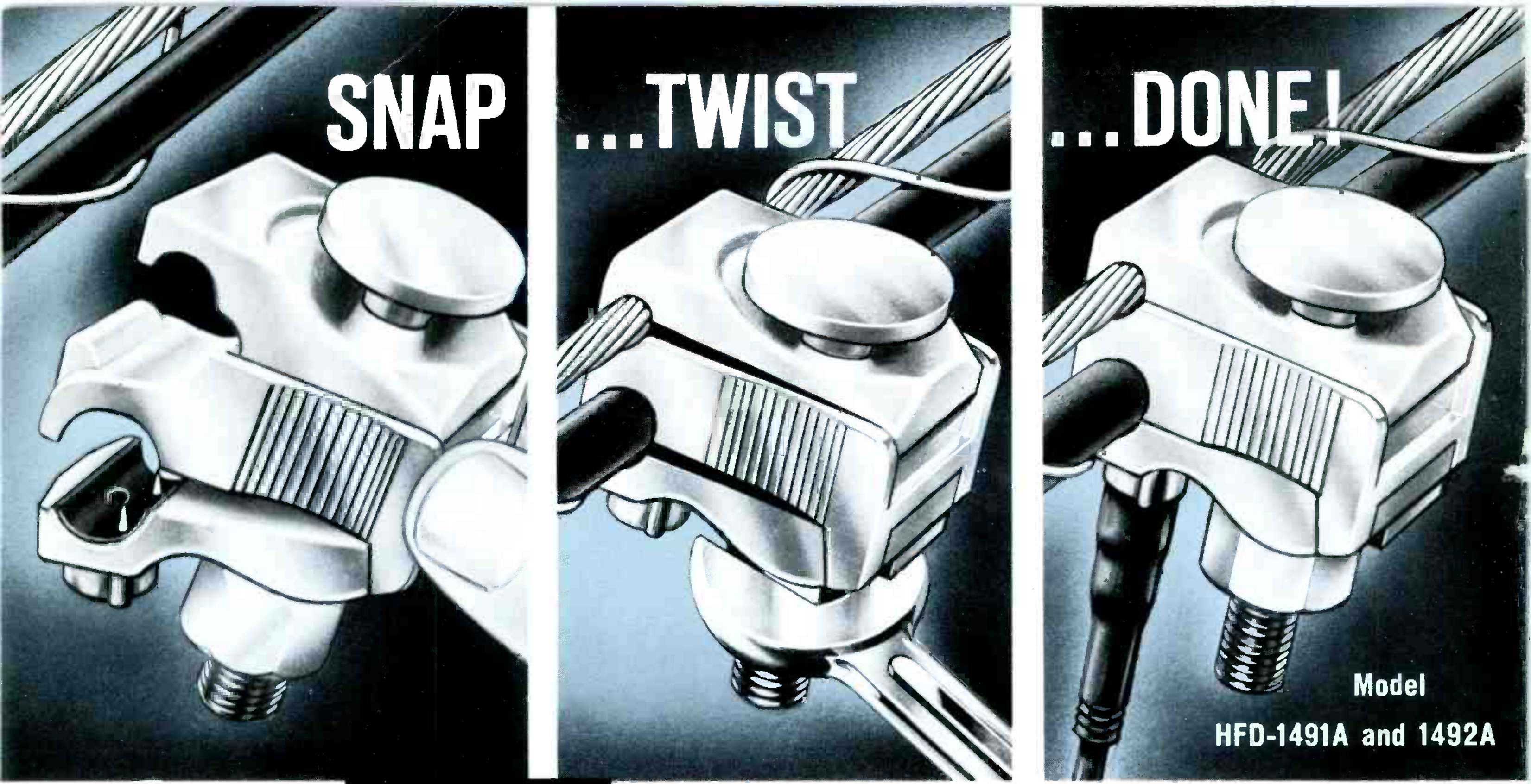


# NEW JERROLD "MINUTEMAN" TAP
# FOR SPEEDY TAP-OFF INSTALLATION

Easiest, quickest, best-performing line tap ever made . . . that's what you get with Jerrold's new HFD-1491A & 1492A Minuteman Pressure Taps—and at no increase in price.

New unified assembly means no dropping or hunting for parts—the nut is swaged on to stay, yet unit opens up wide enough to quickly snap over the feeder-line cable. Pre-molded weatherproof gland is built right into recessed groove. Insert hole is pre-formed...no more clogged cutting tools.

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Model HFD-1491A is for single-shielded RG-11-type cables and JT-1412 aluminum-sheathed cables. HFD-1492A is for double-shielded cables.

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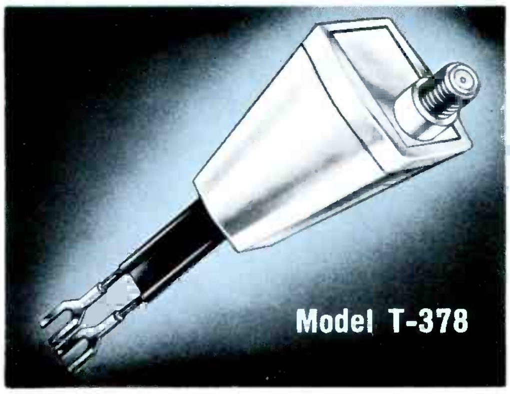
Here's the rugged new transformer designed to work with new Minuteman Pressure Taps to make your home installations fast and dependable. Built to take it, the Model T-378 is housed in high-impact plastic, has a big, hefty "F" fitting on one end, thick, tough 300-ohm leads on the other. The new transformer goes on in a jiffy, and features built-in isolation for both set and system. *All at no increase in price.*

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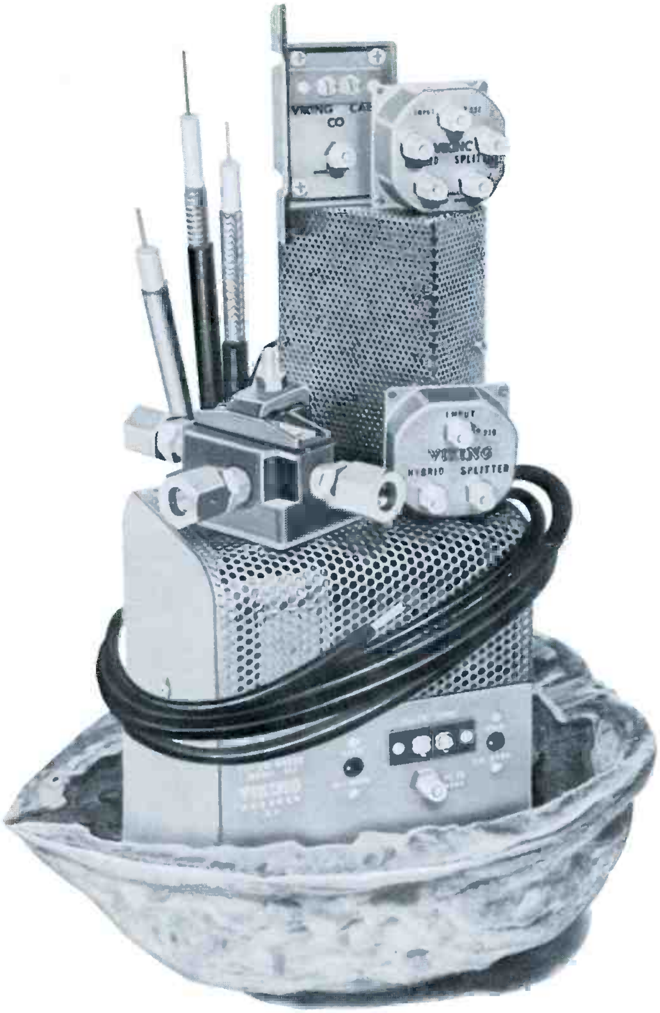


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. . . Viking your source from beginning to end. Manufacturers of the Rainbow series of 59U and all featured mainline cables. Plus a complete line of taps, amplifiers, wall plates, connectors and every component to successfully and profitably install a small or large system. Specializing in all phases of the closed circuit industry. We plan, design, layout and supply everything you need. Viking is your one shop for every phase of Master Antenna, Educational and Instructional Television System Equipment and cable. For a look at what's in our nutshell drop a line on a company letterhead and we will do the rest.

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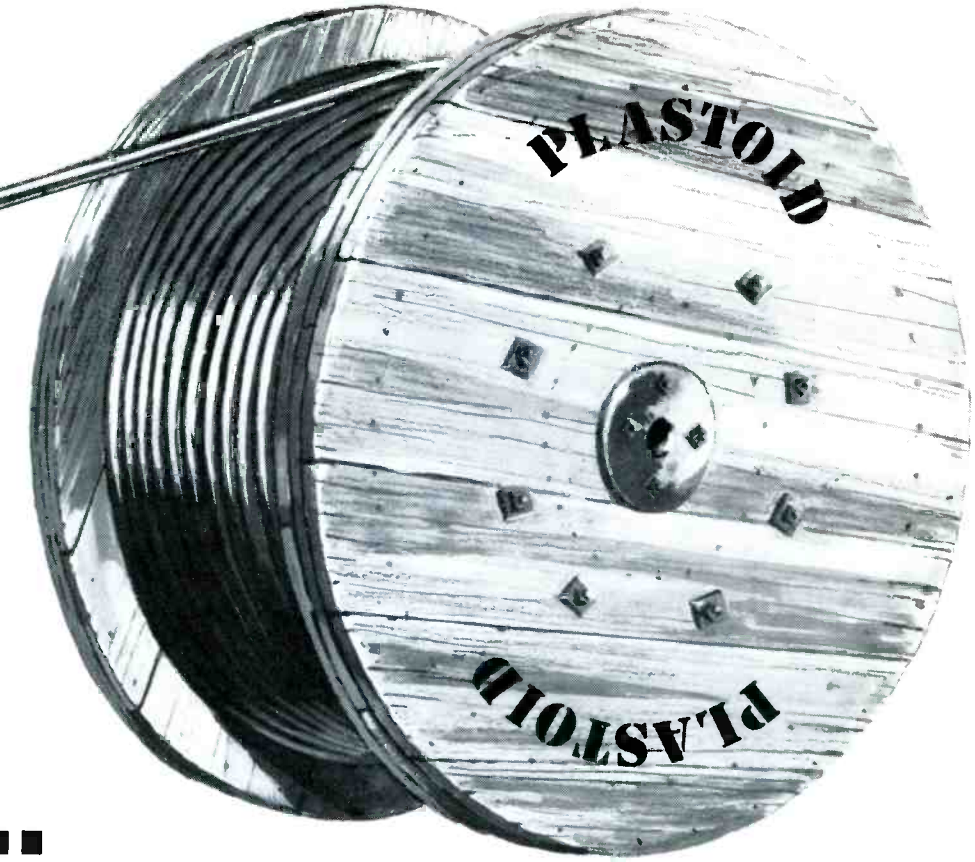


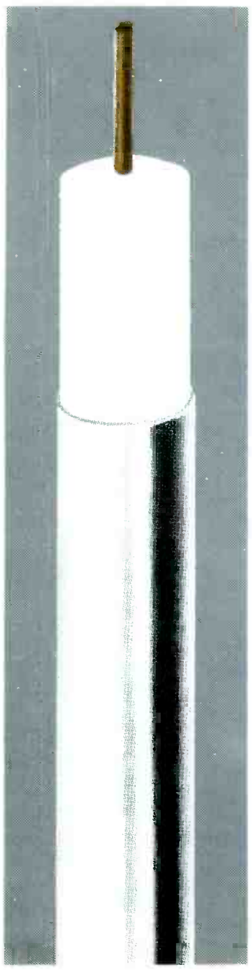

**Look to Plastoid . . .** Strain your solid sheathed aluminum coaxial cable by Plastoid. Tug at it. Put it under pressure. Bend it. You'll find the highest tensile strength cable that also gives you lower db loss than similar seamless aluminum coax. The Plastoid sheath is actually **stronger** because of its weld.

Made under similar exacting quality controls as established by Military Specifications, Plastoid cable employs superior materials, electronically tested for uniformity of gauge before seaming. Thin or weak spots are detected and eliminated. Then, the sheath is welded in a bond that is invisible yet stronger than the parent metal. Proven by the ASTM cone test. Special hydrostatic tests bear out Plastoid strength. **"Under hydrostatic pressures in excess of 2,000 pounds, neither the sheath — nor the seam — split or burst."**

Delivered on sweep tested reels ranging from 1,000 to 5,000 feet in continuous lengths, here is a semi-flexible cable that gives you ease and economy of handling while you enjoy improved electronic characteristics. You get **lower** attenuation across the breadth of the entire band. Longer continuous cable lengths assure fewer splices, less chance for moisture penetration, minimum cable waste, plus reduced connector and labor costs. For extra long life in special environments, Plastoid aluminum sheath also available with an overall Polyethylene jacket.

**PHYSICAL AND ELECTRICAL STANDARDS**

| TYPE | NOM O.D. Conductor | NOM O.D. Dielectric | NOM O.D. Unjacketed | NOM O.D. Jacketed | NOM. Attenuation (db per 100 ft.) Channel #6 | NOM. Attenuation (db per 100 ft.) Channel #13 | Shipping Weight Lbs. per M |
|---|---|---|---|---|---|---|---|
| TA4 | .0752 | .362 | .412 | — | .96 | 1.60 | 66 |
| TA4J | .0752 | .362 | .412 | .480 | .96 | 1.60 | 90 |
| TA5 | .0980 | .450 | .500 | — | .78 | 1.26 | 102 |
| TA5J | .0980 | .450 | .500 | .580 | .78 | 1.26 | 132 |

For immediate delivery or special pricing information about these longer-length, long-pull trunk or distribution CATV cables, wire or write . . .

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**NEW JERROLD TRANSISTORIZED**

# "CHANNEL CHAMP" PREAMPLIFIER

## LOWEST NOISE FIGURE IN THE INDUSTRY
## (4db max., low band; 5½db max., hi band)

Jerrold's new Channel Champ beefs up weak signals to insure clear, sharp pictures on your customer's TV set.

This totally new solid-state preamplifier not only boasts a super-low noise figure but features a matched input and output that gives you *all* the signal your antenna picks up.

Built with a thick cast-aluminum housing protecting an inherently trouble-free transistorized circuit, the Channel Champ will *outperform* and *outlast* any other CATV preamplifier on the market.

Ultra-stable Hi-Q preselector circuitry employs helical resonators. AC-powered to eliminate electrolysis problems. Works with Jerrold 405-P power supply or new PPS-8 power supply which handles up through eight Channel Champs. Zener-diode regulation eliminates signal fluctuations due to voltage changes.

The "Channel Champ", like the famous Channel Commander signal processor, is another member of the Jerrold family of superior equipment designed specifically for the CATV industry. Contact your Jerrold man now . . . Channel Champs are now in stock and available for immediate delivery.

*Specify channel. Price does not include power supply.

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MAY 1964
Volume 1 — Number 5

# TV & COMMUNICATIONS

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## EDITORIAL

Two sobering facts have finally tempered the broadcasters' enthusiasm for restrictive controls on community antenna systems. First, CATV systems have been very important to many stations because of the greatly increased audiences which the cable systems have created. Secondly, the broadcasters, fearlessly led by the NAB, have long been opposed to increased government regulation of stations; now they find themselves in the position of proposing increased regulation for a related industry.

The interest stirred at the Commission level has already turned to the subject of CATV ownership by broadcasters. And the impact could strike even closer to home for the broadcasters. Proposed regulation of CATV and pay-TV could easily suggest additional governmental controls over TV stations.

An interesting facet of NAB's moderating position is the apparent turn-about indicated by Mr. LeRoy Collins' recent disavowal of the NAB anti-pay-TV legislation stand. NAB President Collins now says that pay-TV doesn't need government regulation—and CBS vice president Richard S. Salant, meanwhile, says that CATV doesn't need controls any more than pay-TV does.

This discordant symphony is played against a background of dissatisfaction with NAB policy statements on CATV being voiced by some of the giant organization's members.

We hope that the broadcasters will have the good judgment to exercise considerable restraint in pushing for restrictive CATV legislation which could easily backfire with more controls for broadcast television. And then there is the strong possibility that many of the CATV and pay-TV restriction advocates will find themselves "on the other side of the fence" before long. A number of big broadcasters are trying to buy CATV's now, and CBS already has an option on a big Vancouver, B.C. CATV operation.

We will be quite interested to learn how the NAB will proceed under these circumstances.

Stanley M. Searle

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Just another spectacular **first** from spectacular Ameco!

If you would like to do business with the recognized leader in the cable field . . . If you would like to do business with the company that provides doorstep sales and service . . . If you would like to do business with the company that cares about you and your cable system . . . Give the closest tech-rep a collect call.

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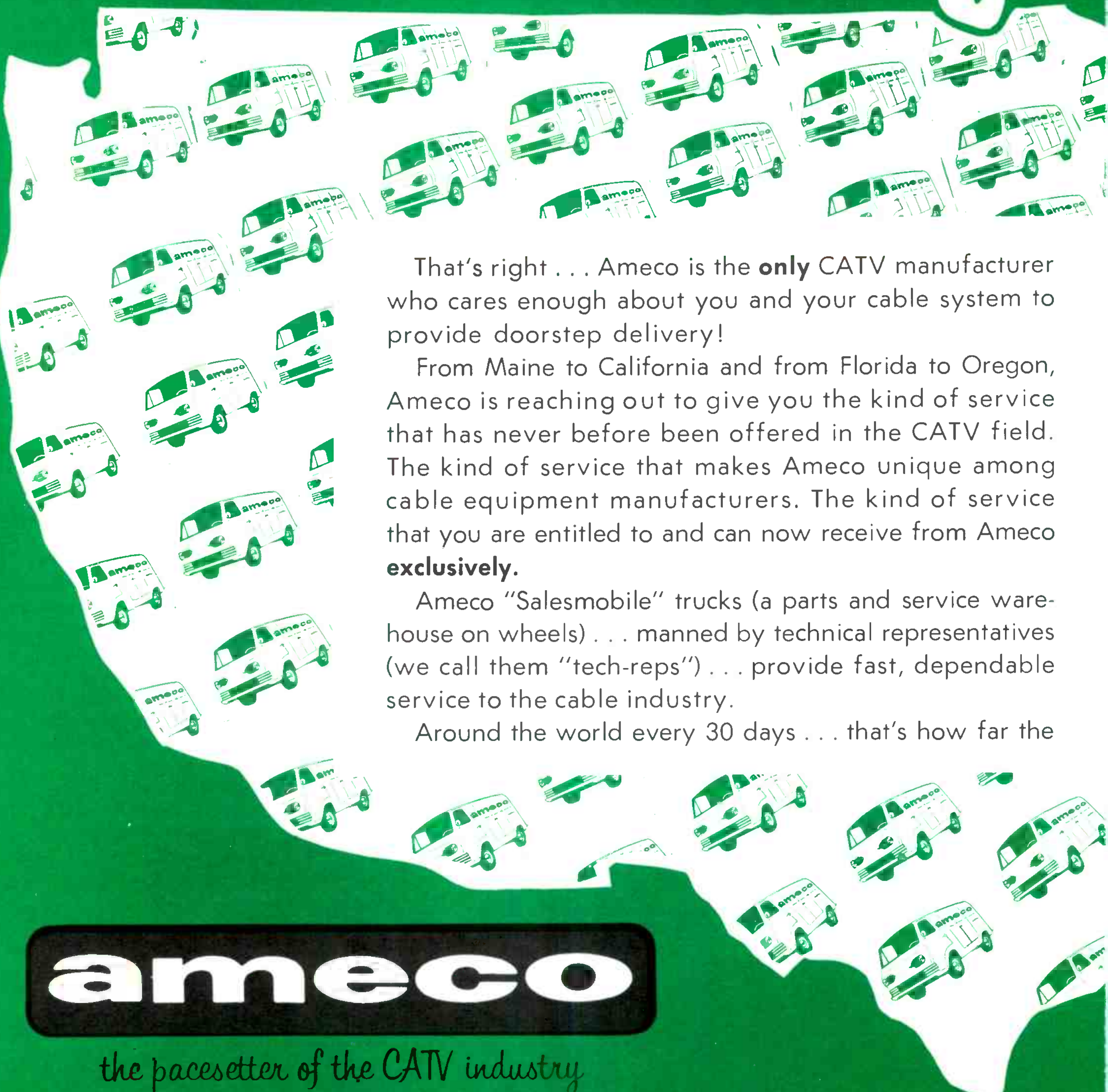

That's right . . . Ameco is the **only** CATV manufacturer who cares enough about you and your cable system to provide doorstep delivery!

From Maine to California and from Florida to Oregon, Ameco is reaching out to give you the kind of service that has never before been offered in the CATV field. The kind of service that makes Ameco unique among cable equipment manufacturers. The kind of service that you are entitled to and can now receive from Ameco **exclusively.**

Ameco "Salesmobile" trucks (a parts and service warehouse on wheels) . . . manned by technical representatives (we call them "tech-reps") . . . provide fast, dependable service to the cable industry.

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*the pacesetter of the CATV industry*

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# News SPECTRUM

## SOUTH-CENTRAL CATV ASSOCIATION MEETS, ELECTS JERNIGAN PRESIDENT

The annual meeting of the *South-Central CATV Association* was held in Jackson, Mississippi May 13th and 14th. At the First General Assembly a motion was approved to change the name of the association to *Southern CATV Association*. The association now includes the following states: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina and Tennessee.

These attractive young ladies are shown browsing through the big Davco catalog at the South Central meeting. Left, Martha Crosser of the Davco staff, right is Dorothy Mugford of Cox Broadcasting. One of the highlights of the convention was Dorothy's talk.

Featured speakers were Dorothy Mugford of Cox Broadcasting Company; Fred Webber of Telesystems, Inc., Fred Stevenson, President of NCTA, Frank Nowaczek, Chairman of Research and Development - NCTA, Washington, D. C., and Jack Crosby,

Jim Davidson, left, and Kim Sanford, seated, demonstrate their Functional Design Head-end to Laural Thompson, center, and Robert Neathery of West Plains, Missouri. Photo was taken in Davco suite at the convention, which was attended by more than 50 CATV operators.

member of NCTA Board of Directors.

Robert F. Jernigan, Southern Division Manager for Southern CATV Systems, Inc., was elected president of the Southern CATV Association. Mr. Jernigan has been active in all phases of the CATV industry for eleven years. He now resides in Hattiesburg, Mississippi. Mrs. Polly Dunn of Columbus TV Cable, was elected secretary-treasurer of the Association. Mrs. Dunn has been active in CATV approximately eight years and resides in Columbus, Mississippi. CATV equipment was displayed by Ameco, Entron, SKL, Reptronics, Inc., Davco, Lenkurt Electric, Viking Cable Company, Superior Cable Company, Electronix, Telco and TeleSystems, Inc.

Attending the South Central CATV Association convention, May 13-14, at the Sun N' Sands in Jackson, Mississippi were left to right: Frank Nowaczek of the NCTA Staff, Washington, D. C., Fred Stevenson, Rogers, Arkansas, NCTA Board Chairman; Jim Davidson, President, South Central CATV Association, Batesville, Arkansas and Robert Jernigan, Hattiesburg, Mississippi, Secretary-Treasurer of the South Central Association.

### FCC EXTENDS DEADLINE FOR REPLY COMMENTS IN 14895, 15233

In response to a request from the National Association of Broadcasters the date for submitting reply comments in Docket Nos. 14895 and 15233, proposed rules to regulate microwave-served CATV's has been further extended to June 18.

### NCTA MEETING TO FEATURE COMMISSIONERS

Featured speakers at the 13th Annual Convention of the *National Community Television Association* will include Federal Communications Commissioners *Kenneth A. Cox*, *Frederick W. Ford* and *Robert E. Lee*. The NCTA convention will be held in the Bellevue-Stratford Hotel, June 14-19, 1964.

Commissioner Cox will be the featured speaker at the Tuesday, June 16 luncheon. Mr. Ford will address the group as luncheon speaker on Thursday, June 18. Mr. Lee will participate in a special panel discussion on UHF television. Appearing on the same panel will be *Mr. Robert G. Weston*, engineering assistant to Commissioner Lee.

According to the NCTA, other guest speakers will include: *Mr. T. Rex Rhodes*, vice president, The Bank of New York, New York City, who will speak on CATV financing; *Dr. John C. Schwartzwalder*, general manager of ETV station KTCA-TV, St. Paul, Minn., *Mr. Donald V. Taverner*, general manager of ETV stations WQED and WQEX, Pittsburgh, Pa., and *Miss Martha A. Gable*, director of Radio and Television Education, School District of Philadelphia, Pa., who will take part in a special panel discussion of CATV's role in educational television on June 16.

*Mr. J. R. Evans*, managing director of Teleng, Ltd., Romford, England, will speak on "The Advance of CATV techniques in Europe" on Thursday, June 18. A legal panel dealing with matters of concern to the CATV industry will include *Mr. George D. Webster*, nationally known tax expert from Washington, D. C., and *Mr. Joseph M. Stone*, an expert on wage and hour laws, also from Washington, D. C.

Theme of the NCTA 13th Annual Convention will be "More in '64." The Association staff anticipates a large attendance by CATV operators and interested parties due to the well rounded program and the site of this

year's meeting. The convenient location near New York and the World's Fair is expected to boost attendance by wives and families of CATV men.

Co-chairmen of the NCTA Convention Committee are *George J. Barco*, NCTA Board Member and president of Meadville Master Antenna, Inc., Meadville, Pa.; and *Robert J. Tarlton*, NCTA Board Member and president of Panther Valley Television Co., Inc., Lansford, Pa.

**TEXANS HOST CONVENTION**

The Texas CATV Association met in Laredo on April 22 and 23. An election of officers was held with Mr. Frank Dowd of Dallas being selected as president. Outgoing president was Mr. Seibert Worley of Shamrock. Convention host Johnny Mankin was reelected Executive Secretary. First-hand reports indicate that an excellent time was enjoyed by all, with many of the 150 attendees taking advantage of the opportunity for excursions into Mexico.

Shown relaxing in a hospitality suite are L. to R. Wayne McKinney and Bob Rogers of Texas Community Antennas and Ed Shafer, vice president of Entron, Inc.

**OKLAHOMA-KANSAS CATV ASSOCIATION ELECTS OFFICERS**

Meeting May 8 at the Allis Hotel in Wichita, Kansas, the Oklahoma-Kansas CATV Association named Bob Story, Durant, Okla. as its president. Elected as vice president was Bob Weary, Junction City, Kans., and I.A. Patterson of Elk City, Okla., was elected secretary-treasurer. The group named the following members as board members: C. J. Hammack, Hooker, Okla., G. H. Dodson, Sayre, Okla., and Jim Monroe, Manhattan, Kansas. About 50 members attended the meeting.

George Milner, left, of Vumore, Oklahoma City, Okla., visited the Davco Electronics suite with some of his key personnel. (L. to R.) Jim Monroe, Don Turley, Kim Sanford of Davco, Jack Shrouf and Willie Wilkins.

# FOCUS

## . . . On Progress

**ENTRON ELECTS HEINZ BLUM**

Newly elected vice president of Entron, Inc. is *Mr. Heinz Blum*, according to *Mr. Robert J. McGeehan*, President.

Mr. Blum headed Entron's engineering and research and development departments since 1953. Prior to joining the company, he was employed with J. Wernard Company in Sydney, Australia, as a production development engineer. He also operated his own engineering office in Berlin, Germany, for four years.

Blum is a graduate of "Gauss" Engineering School also in Berlin. He is a member of the Institute of Electronic and Electrical Engineers, and the Institute of Motion Picture and Television Engineers.

**SANFORD GETS DAVCO POST**

Mr. Kim Sanford was recently appointed sales manager at Davco Electronics, Batesville, Ark. In the new position Sanford will be in charge of purchasing, sales and shipping departments. His experience has been in the field, having been associated with Telco, Lewistown, Pa., for the past eight years.

Kim is originally from Alabama, where he attended Auburn University. He and his wife Nell, are making their home in Batesville.

**NCTA NOMINATES**

A slate of officers and directors will be presented to NCTA membership at the June convention, according to nominating committee chairman *Glenn Flinn*, Past National Chairman. Nominees for office are: for Chairman, *Bruce Merrill*, Antennavision, Inc., Phoenix, Ariz., vice Chairman, *Frank Thompson*, Rochester Video, Rochester, Minn., treasurer, *R. L. Stoner*, Eastern Oregon TV, LaGrande, Ore., and secretary, *Charles E. Clements, Clements TV*, Waterville, Wash.

Nominated for directors of NCTA are: *Harry Butcher* Cable TV of Santa Barbara, Santa Barbara, Calif., *Charles W. Fribley*, Corning Community TV Corp., Corning, N.Y., *Jack Crosby*, Westex Cable Corp., Del Rio, Texas, *Jim Davidson*, Community Antenna Co., Batesville, Ark., *Bob Magness*, Community Television System, Bozeman, Mont., *Al Ricci*, Better TV of Bennington, Vt., *Al Stern*, Tele-Vision Communications Corp., New York City, and *Archer Taylor*, Northwest Video, Kalispell, Mont.

Members of the nominating committee, in addition to Flinn, are *George Barco*, Meadville, Pa., *Gordon Fuqua*, Bluefield, W. Va., and *Robert Regan*, Mankato, Minn.

**TELEGLOBE PATENTS RATING DEVICE**

A U.S. patent for an instantaneous electronic rating and opinion gathering system in combination with basic centralized metering developments was granted recently to *Teleglobe Pay-TV System, Inc., 400 Madison Ave., New York, N.Y.*

Teleglobe considers this rating and opinion gathering system, invented by *Ira Kamen*, Teleglobe's Technical Director, an important breakthrough because it senses and catalogs what the home respondent is viewing without any physical connection to the sub-

**KEY PERSONNEL APPOINTMENTS ANNOUNCED BY AMECO, INC.**

Crediting a nationwide expansion program as the reason, *Ameco* has undergone a number of personnel promotions and additions within the past several weeks.

*Mr. John Buchanan* has been elevated from director of marketing to vice president in charge of marketing and sales, and *Mr. Jim Connor* has moved up from director of purchasing to director of technical sales and marketing development. Buchanan joined

Two additions to the Phoenix home office are *Mr. Robert H. Huston*, who has been named director of public relations and advertising, and *Mr. William Lastinger*, new assistant manager of *Antennavision Service Company*, Ameco's microwave division.

Sales personnel have been added to the following district offices: *Mr. George Henderson* and *Mr. Paul Clark*, Dallas, Texas office; *Mr. Clifford Beyersdoerfer* to the Cincinnati, Ohio office; *Mr. Bruce Frazier* to Minneapolis, Minn.; *Mr. Bill Bryant* and *Mr. George James* to Decatur, Ala.; *Mr. Robert Vandergrift* and *Mr. Lloyd Tate* to Harrisburg, Pa.; *Mr. Bill Dietderich* to Portland, Ore., and *Mr. John Bryant* to the San Francisco, Calif. office. These men will serve as technical representatives for the company's expanding "salesmobile" program.

John Buchanan

Robert H. Huston

Jim Connor

scriber's TV set. All other automated rating systems involve complicated internal modification in the home respondents' TV set in order to compute their viewing habits. This Teleglobe development makes it easier to change respondents and to solicit them on a probability sample format.

As the Teleglobe System may allow the viewer to function as a respondent, it will not record unless the viewer is actually watching the set. The Teleglobe System can, by virtue of the respondent's unit, actually function as an "interviewer" and report on viewer reaction to commercials, public issues, and permit the viewer to report back electronically his reaction to any entertainment and public service programs as well as for the collation of data which could be vital to all types of pre-election poll taking.

The Teleglobe rating and opinion gathering system is a by-product of

Solomon Sagall, left, President of Teleglobe, inspecting the tape readout device of the newly patented automated rating and opinion gathering system invented by Ira Kamen, right, Executive Vice President and Technical Director of the firm.

the Teleglobe proprietary Centralized Metering Systems for Pay-TV and has all the economic benefits of Teleglobe's Pay-TV Systems and, according to the manufacturer, can be manufactured and operated at a much lower cost than any other automated TV rating system.

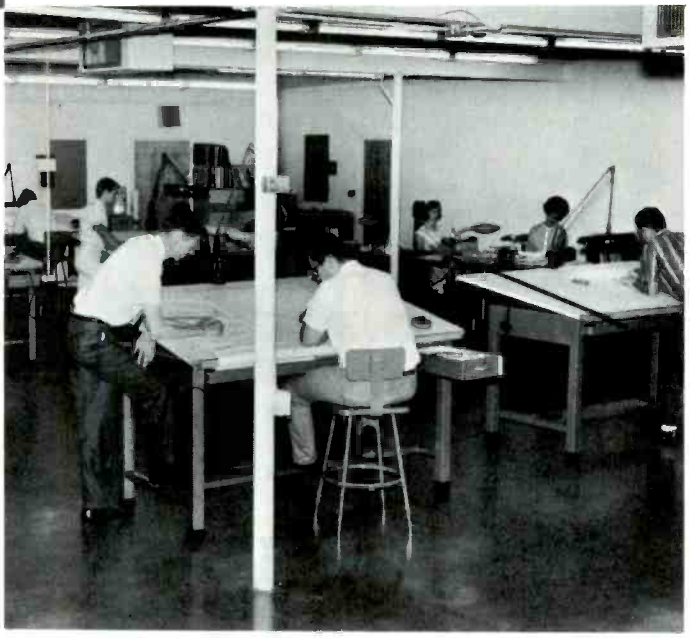
**CATV MANUFACTURERS TO DISPLAY**

According to NCTA thirty CATV equipment manufacturers will have displays in the Exhibit Hall at the Bellevue-Stratford Hotel during the June 14-19 convention.

Exhibitors are: Aberdeen Co., Los Angeles, Calif.; Adler Associates, Wash., D. C.; AMECO, Inc., Phoenix, Ariz.; Ampex Corp., Abington, Pa.; Blonder-Tongue Laboratories, Inc., Newark, N.J.; CAS Manufacturing Co., Mineral Wells, Tex.; Collins Radio Co., Dallas, Tex.; Craftsman Electronic Products, Inc., Manlius, N.Y.; Delta Electronics, Inc., Clarkson, Ontario; Entron, Inc., Silver Springs, Md.; Ft. Worth Tower Co., Ft. Worth, Tex.; Holt Electronics, Mahanoy City, Pa., Jerrold Electronics Corp., Philadelphia, Pa.; Lenkurt Electric Co., San Carlos, Calif.; National Theatre Supply Co., Terrytown, N.Y.; Phelps-Dodge Electronic Products Corp., North Haven, Conn.; The Plastoid Corp., Long Island City, N.Y.; Raytheon Co., Norwood, Mass.; Rohn Systems, Inc., Peoria, Ill.; Spencer-Kennedy Laboratories, Inc., Boston, Mass.; Sony Corp. of America, New York, N.Y.; Superior Cable Corp., Hickory, N.C.; Sylvania Home & Commercial Electronics, New York, N.Y.; Tape-Athon, Inc., Inglewood, Calif.; TELCO, Lewistown, Pa.; Telemation, Inc., Salt Lake City, Utah; TeleSystems Corp., Glenside, Pa.; Times Wire & Cable Co., Wallingford, Conn.; Viking Cable Co., Hoboken, N.J.; and Westbury CATV Co., Mt. Vernon, N.Y.

TV&C STAFF REPORT ON

# A VISIT TO AMECO



In Ameco's Contracting and Construction Department turn-key jobs are plotted and cost figures are compiled.

Again it is our pleasure to take you on a visit to one of the leading cable television equipment manufacturing companies. In the months that follow, we hope to cover all of the major companies in the CATV industry. This month, your reporter called on Ameco, Inc.

It is perhaps uniquely apropos that Ameco is based in Phoenix . . . both the company and the city have enjoyed spectacular growth during the past few years.

In 1940, the population of Phoenix was a mere 65,000. A short two decades later, the size of this city was in excess of 650,000, leading all of the major cities of the nation in an astounding population climb. Acceleration in Phoenix is so dynamic and sweeping that what is true of the city this month is not always the same next month.

So it is with Ameco. Caught up in a staggering spiral of growth, it is a long way from a small store building factory in Safford, Arizona to a vast, bustling, new production plant in Phoenix . . . but Ameco has made that giant step in just ten years.

Solid-state amplifiers are being assembled by highly trained women in this section of the new Production Department.

Our recent visit to this new plant impresses the writer with the thought that the cable equipment company in the "Valley of the Sun" is indeed a bright spot in the CATV industry.

Taking the "cook's tour" through Ameco with Director of Public Relations Bob Huston, was an enlightening trip beginning in the department that gives birth to new products, the research laboratory. A maze of projects and projections by Chief Engineer of Product Development Bill Rheinfelder, was enough to convince us that this department is thinking many, many years ahead.

Moving on to the large new production plant that is headed up by Director of Production Bruce Walters, it was plain to see that most of Ameco's products are transistorized. Row after row of pretty girls work in two shifts to turn out the solid-state equipment that has become Ameco's mark of recognition in the CATV field. As fast as new personnel can be trained, a third shift of workers will be added to turn out equipment around the clock. There is one word that can best describe Ameco's production department . . . "busy."

One of the reasons behind all of this "busyness" became quite apparent after a visit with Director of Contracting and Construction Louie Coggins who is working a crew overtime to keep up with Ameco turn-key jobs. A battery of engineers and draftsmen keep several blueprint machines running hot in this department with over 30 turn-key projects "in the fire" and more coming up soon according to Coggins.

Another phase of Ameco's operations that was contributing to the humming production line became evident after spending a short time with Vice President in charge of Marketing and Sales John Buchanan, and National Sales Manager Ed Whitney. A very simple two word sign on John Buchanan's desk points up the resolutions of this department: "Go . . . Now." From all indications, the sales force is definitely "going." Tech-reps manning "salesmobiles" in every part of the country are already doing their share towards keeping the factory hustling according to Buchanan.

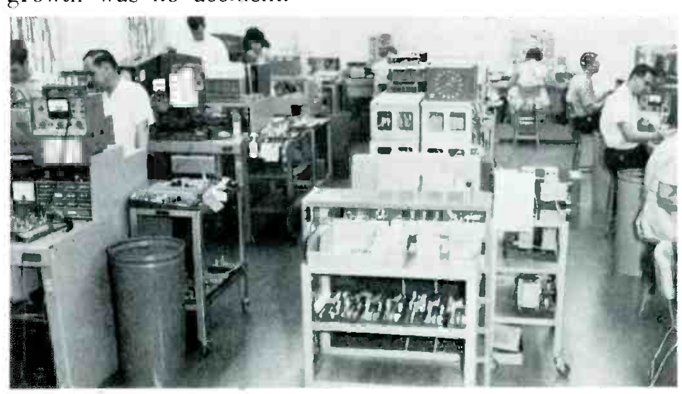
An interesting conversation with Milford Richey, director of technical operations for Ameco and general manager of Antennavision Service Company, Inc., Ameco's microwave common carrier associate, revealed many plans for expansion of microwave activities. The ties that bind the CATV industry with microwave are becoming stronger and stronger and Ameco's growth in this direction has been substantial.

This photo shows part of the research laboratory where Ameco's solid-state products are developed.

Cable systems that extend from Florida to California and an NBC affiliate television station round out the many interests of Ameco.

Winding up the visit to Ameco with President Bruce Merrill could only serve as a prognostic prediction of a bright future for Ameco.

As Mr. Merrill discussed the nostalgic past, it was obviously a long way indeed from that modest start 10 years ago in Safford. A master plan and carefully calculated time table had been adhered to with remarkable accuracy according to the president of Ameco. Ameco's growth was no accident.



All Ameco products are subjected to close scrutiny in the Test and Alignment section before leaving the production plant.

It became clear to the writer that Ameco's future in the CATV industry is built around a man who is looking ahead. While his background is that of a cautious Certified Public Accountant, his thinking is futuristic and optimistic. There will be no resting on laurels at Ameco . . . the "City of the Sun" and the company that has put it faith in solid-state are both growing and going.

# SHARP, CLEAR PICTURES WITHOUT INTERFERENCE

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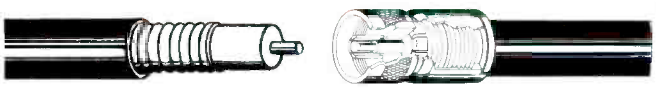
## SUPERIOR'S

## Cell-O-Air Coaxial Cable

## *with 'COPPERGARD'*



Cell-O-Air Coaxial Cable, with Coppergard, provides up to 20% lower attenuation; far better long-term transmission stability, and far greater radiation protection. Solid tubular Coppergard shield also eliminates the radiation leakage apertures present in all braided coaxial types. Corrugation permits hand bending to acceptable limit of 20 times diameter.

| Catalog Number "Coppergard" Shield | Attenuation (Nom. db @ 100 ft.) | | Nom. Overall O.D. |
|---|---|---|---|
| | Ch. 6 | Ch. 13 | |
| 4920 | 0.88 | 1.50 | .480" |
| 4930 | 0.65 | 1.05 | .652" |

**ALSO AVAILABLE: Self-supporting IM "Fig. 8" type and Double COPPERGARD shielded types for direct-burial use.**

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**EVERY REEL SWEEP-TESTED OVER ITS FULL LENGTH**

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

# ELIMINATE "PULLOUTS" THAT CAUSE BLANK SCREENS

*With*

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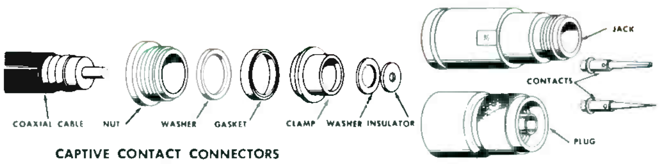
## *Captive Contact* CONNECTORS




CAPTIVE CONTACT CONNECTORS

Superior's Captive Contact Connectors eliminate the "pullouts" that cause blank screens by making positive never-fail contact between lengths of coaxial cable to maintain service. 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.

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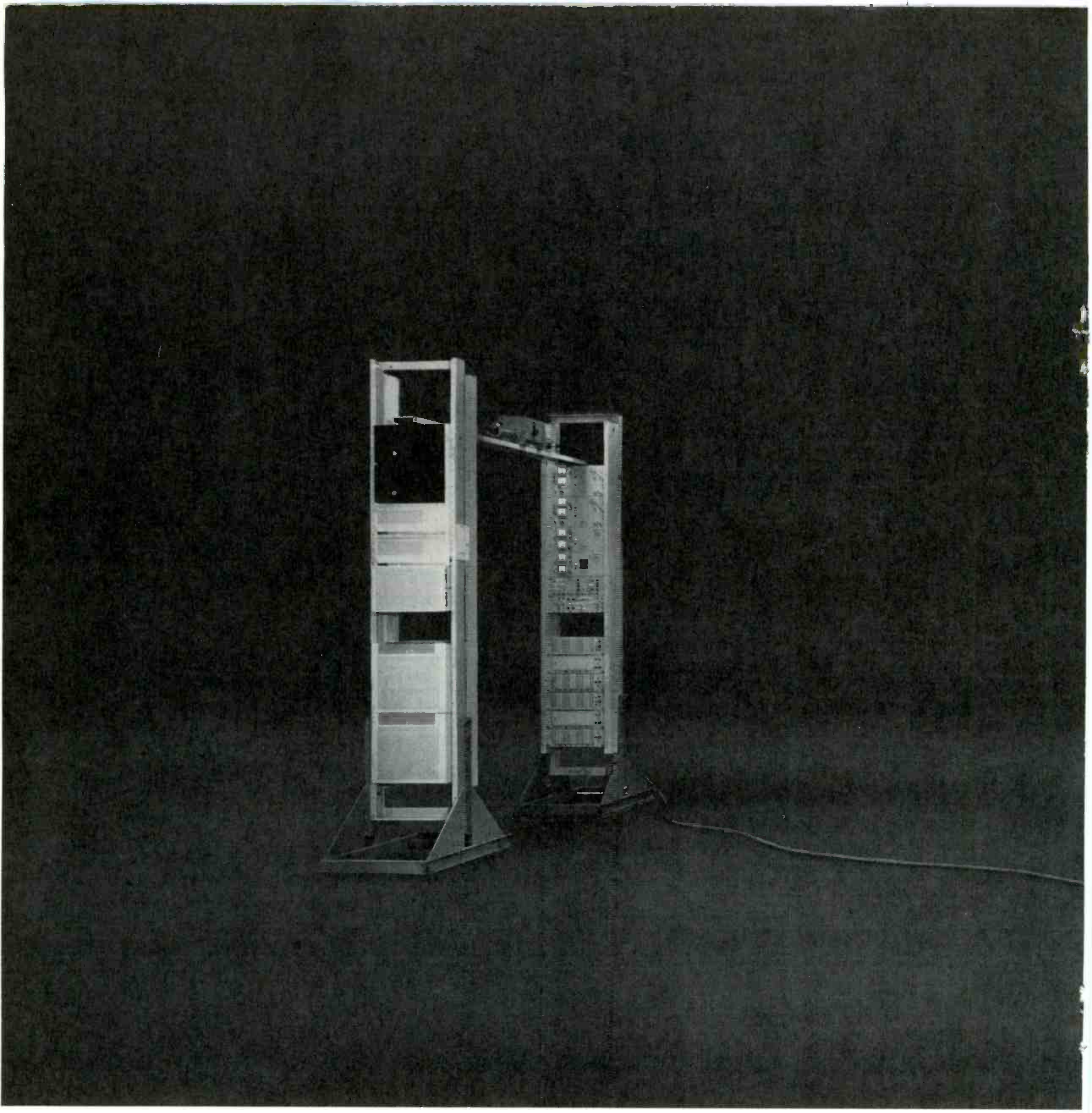

# New link

Look closely. You're watching the demonstration of an advanced solid-state microwave system designed expressly for the transmission of TV.

Recently introduced by Lenkurt Electric, the 76TV carries color television signals or detailed, fine-line pictures of up to 940-line resolution. Low noise figures and high performance makes this system particularly suitable for all ETV, CATV, and STL applications.

*Many options.* The modular design of the 76TV offers unusual flexibility. If you wish, you can purchase just the basic terminal—transmitter or receiver, and power supply—and later on convert to full duplex operation (as shown above) . . . or add other auxiliary equipment without costly modifications. Best yet, the basic design is tested and proven; it is almost identical to over four hundred 76-class terminals already in service.

*Easy maintenance.* Built-in metering and alarm test facilities keep your maintenance staff smiling. No tedious check-out

# in video transmission

procedures are needed. Alarms can be checked out in only three minutes, while no more than five minutes are required to record and compare all readings.

*Long-haul capability*. The system shown will operate over five to eight hops; furthermore, a heterodyne repeater now entering production will be available for inter-city relays of well over 1,000 miles. For complete information on the 76TV microwave system, write today to any of our field offices or see us at the NCTA convention in June.

Lenkurt Electric Co., Inc., San Carlos, California. Other offices in Atlanta, Chicago, Dallas, and New York City.

**LENKURT ELECTRIC**
SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS GT&E

# THE NOT SO QUIET GROWTH OF CABLE TELEVISION

*by Charles Wigutow*
*Telesystems Corporation*

Millions pay to receive their television programs, yet it is not Pay TV. On the contrary, those who supply these reception services make much of the fact that it costs less to pay for television the community antenna way than to receive an equal quantity of pictures by any other method.

Pay TV is not to be confused with community television; Pay TV offers specially selected programs for a price. Community antenna television, better known as CATV does not discriminate between programs. It serves as a convenient pipe-line for all broadcast matter coming from stations it is designed to receive. For this service, subscribers pay a monthly fee, rather than erect their own towers and antennas.

The community television industry has been quietly building up in places, either remote from metropolitan centers, or those sealed off from direct line of sight by mountainous terrain. Today it is big business.

The beginnings were humble. Essentially, cable television was born out of the fascination held by the medium. Reception of pictures through the air is so much about us at this time we are likely to forget the miraculous nature of this device. People who lived in smaller, more distant towns and saw pictures in stores or dwelling places in the big cities wanted this big city miracle for themselves.

Originally, television was a metropolitan luxury. The costs of building and operating a station were so high that a station could recover the expense of existence only in places of massed populations. A home located behind high ground, or even on flat land, if the distance was greater than sixty miles, could not benefit from the television station. TV waves are of such high frequency that they travel in a fairly straight line, called line of sight. These waves do not bend over hills or mountains.

Some enterprising servicemen placed antennas on the tops of nearby peaks, brought common twin lead from these heights into their own and neighbors' homes; and so made television possible for a handful of previously television deprived people.

These were the simple beginnings of cable television Cable television wasn't hard to sell. Subscribers found their way to cable offices wherever they were located on the promise of receiving one or two stations. And they paid as much as $175 or $200 to be installed on community systems. These amounts are high compared to the $20 or less for installations currently offered by new systems. But then the subscriber could sit in on a new magic world that ordinarily could not have been available to him. Television kept these new viewers compulsively and happily chained to their sets throughout most of their leisure waking time.

Simple methods of stringing lines into homes gave way to the most advanced electronic wizardry. Laboratories worked overtime to produce equipment that would maintain strong, interference-free signals through the miles of cable that were being strung on utility poles in community antenna towns. Today cable television layouts and equipment are of extremely sophisticated design.

Communities of all sizes, geographically spotted outside of reception patterns of television stations have for the greater part been wired by this time. But CATV has been moving into other towns where there is reception from one or more stations, although the quality of pictures may have left something to be desired. And the trend has been to reach out to greater distances by the use of microwave bringing to town other stations that were far outside the fringes of any possible local reception.

At this point, some of the broadcasters have protested, and the Federal Communications Commission decided to have another look at the growing CATV industry. Was the table of allocations for television stations being upset? A few stations claimed economic injury; they could not compete with a cable system bringing in all the networks, and probably independent or educational stations in addition.

The FCC had set up a list of priorities in 1952 on providing television service throughout the country. The first of these was to provide at least one television facility to all parts of the United States. But those who had experienced television reception from more than one source could not be expected to be pleased with such a limitation when it was feasible for them to have their own choice of many kinds of programs at any time of the broadcast day.

This goes back to the Free Speech Amendment in the Bill of Rights. Democracy operates on two types of freedoms: the right to unhindered learning, and the right to unhindered expression. This is the firm interpretation placed on the First Amendment by the United States Supreme Court. It has been the guide applied by the Federal Communications Commission in its decisions on Public Interest.

Ordinarily, concentrated populations in the big cities favor availability of more sources of information; their numbers help the owners of television stations meet their heavy costs. Community cable systems have been responsible for changing the balance in favor of many smaller communities over the bulging metropolitan areas. Cities with populations of less than fifteen thousand are able to receive more programs than those in cities numbering millions.

No one can say that there is a monopoly of opinion in these smaller places. After all, nationally circulated magazines reach into every home. Radio stations dot the American landscape in many places where television stations cannot exist. Does this mean that further multiplica-

*(Continued on page 20)*

**STL, ETV, CATV, CCTV and Data**

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Collins offers you a complete microwave equipment line. You'll find equipment for short haul systems. Long haul systems. Microwave in the 6 kmc and 12 kmc frequency bands. Equipment with power from 50 mw to 5 watts. Receiver IF bandwidth of 15 or 25 mc. Complete ac or dc operation. Remodulating or heterodyne repeaters.

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Before you invest in any microwave equipment for your video application, call Collins. Let us show you what our experience in design, engineering, manufacturing and application can do for you. In economy. In systems flexibility. In reliability.

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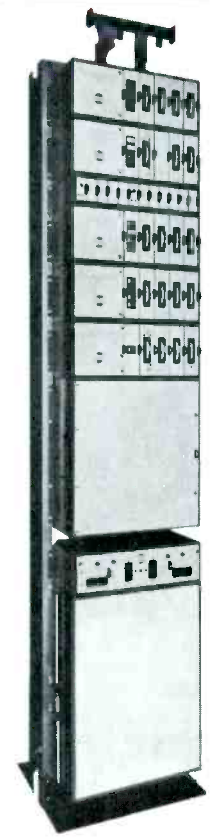
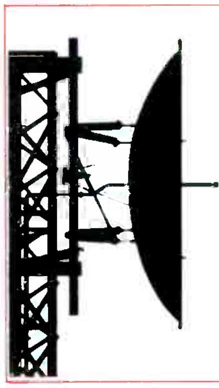
| 5925 to 8400 mc | 100 mw | 15-25 mc |
| | 1 w | 15-25 mc |
| | 5 w | 15-25 mc |
| 10,700-13,200 mc | 50 mw | 15-25 mc |
| | 500 mw | 15-25 mc |



MW-106D RF Heterodyne

MWV-601B Microwave RF Equipment



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COLLINS

*(Continued from page 18)*

tion of as many sources of information and other broadcast matter as can possibly be provided by TV, should be discouraged?

Sociologists are in general agreement that all of the United States, city and country, is rapidly becoming one community. The idea of hinterland is fast disappearing. For this, television is getting most of the credit by these scholars of the contemporary American scene.

What are the prospects for CATV? It has moved into cities with even more than one local station. If CATV finds markets in these places, it is obivous that it is only because people want community systems. No one is forced to subscribe. Some programs are available to those who want to put up their own antennas. But evidently viewers want all the stations they can get; the more choice, the better they like it.

There are about 1400 community systems within the United States. With an average of 800 subscribers each, this adds up to more than 1,100,000 subscribers. Count an average family as more than three and a half persons, then CATV serves more than 4,000,000 viewers. New systems are being constructed so rapidly that the official organization, National Community Television Association cannot keep current with the exact number.

Cities being wired for cable television are becoming larger. Even New York can be said to be partially cabled through an inter-linking hotel television system. The companies getting into ownership of CATV are also of substantial size. It is not hard to understand, since cable television is part of the broadcasting complex, that broadcast interests are flocking into the community antenna systems business.

If the present trend continues, the next ten years might see a tripling of numbers of subscribers to community antennas. There are other reasons than an increase in variety of offerings by cable. In larger cities there are many kinds of interferences to good reception. Ghosting caused by bouncing signals, and electrical noise are some of the problems CATV eliminates. Pictures on CATV are controlled for quality right up to the set in the home.

CATV advocates counter the charge made by some broadcasters that they have a harmful impact on local stations. Up to five years ago, only three stations located in CATV cities claimed economic injury from the community system. One of these, in Atlantic City, served a population of about 100,000. But the area's cable systems had no more than 4,000 subscribers at that time. A local applicant for a UHF license in this area has since asked those same systems if they would put this station on the cable should he get the license. CATV would be in position to provide such a station with a ready-made audience.

Knowledgeable CATV men say that the availability of other stations keeps the local station's sights set on more local programming, since this is the kind that get most acceptance in its own town. And it gives the home channel an advantage over the other broadcasts. If this is the case, then the FCC's first priority for television service is being satisfied.

When there is such a large variety of programming available, there is little chance of monopoly of opinion in the CATV town. If this monopoly ever existed it has been outmoded by the techniques of cable system engineering.

# Performance Testing of Television Channels

by Maurice E. Cookson, E.E.
Lenkurt Electric Co., Inc.

**Part One**

Television, especially color television, imposes new performance requirements on communication circuits. Unlike most other kinds of transmission, television is extremely waveform-sensitive. The ability of a television circuit to transmit an image which faithfully represents the original subject is directly dependent on the ability of the system to reproduce a signal waveform precisely. By contrast. in speech or even data transmission, the accurate reproduction of the signal waveform is relatively unimportant so long as the magnitudes of the various spectral components of the signal are reproduced accurately.

In television, the reproduction of the brightness of individual picture elements is determined by the voltage of the television signal at a given moment. To faithfully reproduce a contrasting edge, say, from black to white or white to black, the television signal must be able to make an abrupt change or "step" voltage without distortion. The shape of the video waveform depends entirely on the content of the picture, possibly consisting of impulses, steps, or level plateaus instead of the sine wave combinations which characterize speech or music waveforms.

This inherent difference between video and audio waveforms naturally leads to differing transmission requirements and capabilities. An effective transmission system for speech must have good amplitude-versus-frequency linearity. That is, amplitude response must not vary appreciably across the frequency band occupied by the audio signal. However, phase irregularities are relatively unimportant in speech transmission.

In a television system, phase characteristics become extremely important. Non-linear phase shifts as a function of frequency serve to distort the all-important waveshape, and these distortions are directly visible on the television screen as some form of picture distortion. Amplitude-versus-frequency linearity is also extremely important because it determines the ability of the equipment to reproduce accurately the brightness values of the subject. Furthermore, it determines the ability of the waveform to make rapid changes from one level to another in response to fine detail in the picture. Thus, good frequency response affects the ability of the television signal to accurately achieve the desired voltage levels and to reach these values at the required time.

When linearity of phase shift or amplitude response is poor, various forms of distortion may be produced. For instance, where low frequency (such as 60 cps) phase and amplitude response is poor the signal is unable to adjust itself to the desired value

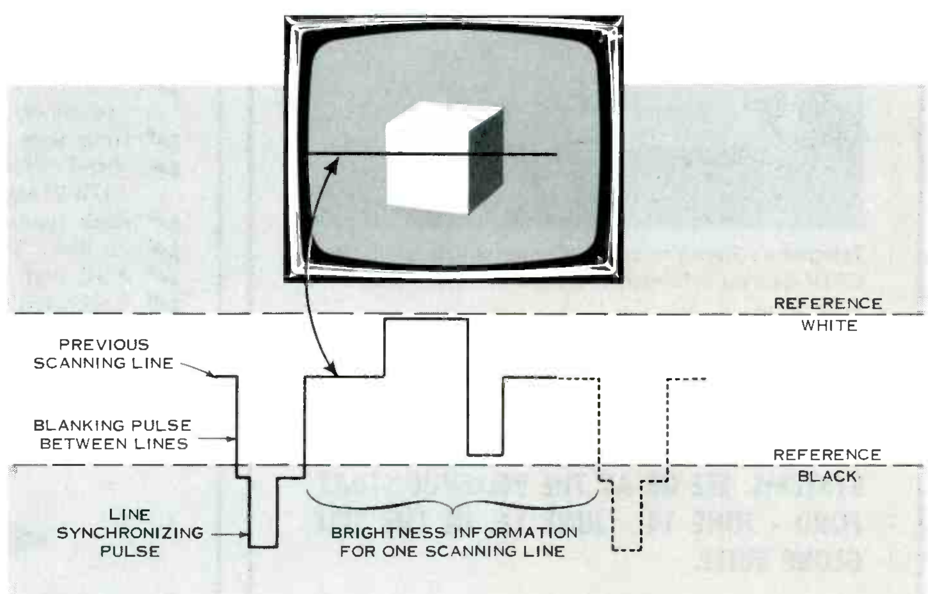



Figure 1. Basic television signal for a single scanning line. The partial scan shown in red in the picture raster produces a waveform like that shown directly below it. At the end of each scan, the blanking pulse darkens the tube while the scanning beam is returned. The scanning sweep is triggered by the synchronizing pulse which occurs during blanking. Ability of transmission system to pass such abrupt waveforms without distortion is vital to good picture reproduction. Clean edges between contrasting colors require excellent ability to transmit square waves and other such transients.

Figure 2. Poor frequency response or other irregularities lead to distortion of various sorts in the reproduced picture. Echoes usually result from non-linearities in baseband frequency characteristics, or from multipath transmission. Since transmission errors are rarely as bad as this exaggerated example, sensitive test methods are required to permit accurate evaluation of quality.

for a considerable portion of the scanning sweep. This shows up on the picture monitor as "streaking"—errors in the brightness of the image. Response errors at the higher frequencies may result in "ringing," "smearing," or echoes. The magnitude and distribution of frequency and phase errors have an important bearing on the way the picture is affected. The accurate location of picture information on the screen is a function of the ability of the system to respond within a certain time, but not *beyond* the proper time. Frequency and response time are reciprocal functions of each other; one can be transformed into the other, and

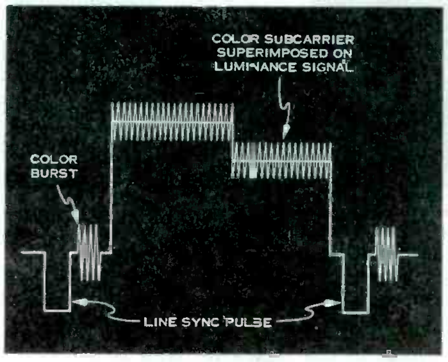



Figure 3. In NTSC color system, "Color burst" is transmitted as phase reference for color subcarrier superimposed on luminance signal. Any change in phase or amplitude of subcarrier causes color change in picture. This is called "differential phase" or "differential gain" when caused by changes in luminance signal.

this transformation determines how the picture is affected by frequency response errors.

For instance, if there is a "narrow" irregularity in the television baseband frequency response—that is, an amplitude variation that is restricted to a rather narrow band of frequencies, the waveform will exhibit a "ringing" of low amplitude but of long duration. This shows up as an echo or "ghost" following important transitions of dark and light in the picture. The greater the bandwidth over which the amplitude response error extends, the smaller the separation between the desired detail and its echo. If the bandwidth occupied by the irregularity becomes smaller, the echo is more widely separated from the main image.

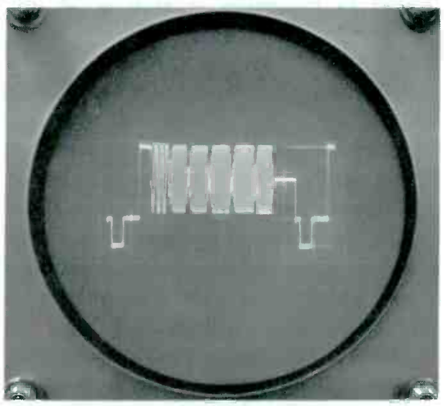
Most of these effects which are of great importance in the transmission of television have only negligible effect on the transmission of single or multiple-channel speech signals. For this reason, conventional methods of testing speech channels are able to reveal little about the suitability of a transmission channel for carrying television signals. Testing methods are required which are sensitive to those characteristics which directly affect picture quality.

**Television Test Signals**

A rough idea of transmission quality can be gained simply by observing the transmitted picture, and often a skilled technician can diagnose difficulties directly from the raster. Since such evaluation is entirely subjective, problems arise in defining transmission quality. An impairment barely noticeable to one person may be highly objectionable to another. Under these circumstances what constitutes "acceptable" picture quality, and how should it be expressed?

In the final analysis, of course, a transmission system must provide a picture acceptable to the viewer. Thus, the amounts of tolerable distortion are based on viewing tests by critical viewers. Large amounts of distortion may be tolerated if the effect on subjective picture quality is negligible; but other, more potent types of distortion may be allowed much narrower tolerances. This, of course, suggests the need for standarized test methods which can be readily reproduced under a variety of conditions, but which do not require subjective judgments of quality. Many such tests have been developed by the television industry.

In general, the tests developed for black and white television are concerned with the measurement of three



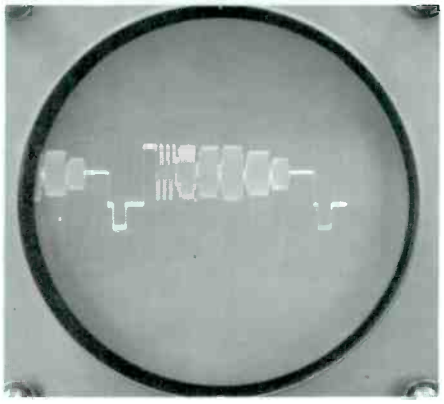
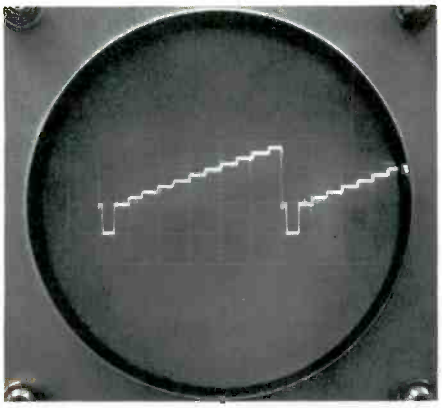


Figure 4. Multiburst signal consists of consecutive "bursts" of ascending frequencies, all transmitted at reference white level (A). Changes in frequency response show up as variations in relative amplitude of different frequencies (B). Note frequency roll-off at upper frequencies.



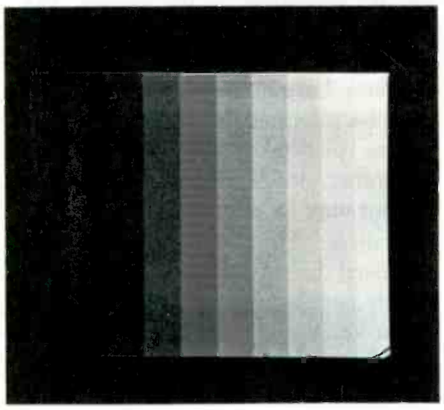


Figure 5. Typical stairstep test signal as shown on the "A-Scope," and how it appears on picture monitor. Note that each step represents a shade of light. When applied to system, each step is equal in amplitude. Non-linearities in system are revealed by compression or expansion of individual steps or parts of waveform.

transmission parameters:

1. Amplitude-versus-frequency linearity,
2. Phase-versus-frequency characteristics, and
3. Transient response.

The first of these, amplitude linearity, implies the ability to reproduce signal voltage accurately regardless of the frequency (within the band of interest). The last, transient response, is the ability of the system to "follow" sudden, impulsive changes in the signal waveform. This ability is largely controlled by a combination of the two previous characteristics, amplitude and phase response. In general, good transient response requires excellent amplitude and phase characterists, but is not necessarily assured, since minor perturbations of one may combine with the other in "the wrong way" to cause distortion of transients.

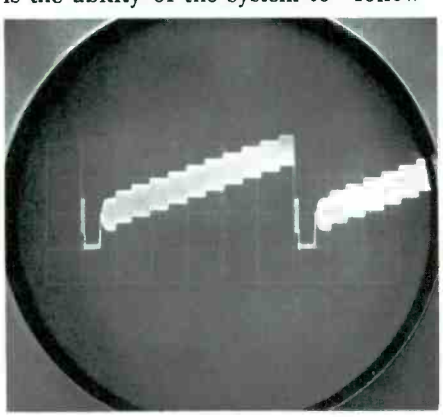


Figure 6. Stairstep test signal with superimposed 3.58-mc color subcarrier can be used to measure differential phase or gain. Differences in amplitude of modulation reveal differential gain. Differential phase measurements require synchronized phase detector.

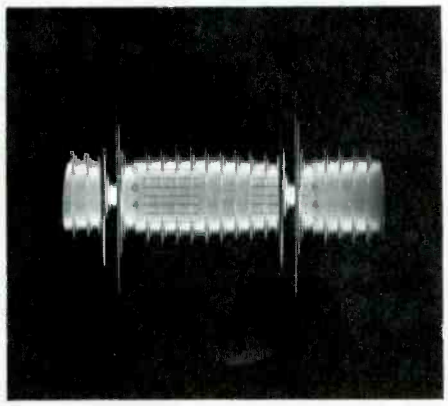


Figure 7. By passing stairstep with subcarrier through a high-pass filter, low-frequency steps are removed, leaving only subcarrier. Variations in amplitude reveal differential gain more clearly than in original unfiltered form (Figure 6).

Color television transmission requires the consideration of these three factors, plus two more:

4. Differential gain and
5. Differential phase.

These last two parameters are perhaps the least understood, and yet they are the ones which place the most stringent requirements on the transmission system. *Differential gain* is the variation in the gain of the transmission system as the luminance or brightness signal varies between the values for "black" and "white." Any variation in phase of the color subcarrier as a result of changing luminance level is called *differential phase.* Ideally, variations in the *luminance* signal voltage should produce no changes in either the amplitude or phase of the color subcarrier. Thus, the presence of either one implies distortion—and thus it is redundant to speak of "differential gain distortion" or "differential phase distortion."

Both of these parameters are directly concerned with color information. In the American and Canadian NTSC system, a color subcarrier at a frequency of about 3.58 mc is superimposed on the luminance signal. Different colors or *hues* are indicated by shifting the phase of the color subcarrier. The *saturation* or richness of the color is transmitted by varying the amplitude of the color subcarrier. In an ideal system, which would have no differential gain or differential phase, changing brightness values in the picture would have no effect on the phase or amplitude of the subcarrier. However, when differential phase is present, a change in the brightness of the scene could change the color of a green object to yellow, while differential gain could change the color saturation from, say, a dark green to a pale value.

Even before color television, there was no simple, easy-to-use test signal that would give quantitative as well as qualitative evaluation of *all* transmission impairments. With the addition of differential gain and differential phase to the characteristics to be monitored, the problem of testing became even more difficult. Several test methods, however, have gained wide acceptance for measuring specific impairments, and some can be used for more than one of the parameters listed

Figure 8. Streaking of picture is caused by poor low-frequency response. Note that relative duration of brightness vaues determines the amount of visible error in picture at left. At right is a typical window signal as it appears on the picture tube when the same amount of low frequency error is present.

above.

### Multiburst Signal

The *multiburst signal* is used to make a quick check of the amplitude-versus-frequency charactersistics across the baseband. The signal consists of a series of "bursts" of equal-amplitude sine waves, each at a different frequency. In addition to the burst frequencies, the test signal includes a horizontal synchronizing pulse and a burst of peak white—the so-called "white flag"—to provide a white reference level. The complete signal is transmitted during one line interval. Typical burst frequencies are 0.5, 1.5, 2.0, 3.0, 3.6, and 4.2 mc. A transmitted multiburst signal appears in Figure 4A, and the received signal is shown in Figure 4B. A quick glance at the oscilloscope ("A-Scope") waveform presentation of the received signal reveals a substantial decrease in gain with increasing frequency.

Obviously, the multiburst is not a complete check of the amplitude-frequency response. Dips and peaks occurring entirely between the burst frequencies may not show at all. This test is very useful, however, because it provides a spot check of the overall system response which can be evaluated visually in a few seconds.

### Stairstep

The *stairstep signal* is so called because the A-Scope presentation resembles a staircase consisting of 10 steps extending from black level to white level. On the picture monitor this signal produces a series of vertical bands. Both presentations are shown in Figure 5. In the undistorted signal these steps are equally spaced. Thus, a visual check of the relative height of the steps after passage through the transmission system provides a quick and easy method for qualitatively evaluating system linearity.

A sine wave of 3.58 mc (the nominal color subcarrier frequency) impressed on the stairstep signal provides a method for measuring differential gain and differential phase. If this composite signal is passed through the transmission system and then through a high-pass filter, the low-frequency step components are eliminated and the 3.58-mc signal remains—distorted by any differential gain or differential phase which may be present in the system. Any differential gain at the 3.58-mc subcarrier frequency shows up as amplitude variations in the

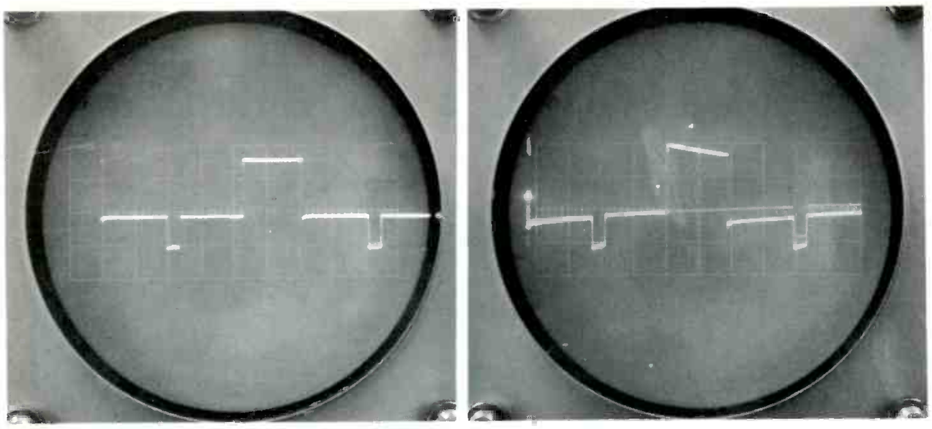


Figure 9. Oscilloscope presentation of square wave response in system with poor low-frequency response. Waveform at left is reasonably good (note tilt of sync pulse). Picture at right illustrates very bad low-frequency response. Streaking would be severe.

horizontal presentation, as shown in Figure 7.

Differential phase can be measured by using a phase detector to compare the phase of the 3.58-mc signal impressed on a stairstep luminance signal with the phase of a reference signal of the same frequency. This reference signal may be provided in several ways. One method is to use a local free-running oscillator synchronized by the horizontal synchronizing pulse transmitted with the stairstep. The phase detector then measures the phase differences between this locally generated signal and the received signal at the various luminance levels. Any difference, measured in degrees, is the differential phase.

Figure 10. "Ringing" shows in picture as echoes displaced to the right of transitions between dark and light.

### Window Signal

The *window signal* takes its name from its appearance on the picture monitor—a rectangular white area on a black background. The signal is generated as a line frequency (15.75 kc) square wave having a peak value equal to reference white. Since only half of each cycle is at reference white, the other half cycle being near reference black, only half the width of the screen is white. If the line frequency square wave is modulated by a 60-cycle square wave, the window signal will occupy only half the height of the picture raster. Most commercial window signal generators permit the resulting window to be adjustable in size and position.

The window signal is particularly useful in testing for low-frequency distortion. Phase distortion in the frequency range below about 200 kc produces "streaking"—one of the more objectionable forms of picture impairment. Streaking is the appearance of an incorrect luminance in the picture because of the waveform's inability to reach the correct value promptly. It usually spreads to the right from a point of sharp transition between light and dark or vice versa, as shown in Figure 8. In addition to being visible on the raster presentation of the window, low frequency phase distortion can also be seen on the A-Scope, where it is indicated by a tilting of the square wave from the horizontal. As little as 2% tilt may be detectable in the picture, and 5% tilt indicates distortion which is readily noticeable. Figure 9B shows an extreme amount of "square-wave tilt."

The window signal is also used to test for "ringing"—a waveform "overshoot" or damped oscillation. Ringing is usually produced by sudden voltage transitions in a system with a sharp upper frequency cutoff, or by a transmission discontinuity below the cutoff frequency. The frequency of oscillation approximates the cutoff frequency or the frequency of the discontinuity. The "sharpness" of the discontinuity determines the duration of the ringing. As shown in Figure 10 each oscillation due to ringing shows as a light or dark band following the tonal transition which induced the ringing. By measuring the overshoot of square-wave transitions, it is possible to estimate the effect on picture quality and to determine the degree of correction required. Figure 11A shows the A-Scope presentation of the same degree of ringing shown in Figure 10, and Figure 11B shows the same effect on a sine-squared test pulse.

### Transient Response Tests

Most of the tests descirbed above are essentially "steady state" tests—that is, tests which employ sine wave signals or other signals which are inherently repetitive. Although these tests have significant value in evaluating the overall response of a television transmission system, they have definite limitations.

The most typical television signal is not necessarily repetitive at all, but may consist of a number of transients or instantaneous changes in amplitude. Such signals impose performance requirements on a transmission system which cannot be adequately simulated by sine wave substitutes. A television subject may consist of "optical transients" in which a small bright object may appear against a contrasting dark background. For perfect reproduction, the signal waveform should rise instantly to the value representing the brightness of the small object, then just as quickly return to its former value as the scanning beam moves on.

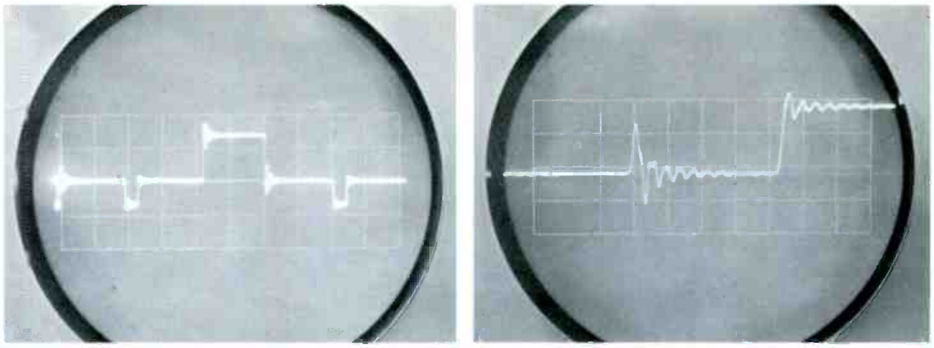
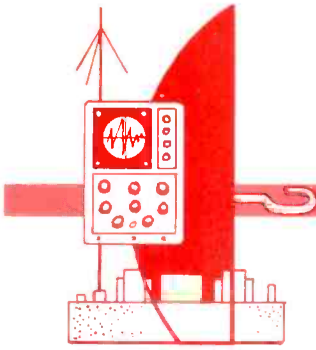


Figure 11. Same amount of ringing as in Figure 10 produces severe distortion of window signal (A) and sine-squared test pulse (B). Note severe oscillations at beginning and end of square wave. Sine-squared test is the more sensitive of the two, but is harder to evaluate qualitatively. Next month's article discusses this test in detail.

In steady-state types of testing, the low-frequency components of the waveform that are necessarily present as a result of the long durating of the test signal may obscure or modify the response of the system to transients. Since steady state signals are not necessarily typical of those which the system may be called upon to transmit faithfully, they are not fully adequate in evaluating performance of the system. Furthermore, steady-state tests are less suitable for establishing *tolerances* on the distortion which may be allowed in a television system.

Because of these more or less inherent disadvantages of the "traditional" steady-state test methods, waveform or transient response tests have been developed, and these are becoming more widely accepted, particularly in England and other European countries. The most widely used transient response test is a combination of a sine-squared pulse and a modified square wave which together form the so-called *pulse and bar* test signal. This test method offers many advantages under some circumstances and has been recommended, along with some other tests, by the CCIR (International Consultative Committee for Radio). The sine-squared pulse and bar test will be discussed in the second article of this series, which will appear in the next issue of *TV & Communications*.


1. A. Ste-Marie, "Video Testing Techniques in Television Broadcasting," Communications and Electronics; March, 1958.
2. Electrical Performance Standards for Television Relay Facilities, Electronic Industries Association Standard RS-250; 11 West 42nd Street, New York 36, N.Y., October, 1961.
3. Requirements for the Transmission of Monochrome Television Signals Over Long Distances. C. M. T. T. (Annex 15/1) recommendation at the Xth Plenary Assembly of the C. C. I. R.; Geneva, 1963.



# PRODUCT REVIEW

### NEW TEST SETS

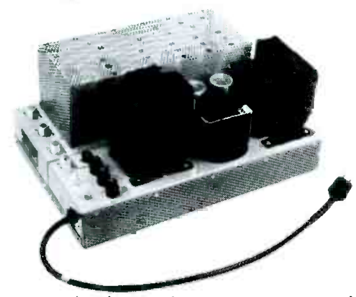
**Jerrold Electronics Corporation** has introduced two new combination test sets, Models 601-CM (pictured) and 602-CM, for test and alignment of RF circuits in the total frequency range of 4 to 225 mc. Jerrold indicates that the instruments are a combination of a new Jerrold sweep frequency generator and a Jerrold CM-10 marker generator mounted together in one compact housing. The manufacturer claims that the two new instruments provide a complete testing unit for checking characteristics of RF circuits.

Jerrold has also announced new sweep generators, Models 601-5BR and 602-5BR, which feature a built-in RF detector, a 70 db built-in attenuator in 10 db steps, and a built-in marker inserter and amplifier. The generators also have an output VWR of less than 1.1:1 and a horizontal output featuring approximately 360 degrees phasing. The Model 601-5BR has a frequency range of 12 to 225 mc and the Model 602-5BR has a range of 4 to 112 mc. Total sweeping range of each generator is divided into 11 overlapping ranges. Generators are available as single units or in bench or rack-mounted configurations.

Combination test sets 601-CM and 602-CM are priced at $745 each. The single unit sweep generators are individually priced at $450. Delivery is from 8 to 10 weeks.

### DISTRIBUTION AMPLIFIER

A new high-low FM distribution amplifier is being offered by **Entron, Inc., 2141 Industrial Pkwy., Silver Springs, Md.** Designated as Model LHD-404R, the new unit is designed to feed low and high VHF and full FM signals into as many as four distribution lines with an output level of 50 dbmv at channel 13. It utilizes a combination of 10,000-hour tubes and highly reliable compactrons to deliver high level signals; systems layout is simplified since the need for most distribution line extender amplifiers is eliminated.

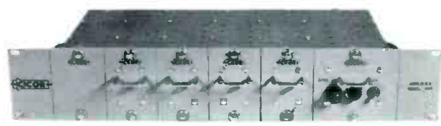


Its matched single input terminal allows the LHD-404R to be fed from a directional coupler or from the end of a distribution line; therefore, it can serve as either a bridging or a distribution line extender.

The unit, which features proven split band technique, feeds 1½ miles of distribution lines. It includes long life silicon rectifiers and separate high and low band gain and tilt controls. Filament and screen voltage regulation assure gain stability under varying line voltage conditions, and increase tube reliability by keeping filament and cathode temperatures constant.

### DISTRIBUTION AMPLIFIER

A new amplifier designed for the distribution of signals with very low distortion has been developed by **C-COR Electronics, Inc., P.O. Box 824, State College, Pa.** A typical application is the



distribution of a number of standard signals throughout a laboratory. With a pass-band of 1 kc to 2f0 mc, ouput capability of 1 v rms to each output and gain adjustable plus or minus 3 db, distortion is less than 0.5%. Impedances in and out, 50 ohms; isolation, 40 db between outputs. A complete unit consists of one to five amplifier modules with three outputs per module plus a regulated power supply module. Write Mr. James R. Palmer, President of C-COR for details.

### TOWER BEACONS

A complete line of obstruction **lighting equipment** is now available from Rohn Manufacturing Co. The Rohn B-1 300 MM Code Beacon, manufactured to meet complete FAA and FCC specifications, is designed to provide maximum durability and performance, according to the manufacturer. This beacon is designated for use on TV, microwave and transmissio nline towers, and other lofty structures as an aircraft warning system. junction boxes for use with the above

Rohn obstruction lights are available in either single or double models. Also available are beacon flasher units and lighting equipment. Complete tower lighting kits are available. For details contact Mr. R. A. Kleine at **Rohn Mfg. Co., P. O. Box 2000, Peoria, Illinois.**

### NEW ALUMINUM HELIAX

Andrew Corporation has announced that foam Heliax cables are now available with corrugated aluminum outer conductors in three popular sizes. These new coaxial cables are offered in ½", ⅞" and 1⅝" diameters with a low loss foam polyethylene dielectric. All three sizes feature Heliax flexibility and handling ease, available for the first time in aluminum cables.

The continuous corrugated outer conductor sheath is crush and kink resistant, yet lightweight. Aluminum Heliax is available in long splice free lengths and jacketed for added protection. A series of easily attached compatible connectors is available for all sizes.

Detailed specifications are available from **Andrew Corporation, P. O. Box 807, Chicago, Illinois, 60642.** Request Bulletin 8527.

**NEW COAXIAL CABLES**

**Plastoid Corporation, Long Island City, New York,** has announced the addition of two constructions to their "Corrugated 5 MIL Copper Shielded" coaxial cable line. The new constructions are:

**PP-21732** — .480" O.D. Distribution Line, made with a "Corrugated 5 MIL Copper Shield" and an integrated .109" O.D. solid galvanized steel messenger having a 2000 lbs.-plus breaking point. This construction is electronically the same as the CT-48 unmessengered Distribution Line coaxial cable: Nominal db loss per 100 feet at Channel 6, .855 db at Channel 13, 1.40 db. Approximately 3000 feet per reel.

**PP-21734** — .650" O.D. **Trunk Line,** made with a "Corrugated 5 MIL Copper Shield": Nominal db loss per 100 feet at Channel 6, .650 db at Channel 13, 1.05 db. Approximately 2000 feet to 3000 feet per reel.

The new "Corrugated Shielded" constructions expand the Plastoid "All Band" line that also features TA4 - .412" O.D. "Solid Aluminum Sheathed" **distribution line:** Nominal db loss per 100 feet at Channel 6 - .96 db, Channel 13 - 1.6 db and TA5 - .500" O.D. "Solid Aluminum Sheathed" **Trunk Line:** Nominal db loss at Channel 6 - .78 db, Channel 13 - 1.26 db. Both aluminum cables are also available with an overall polyethylene jacketing to protect against extreme atmospheric conditions and for direct burial purpose. All aluminum cable constructions available in **continuous** length put-up of 1000 feet to 5000 feet per reel.

**PRECISION INSTRUMENT CATALOG**

The Wayne Kerr Corporation, manufacturers of transformer ratio-arm bridges and other precision electronic instrumentation, have just published a new 6-page, 2-color, illustrated short-form catalog that covers the company's entire line.

Copies are available to qualified personnel who request them on company letterhead. Write to: Mr. Graham Miller, **Wayne Kerr Corporation, 1633 Race Street, Philadelphia, Pennsylvania.**

# DIRECTORY ADDENDUM

The March 1964 issue of TV & Communications included a comprehensive Directory of CATV Equipment. The following information is published to correct or supplement listings in the March issue.

## BROADBAND HEADEND AMPLIFIER

**DAVCO ELECTRONICS CORPORATION**

**Functional design head-end.** Handles up to 12 adjacent channels. Features Entron equipment in Davco's unique design layout. Completely lab assembled and aligned, it also incorporates any number of FM channels, closed-circuit for weather, Telemation Weather Channel and Tape Athon music channels. Electronically regulated power supplies, electronic mixing, built-in remote power supplies for antenna pre-amps and regulated AC source are all available features.

Hi-Q filtering on all channels assures adequate adjacent channel suppression. Equipment is mounted in sloping horizontal racks which are bonded together. All connecting cables are double shielded RG-6/U with BNC connectors and are custom fitted to the assembly. All conversions are crystal controlled, and all channels have video AGC control. Tubes are selected, long-life. Each of these head-ends is custom designed to your channels and system. Write for details and quotations.

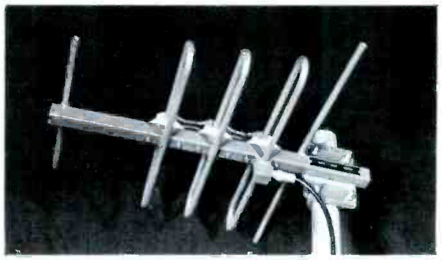
## COAXIAL CABLE

**ALPHA WIRE COMPANY**

**F-606 RG-59/U Cable for CATV use.** Thoroughly sweep tested and checked for spectrum response. Foam dielectric; copper conductor. 75 ohms nominal impedence; black poly .242 OD Jacket. Write for complete specifications and prices.

## BROADBAND ANTENNAS

**TACO (TECHNICAL APPLIANCE CORP.)**



**Multi-channel 5-element yagis, Y-53 series.** 50 to 500 mc with models broad-banded to cover wide ranges within TV and communications spectrum. Especially applicable for multi-channel use for either high or low TV channels. Construction features include 1½" square heliarc welded crossarm with ½" diameter elements reinforced with 5/8" sleeves. Gain at channel 2 is 7 db; at channel 6, 7 db and 7.5 db at channel 13. Three driven elements. Hermetically sealed terminal boxes. 50 ohm impedence.

**JERROLD ELECTRONICS CORP.**

**Broadband VHF TV antennas, J-Series.** True log-periodic design assuring extremely flat response and matched output over the entire band. Front-to-back ratio at 22 db. High gain of 8½ db on high band and 8 db on the low band. 75 ohm impedance. Specify J55-LO for low band model; J105-HI for high band.

## SINGLE CHANNEL ANTENNAS

**JERROLD ELECTRONICS CORP.**

**Cut-to-Channel and FM yagis, J- Series.** Ruggedized single-channel models precisely cut for channels 2-5 and 7-13. Have high gains of 10.5 db over reference dipoles on the high channels and 8 db on low channels 2-6. 75 ohm impedance. Order by channel.

**TACO (TECHNICAL APPLIANCE CORP.)**

**Screen reflector yagis, SY-41 and SY-42 Series.** For single-channel, high band, applications. Screen type yagis have high front-to-back ratios and high gain. All models feature heavy-duty welded construction. Will mount easily to tower mounts. SY-41 models consist of a single 4-element yagi on a screen reflector. Yagi elements are ½" aluminum alloy with ⅝" reinforcing sleeves. Reflector is made with 1¼" aluminum frame and ⅜" reflecting rods. SY-42 models have two 4-element yagis on a screen reflector and are supplied with combining lines providing a single coaxial input. (Specify high band channel.) 50 ohm impedance.

**5-element multi-driven yagis, Y-51 series.** Selection of two or three driven elements enables the design engineer to select narrow or broad band response with impedance, pattern and gain characteristics to obtain highest possible efficiency. 50 to 112 mc. Features narrow bandwidths and sharp patterns. Relatively flat response over the frequency range and sharp drop-off outside the desired band. Standard models to cover each VHF TV channel and the FM band. 8 db gain. Constructed with 1¼" square crossarm and elements of ⅝" diameter with ¾" reinforcing sleeves. Hermetically sealed terminal boxes. 50 ohm impedance.

**5-element multi-driven ruggedized, yagis, Y-54 series.** 30 to 88 mc. This series is more ruggedly constructed than Y-51, to provide additional strength required in areas subject to exceptionally high winds and very heavy ice loading. Crossarms are 2" square and elements are ¾" diameter with ⅞" reinforcing sleeves. Hermetically sealed terminal boxes 8 db gain. 50 ohm impedance.

**8-element multi-driven yagis, Y-81 series.** 50-66 mc. Two models available with standard ruggedized yagi construction. Three driven elements. 10 db gain at channel 2. Heliarc welded crossarm is 1¼" in diameter. ⅝" elements are reinforced with ⅞" sleeves. Hermetically sealed terminal boxes. 50 ohm impedance.

**Triple-driven dipoles Y-101 series.** 8 and 10 element low-band yagis. Three driven elements. Same construction features as Y-81 series. 11.2 db gain at channel 6. Available for 66-88 mc. 50 ohm impedance.

**10-element high-band yagis, Y-102 series.** Utilizes two or three driven elements. Same ruggedized construction as above. 112-163 mc. 50 ohm impedance.

**10-element high-band yagis, Y-103 series.** Two driven elements. For television channels 7-13. Provides 12 db gain at channel 13. Construction same as preceding listings. 50 ohm impedance.

## FM ANTENNAS

**TACO (TECHNICAL APPLIANCE CORP.)**

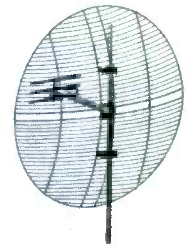
**Ruggedized yagi for FM. Model Y104 series.** 10-element low-band multi-driven yagi also used for communications and special purposes. Ruggedized design features heliarc welding, square crossarms, hermetically sealed terminal boxes. Available for frequencies from 43-88 mc. 50 ohm impedance.

**J-Series broadband and cut-to-channel antennas.** (See Broadband and Single Channel listings.)

Highly directional ruggcedized units. Model J55-FM. Provides high gain, flat response. 75 ohm impedance.

## UHF ANTENNAS

**JERROLD ELECTRONICS CORP.**



**Heavy-duty UHF parabolic, J3065 series.** Designed to meet the need for highly directional rugged antenna for fringe and super-fringe reception of UHF stations, channels 14 to 83, including MPATI channels 72 and 76. 75 or 300 ohm models.

**TACO (TECHNICAL APPLIANCE CORP.)**

**UHF screen antennas, SB-series.** Designed to withstand the most adverse weather conditions. Used, for off-air reception for community or MATV systems. In MATV not incorporating electronic amplification, the very high gain of these antennas makes possible signal distribution through dividing networks with satisfactory results. Units are ruggedly constructed, factory assembled, ready-to-install. When 75 ohm coaxial input is desired, order SB-3048 tapered line balun. Model SB-16 consists of 16 bow-tie elements on 39" x 66" screen. SB-32 has 32 bow-tie elements on 78" x 66" screen. SB-64 has 64 bow-tie elements on 78" x 132" screen. SB-16 series provides gain of 17 db, SB-32 gain is 20 db, and SB-64 provides gain of 23 db. All three series are for television channels 14-83 (specify channel when ordering). 300 ohm impedance.

## MICROWAVE ANTENNAS

**TACO (TECHNICAL APPLIANCE CORP.)**

**2500-2700 mc ITV Antenna.** New lightweight microwave antenna for educational television in Instructional Television Fixed Service. Available in 4 and 6 ft. diameters parabolic antenna design produces gain, relative to linear isotropic radiator, of 27 and 30 db respectively. Total weight, including mount, is less than 50 lbs. Withstands winds to 100 m.p.h. Cast dipole element requires no guying. Provisions are made for installing the feed for either verticle or horizontal linear polarization. Models EPA-4 and EPA-6.

## ANTENNA ACCESSORIES

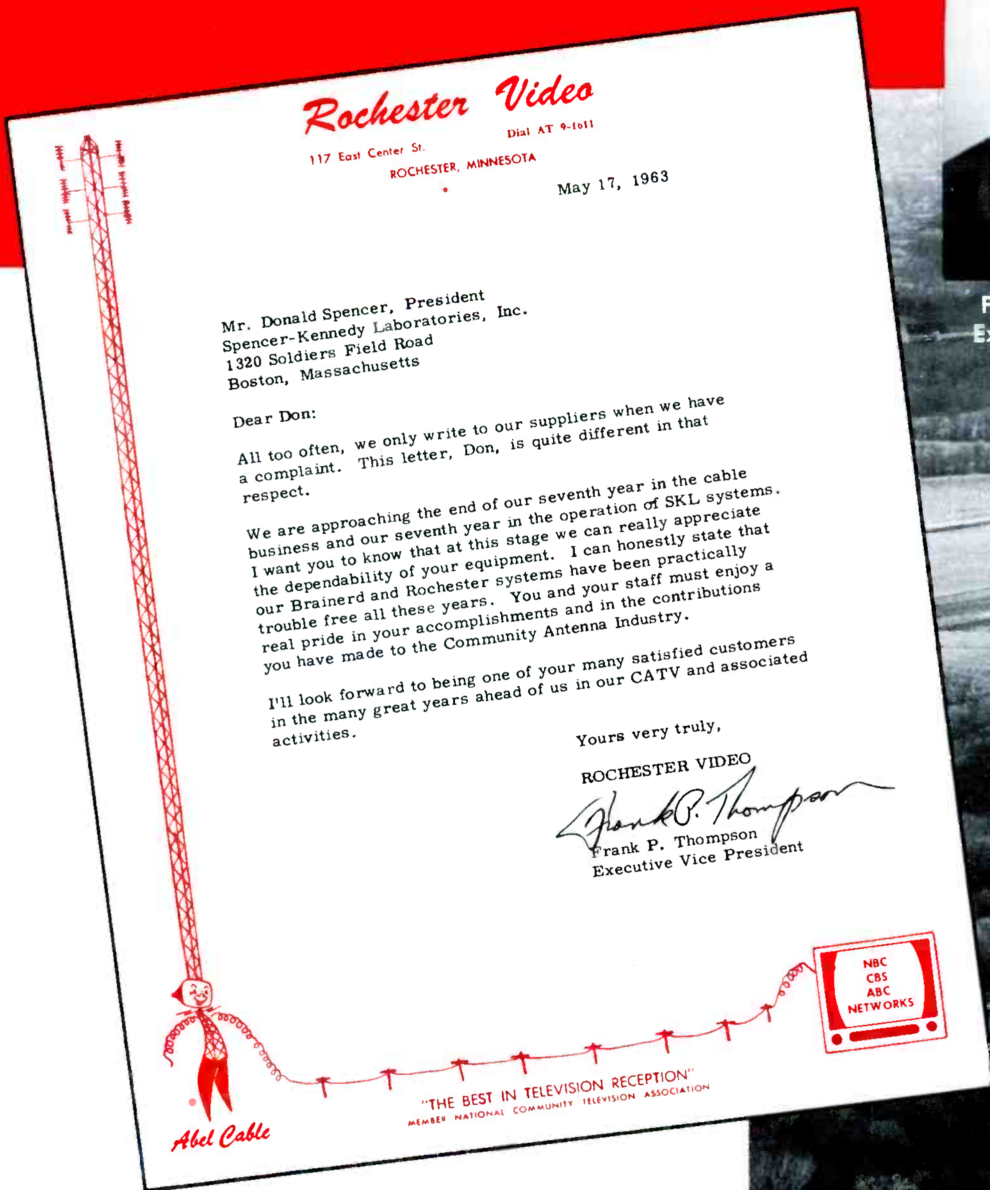
**TACO (TECHNICAL APPLIANCE CORP.)**

**Antenna mounts.** A series of antenna mounts for all types of Taco spun and mesh reflectors is available. The series includes: pipe mounts for standard service; heavy-duty pipe mounts for areas with severe wind loading; roof mounts of the three point type with adjustment of plus or minus 5 degrees; tilt mounts for sloping roofs or where an antenna cannot be located directly below a passive reflector; special mounts for specific requirements. Write for additional details.

**Anti-icing equipment.** Radomes for all size dishes are available for applications where antenna must perform under adverse conditions. Heater units are available to prevent the accumulation of ice and snow on the radome-dish assembly. Individual heaters are available also to heat the dish and feed units where the use of a radome is not desired.

**Ruggedized yagi antenna accessories.** Write for complete catalog.

# Experience Means Satisfaction To SKL System Operators



Rochester Video
117 East Center St.
ROCHESTER, MINNESOTA
Dial AT 9-1611

May 17, 1963

Mr. Donald Spencer, President
Spencer-Kennedy Laboratories, Inc.
1320 Soldiers Field Road
Boston, Massachusetts

Dear Don:

All too often, we only write to our suppliers when we have a complaint. This letter, Don, is quite different in that respect.

We are approaching the end of our seventh year in the cable business and our seventh year in the operation of SKL systems. I want you to know that at this stage we can really appreciate the dependability of your equipment. I can honestly state that our Brainerd and Rochester systems have been practically trouble free all these years. You and your staff must enjoy a real pride in your accomplishments and in the contributions you have made to the Community Antenna Industry.

I'll look forward to being one of your many satisfied customers in the many great years ahead of us in our CATV and associated activities.

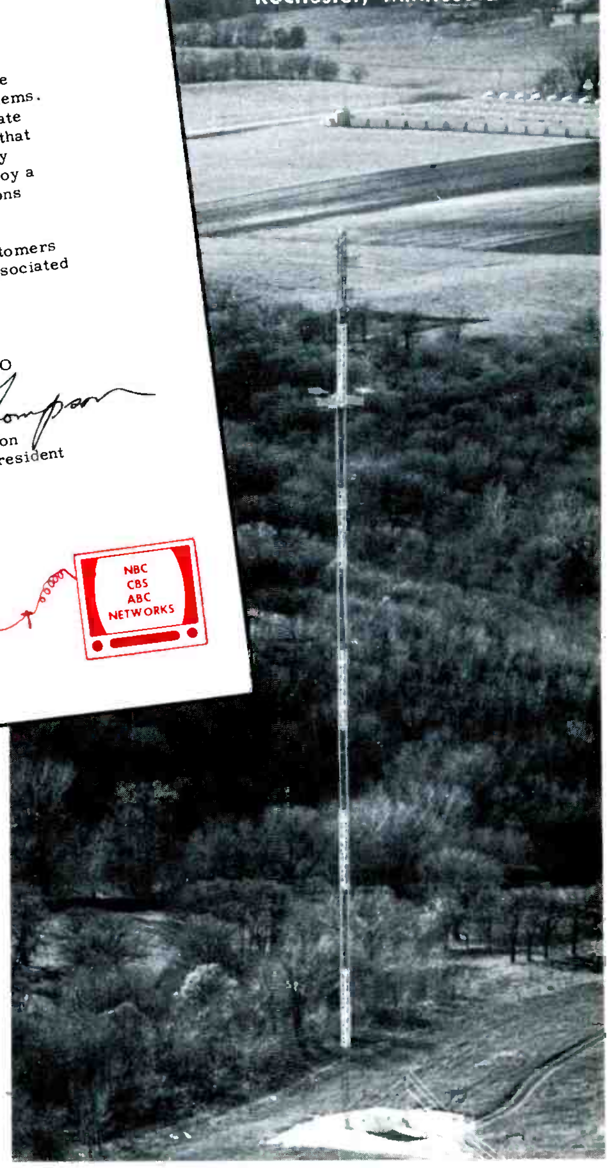
Yours very truly,

ROCHESTER VIDEO

Frank P. Thompson
Executive Vice President



FRANK P. THOMPSON
Executive Vice President
Rochester Video
Rochester, Minnesota



Frank Thompson has 7 years' experience in the highly successful operation of SKL systems, serving many thousands of subscribers. He has long been a member of the National Community Television Association's board of directors and has taken an active interest and leading part in CATV industry affairs.

Like many other SKL system operators, Frank Thompson knows that the fine quality, low maintenance cost and continuing dependability of his SKL equipment, year after year, have made a real contribution to the outstanding operating record he has achieved.

SKL

**SPENCER-KENNEDY LABORATORIES, INC.**

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