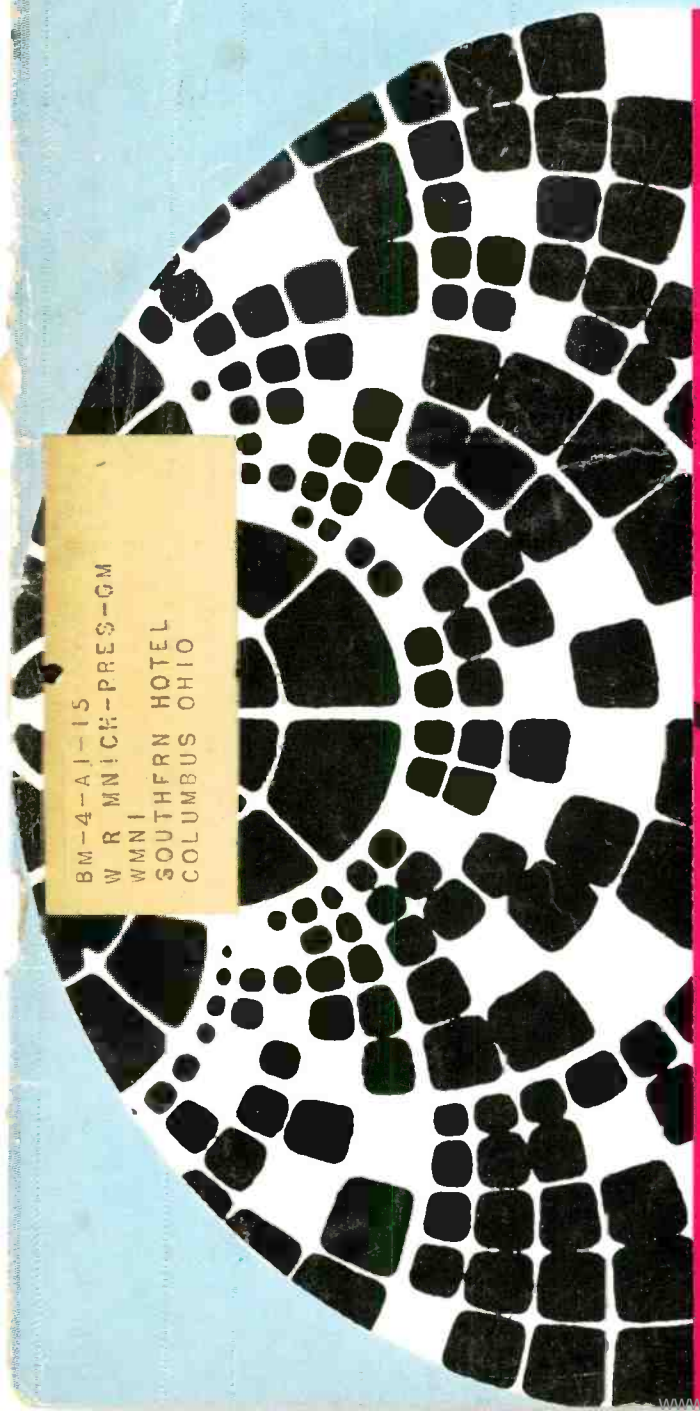
A MACTIER PUB[illegible] 1965

# BM/E

THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING





**What Telecasters Are Doing With Microwave**

**Appraising an Existing CATV System**
**Full-Time vs. Daytime Operation**
**Conducting a Frequency Search**
**Building an FM Station**

# Light years ahead...



## INTRODUCING THE NEW JERROLD Starline™

# SOLID-STATE CATV EQUIPMENT

CATV history has just been made. The exciting new Jerrold *Starline* Series has opened up an entirely new concept in CATV distribution equipment.

Now, for the first time, you can have plug-in prepackaged ultra-compact *groups* of solid-state components (trunkline and bridging amplifiers, AGC's) within a single weatherproof, radiation-proof cast aluminum housing—ready for mounting on messenger cable, pole, or crossarm. All active equipment for a complete station is now available in your choice of complete lightweight units.

But the new Jerrold *Starline* Series is far more than just convenient and easy to install. It represents the greatest electronic achievement in CATV . . . another giant step ahead in Jerrold 12-Channel system capability and unmatched picture quality. *Starline* is all new—the industry's most advanced, most reliable line. Look at these exclusive features:

- **50-amplifier main-trunk cascadability for 12 channels, at −57 db crossmod**
- **More than 1,100 db of main trunkline**
- **All silicon transistors**
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- **Full-wave rectification permits power supply to handle more amplifiers**
- **Seized center conductors for positive solderless connections**
- **Radiation-proof housing**

Gear up for increasing subscriber demand in the Golden Age of CATV. Talk with the man from Jerrold *now*, or write for complete information on the new *Starline* Series.

Patent pending

JERROLD

CATV Systems Division
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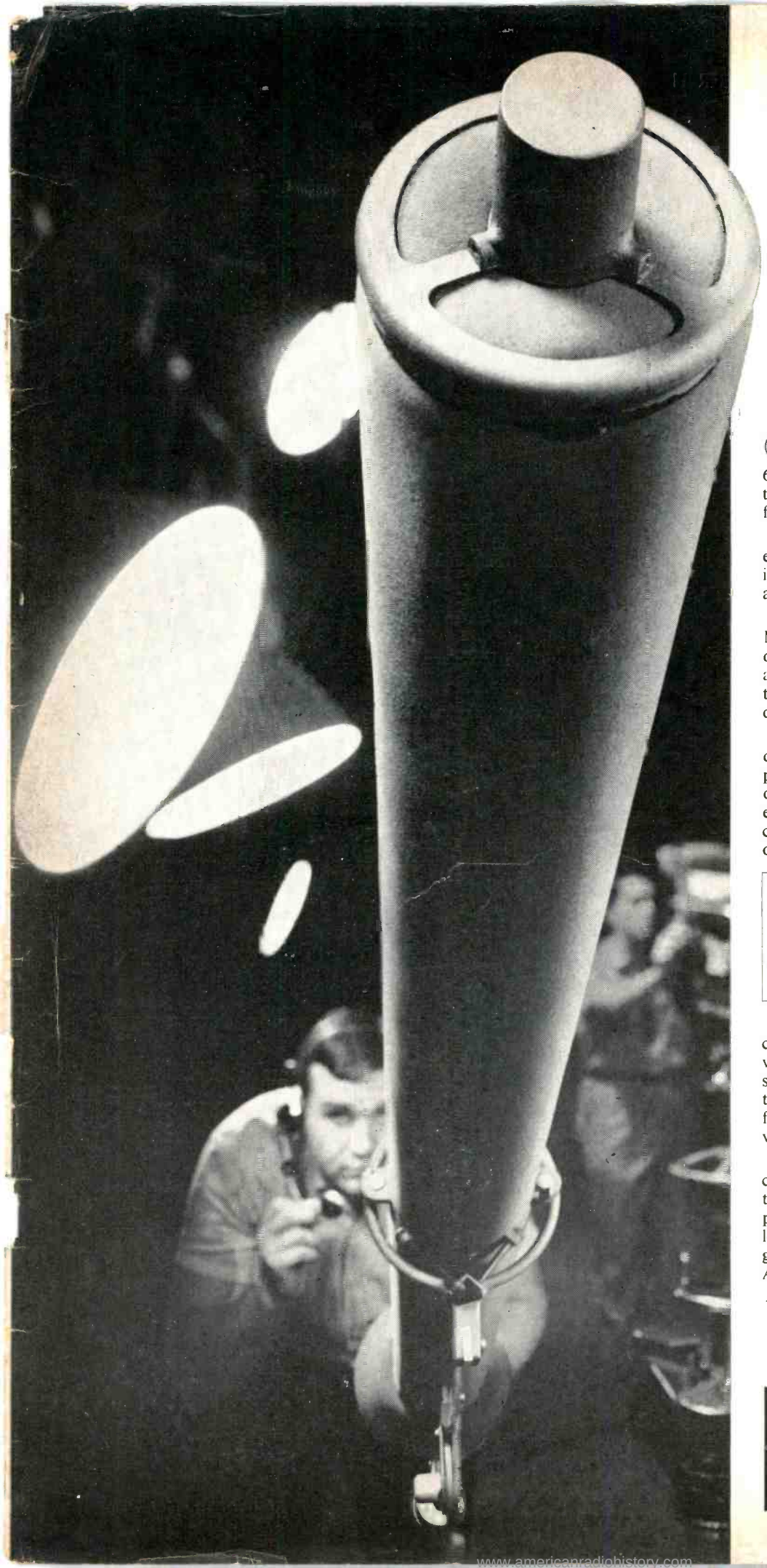


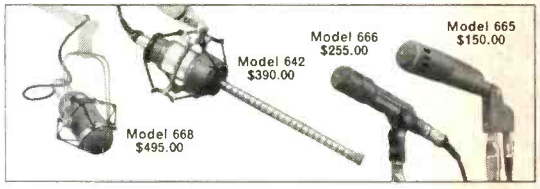
# How does this 7 FOOT MONSTER help solve your sound problems?

The giant microphone shown here is the biggest microphone in captivity! The Model 643 is also the most directional microphone sold today. It helped E-V win the first Academy Award for microphone design in 22 years.

But beyond this, the 643 has been one of our most effective field research tools, offering a far-reaching insight into the nature of directional microphones, and their applications.

An obvious result of 643 research is our unique Model 642. Same E-V Cardiline™ principle*, but only 18 inches long. It reaches up to twice as far as any other broadcast unidirectional microphone to give you better long distance pickups than were dreamed possible a few years ago.

And this same basic research stimulated the development of our new Model 668 cardioid microphone. It uses the Continuously Variable-D® cardioid principle (a creative development from our exclusive Variable-D patent*) to provide smoother cardioid action—plus more versatility—than any other boom microphone you can use.




But let's not ignore the most popular professional cardioid microphone of all, the Model 666. Here's where the Variable-D principle got its start. And since the introduction of our seven foot laboratory, the 666—and its companion, the 665—has been further refined to offer better performance and value than ever before.

From such startling microphones as the 643, come continuing basic improvements—and the tools you need to solve your most difficult sound problems. Only E-V provides this kind of design leadership. E-V microphones in your studio will give you a big head start toward better sound. After all, we're at least seven feet ahead of everybody!

*Model 643, $1,560.00. Normal trade discounts apply on list prices shown.*

*Cardiline Patent No. 3095084. Variable-D® Patent No. 3115207

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Electro-Voice®
SETTING NEW STANDARDS IN SOUND

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NOVEMBER 1965 / VOLUME 1 / NUMBER 11

# BM/E

THE MAGAZINE OF
BROADCAST
MANAGEMENT/
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The intriguing pattern on this month's cover is what microwave engineers call a Smith Chart. Functionally, it is useful for plotting impedance, and determining component requirements of a system. Art Director Gus Sauter has used it graphically to highlight one of this month's features, "What Telecasters Are Doing With Microwave," beginning on page 27. If you're in TV, you'll be interested in how O & O microwave systems are being used advantageously. If radio is your game, you'll find the features beginning on pages 24 and 31 more to your liking. And if CATV is more your cup of tea, don't pass up the article starting on page 18.



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# BROADCAST INDUSTRY NEWS

## 1st 100w VHF Translator

FCC's Broadcast Bureau granted the application of KMSO-TV, Inc. for a new 100w VHF translator station in Kalispell, Mont. This is the first grant of a high-power TV translator on an assigned channel (Ch. 2) pursuant to rules which became effective Aug. 16. Currently, there is no TV service in Kalispell. KGEZ-TV (later KULR) began operation on channel 9 in July 1957, but went silent the following April. Operation was resumed in October 1958, but the station went off the air for good in May 1959, and surrendered its license Feb. 21, 1962. Eighteen applications for high-power translators were reported pending the end of September—12 for VHF channels and 6 for UHF channels.

## B.B.C. Buys Microwave

Microwave Associates, Ltd., wholly owned subsidiary of Microwave Associates, Inc. Burlington, Mass., has received a substantial contract for portable microwave links from British Broadcasting Co. Initial delivery, scheduled for early next year, includes MLV-7000 equipment. Using all solid-state 250-mw transmitters and crystal-controlled receivers, the heterodyne design permits multiple-hop relay without necessity for demodulation at each repeater station. CCIR 625-line video, sound channel, and order wire facility is incorporated. Light-weight transmitter and receiver heads mount directly behind antenna dishes using either single or dual feed system. Full metering of key circuits is included. Equipment will be manufactured at the firm's Luton plant.

## Viking Tops Old Sales Records

Robert Baum, V-P sales, Viking Industries, Hoboken, N.J., reports that sales for 1965 are at an all-time high, averaging approximately 40% over the corresponding period for the first half of '64. Mr. Baum also announced that the company plans to build a new multi-million dollar plant to further expand production and provide larger research and development departments. Viking makes coaxial cable as well as electronic equipment for CATV.

## Rome Cable & Ameco Affiliate

Ameco, Inc. has been appointed national distributor for Rome Uniform CATV Cable. J. R. Woods, Rome Cable sales manager, said, "Choosing Ameco as a partner for progress has teamed us with an acknowledged leader in CATV. Rome Cable-Ameco joint research efforts will undoubtedly advance the state of the art for the benefit of the entire industry."

Ameco, in a registration statement filed with SEC, said 400,000 shares of common stock would be offered through an underwriting group headed by Hornblower & Weeks-Hemphill, Noyes. 200,000 shares will be sold by the company and 200,000 by a stockholder.

Ameco also reports it is in a position to offer component financing so that system owners can go ahead with rebuilds, improvements, or extensions without waiting for financing arrangements. According to Ameco, credit decisions are made within 24 hours, interest rate is 5%.

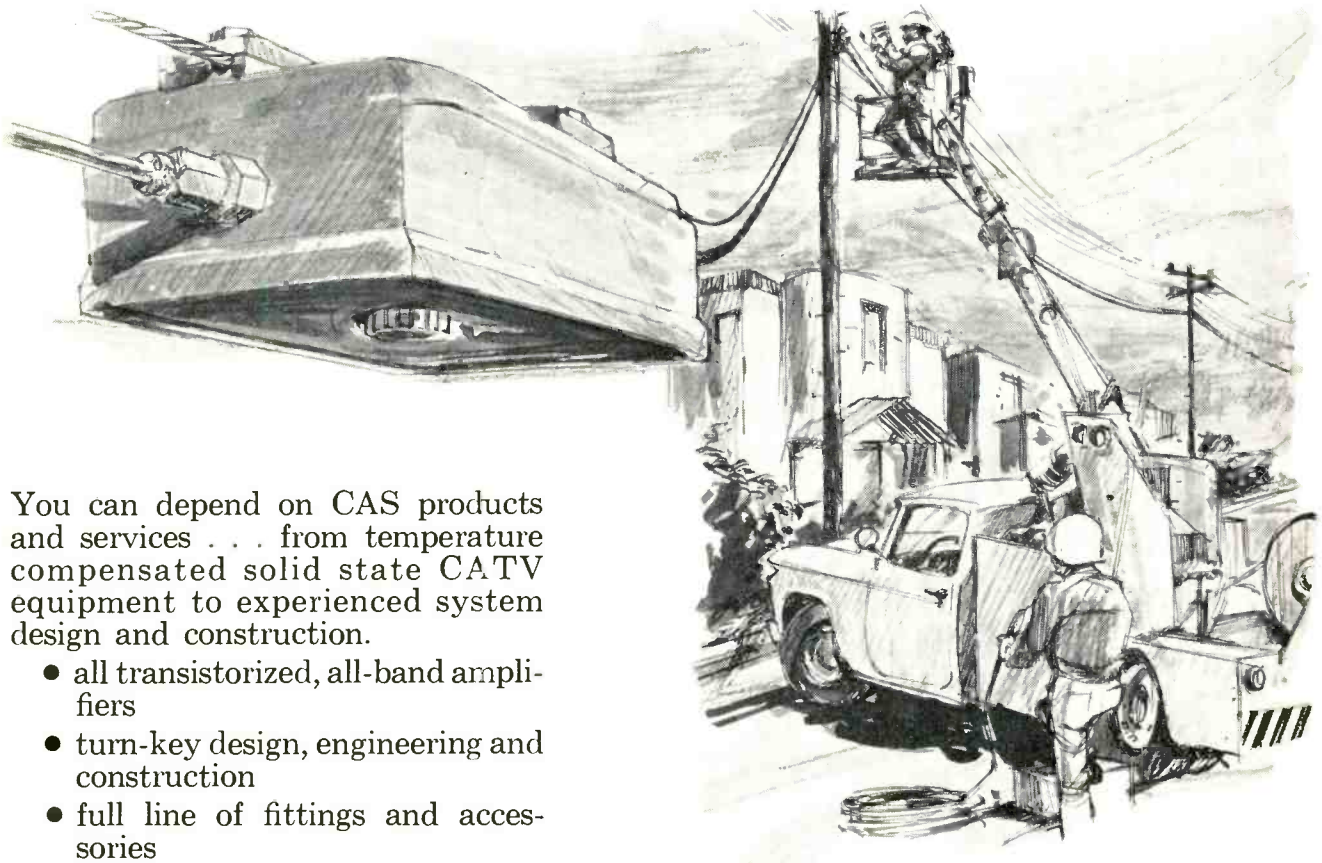
Mayor Michael Piazza (r.) of Pine Hill, N.J. studies topographical map with representatives of Jerrold Electronics Corp. before boarding specially-equipped helicopter for a TV signal survey. With him are Frank N. Cooper (l.), field rep, and Nathan Levine, C.E. for the Community Operations Div. Mayor Piazza requested the survey to determine the feasibility of erecting tower facilities for a CATV system in Pine Hill.

## Hi-Q Plant Expands

An added 30,000 sq. ft. to the Myrtle Beach, S.C., plant of Aerovox Corp. Hi-Q Div. will significantly increase the manufacturing capabilities, engineering labs,

Fifteen sales reps were introduced to several new products and went through a thorough work session on the operation and alignment of many products at McMartin Industries first national sales meeting in Omaha during September. Above, Gary Smith, Audio Marketing Manager, makes a strong point about one of the ten new products introduced.

# specify CAS for performance-proved CATV products and services!



You can depend on CAS products and services . . . from temperature compensated solid state CATV equipment to experienced system design and construction.

- all transistorized, all-band amplifiers
- turn-key design, engineering and construction
- full line of fittings and accessories
- power supplies for transistorized equipment
- live weather instrument packages
- ruggedized antennas
- aluminum and flexible coaxial cable
- TV and FM head-in systems

*Write for CAS all-transistorized equipment brochure!*

CAS MFG CO

P. O. BOX 47066 • DALLAS, TEXAS 75207
214/BL 3-3661

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offices and production area. Since 1949, the plant has grown from one to four buildings, employment from 14 to 900 people. The new construction is expected to cost $300,000, including new equipment.

## Stromberg & Entron Associate

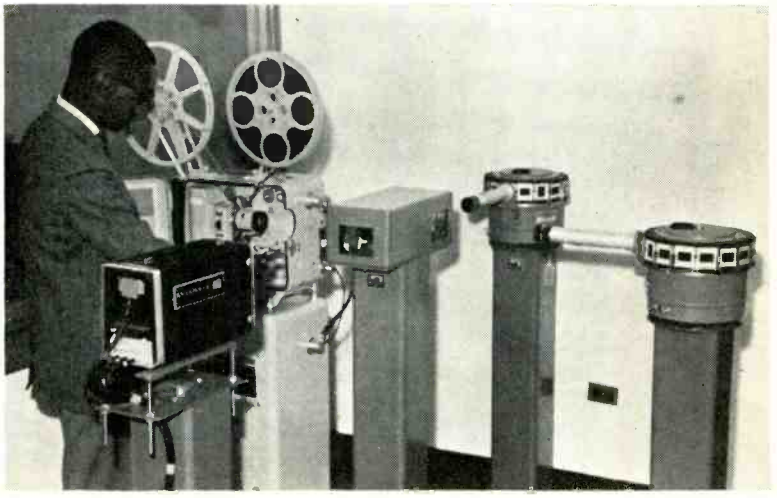
Stromberg-Carlson Corp., subsidiary of General Dynamics, is entering the CATV field in association with Entron, Inc., Silver Spring, Md. Under terms of the association, Stromberg-Carlson, using Entron developed equipment, will finance, engineer, furnish, and install complete systems for telephone operating companies. William A. Rockwood, V-P of S-C Telecommunications Group, and Robert J. McGeehan, Entron pres., said in joint announcement that many independent telephone companies are looking at CATV as a means of providing new communications for their areas.

## Kaiser & Cox Join Hands

Organization of a new company to produce and market CATV equipment was announced Sept. 30 in New York by Edgar F. Kaiser, Kaiser Industries Corp. prexy, and J. Leonard Reinsch, head of Cox Broadcasting. The Kaiser-Cox Corp., based in Phoenix, will be equally owned by Cox and Kaiser Aerospace & Electronics Corp. (wholly owned subsidiary of Kaiser Industries). Mr. Kaiser will serve as chairman of the board, Mr. Reinsch as president.

According to Mr. Reinsch, "Kaiser's productive capabilities, coupled with its research and development team, will complement the Cox leadership in CATV among group broadcasters." The new organization will immediately establish warehousing facilities and district sales offices in St. Louis, Pittsburgh, Atlanta, Oakland, Phoenix, and Portland, with additional locations yet to be selected. Parts and services will be handled by sales engineers, who will provide doorstep delivery of equipment and technical assistance.

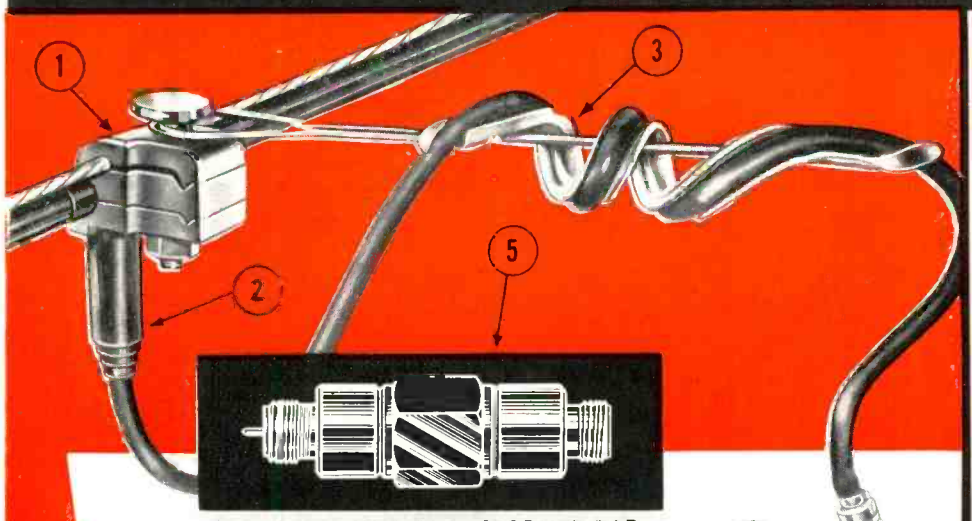
A Magnecord Model 1024 shares the spotlight with movie star Keenan Wynn on the set of Ivan Tors' MGM production, "Around the World Under the Sea." The equipment is part of an elaborate simulation of a submarine interior used in the $4 million epic. The studio also has announced plans to use the 1024 in an upcoming TV series.



A closed-circuit ETV system designed and manufactured by Sylvania Electric Products, Inc. has been installed at North Carolina College at Durham. Using three 800-line resolution cameras, the unit in left foreground views an optical multiplexer (center) into which two slide projectors (right) and a motion picture projector (left) are permanently focused. The system serves 15 classroom monitors, and includes a "talk-back" system.

# CRAFTSMAN COMPLETE TAP-OFF Package..

**$3.75** IN LOTS OF 100 **$3.95** IN LOTS OF 25





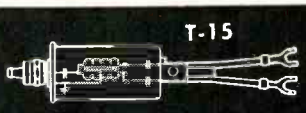

BACK-MATCHED TRANSFORMER TAP
Specify Type—Refer to Table A

**YOUR PACKAGE INCLUDES:**

1. TAP BLOCKS (refer to Table B)
2. HEAT SHRINK BOOT
3. 2 POSI-GRIPS
4. T-15 TRANSFORMER (Epoxy-filled and Full-Shielding)

4a. PLASTIC CLIP, MALE CONNECTOR and FERRULE

5. BACK-MATCHED TRANSFORMER TAP (refer to Table A)




- PLASTIC CLIP
- MALE CONNECTOR
- & FERRULE SUPPLIED

# EVERYTHING YOU NEED

## for SINGLE HOUSE-DROP in ONE PACKAGE

**WE SHIP WITHIN 24 HOURS!**

**TABLE A**

**BACK-MATCHED TRANSFORMER TAPS**

TECHNICAL SPECIFICATIONS

Frequency response: ..... 8-220 MC
Tap-off flatness: ..... ± 2 db
Body: ..... Solid brass, silver plated tap output is AC/DC isolated
Tap VSWR: ..... 1.2:1 max.
Output connector: ..... F type
Dimensions: ..... 2-1/4" x 5/8"

| Craftsman Order Number | Type | Insertion Loss |
|---|---|---|
| 304-12 | 12 db | 0.75 db |
| 304-16 | 16 db | 0.25 db |
| 304-20 | 20 db | 0.10 db |
| 304-24 | 24 db | 0.10 db |
| 304-30 | 30 db | 0.10 db |
| 304-36 | 36 db | 0.10 db |
| 304-40 | 40 db | 0.10 db |
| 304-50 | 50 db | 0.10 db |

**TABLE B**

**PRESSURE TAP BLOCKS**

| Type Cable | Construction | O. D. of Cable | Order No. |
|---|---|---|---|
| RG11U | SSSJ | .407 | 200 |
| | DSDJ | .465 | 201 |
| Strip-Braid 308/408 | SSSJ | .465 | 201 |
| | DSSJ | .465 | 201 |
| Aluminum .412 O.D. | Unjacketed | .412 | 202 |
| | Jacketed | .480 | 203 |
| Corrugated CF480 Cables | Jacketed | .480 | 203 |

BE SURE TO STATE *BOTH* ORDER NUMBERS AS SHOWN ON CHARTS
(For ex: Order #201/304-20)

CEP

**THE PIONEER CATV ACCESSORY MANUFACTURER**

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**CRAFTSMAN ELECTRONIC PRODUCTS, INC.**
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# NAMES IN THE NEWS

**William T. Welsh** and **Mike W. Fossier** have been elected Raytheon V-P's. Mr. Welsh, manager of Raytheon's CADPO since 1960, is V-P, Government Marketing. Mr. Fossier, previously chief engineer for the Missile Systems Div, is V-P, Div. Assistant General Manager-Technical.

**Albert W. Malang** has been appointed Manager-Broadcast Product Planning for G. E. Visual Communications Products. He was former chief video facilities engineer, ABC.

A. W. Malang

V. P. Marlin

**Vincent P. Marlin** has been named NYC district sales rep for G. E. Visual Communications Products, moving up from headquarters sales engineer for broadcast products.

**Louis J. Crispiano** is now marketing and planning manager for Products Engineering Div., Sony Corp. He was manager of commercial products department, ITT Distributor Products.

**Robert D. Ashby**, appointed assistant advertising director early this year, has been named sales promotion manager, Ameco, Inc.

R. D. Ashby

A. C. Veldhuis

**Dr. Albert C. Veldhuis** has joined the American Electronic Labs as a senior staff consultant. Dr. Veldhuis had been with Trylon, Inc.

**Nick Young** has been named national training manager with Blonder-Tongue Labs. Mr. Young was an applications engineer with Bell Television.

**Samuel G. Harris** has been promoted from director of marketing, to V-P, Marketing, Delta Electronics, Inc.

**Lyonel "L.J." Gardner** has joined Jack Pruzan Co. as inside sales rep. Previously, Mr. Gardner was sales office manager for Oliver Electrical Manufacturing Co.

# BROADCASTERS SPEAK

We hope to hit the air soon with a new TV station in the U. S. Virgin Islands. Your magazine will be of interest to us there.

As one who is greatly in favor of computers, automation, and short cuts, I nevertheless find it more difficult to decode the number of the item of interest, and transfer that number to a circle on a card, than to simply sit down and write a letter. So if you will go along with such human frailty, I would indeed like to receive BM/E.

Donald W. Husted
W O R A-T V
Mayaquez, P.R.

Although you have advertised and commented on just about any needed product within the broadcast industry, I have seen no mention of a record cleaning product suitable for "mass" cleaning of station records. The soap and water solution may serve to clean random discs, but the drying problem and time required with this method is forbidding. Is there a product, solution, or method that would make cleaning records economical?

Carl B. Haeberle II
Production Director, WAJR-FM
Morgantown, W. Va.

*Okay, you experts in radio - land, what's the answer?*

Thank you very much for the coverage on TeleMation in your September issue. I was a little concerned, however, when I noticed that Bob Cooper used WEATHER CHANNEL as a generic term. As you well know, WEATHER CHANNEL is the TeleMation trade name for a line of TV weather-forecast equipment.

I'm sure you recognize that many valuable trade names have lost their position in the courts because similar "lower-case" publication of the name went unchallenged.

Mills L. Crenshaw, Pres.
Crenshaw Advertising
(Agency for TeleMation, Inc.)
Salt Lake City, Utah

*Trade name copiers take note. We plan to use "information channel" in the generic sense.*

**Would you please send us a copy of your May issue? We are very much interested in the instructions on how to fill out Form 301 and also the reference you have to the Commission's position on lotteries.**

David Luther
Program Director, WBTM
Danville, Va.

My heartiest congratulations on your fine magazine. It fills an obvious gap.

Please address all future issues to my new address, as I don't want to miss an issue.

Gary A. Wittie
KMID-TV
Midland, Tex.


# Introducing the Ampex AG-350 with solid state electronics.

**This new recorder guarantees even greater reliability than its predecessor—the famous 350 Series.** Here's reliability you can count on for continuous programming over long periods. Reliability you need for a major broadcast or recording assignment that may represent thousands of dollars in talent and studio set up. Reliability you must have for the "one chance" recording of a hot news event.

The AG-350 offers the ideal combination of all-new, 100% solid state electronics (evolved from years of Ampex transistor research for reliable Aerospace recorders) and the famous 350 Series Transport.

New features for greater operating convenience: overhead electronics in an all-new, functional console design; automatic equalization switching with change of speed; wide head gate opening for ease in editing, threading, cleaning heads; new, simplified control panel and switches; new ferrite erase heads for better erasure.

The Ampex AG-350 is available in console, portable, or unmounted versions; mono or stereo; record/reproduce or reproduce only; single or two channel; 3¾-7½, or 7½-15 ips speed.

Mail the coupon for your free copy of our new illustrated brochure #1706 which contains a complete description and specifications of the new AG-350 Series. And if you'd like descriptive literature on Ampex spot programming recorders, portable recorders, mastering recorders, high-speed duplicators, mixers, tape and accessories, just check the box on our coupon.



Please send me information on:
☐ new AG-350 Series recorders
☐ other Ampex equipment

(please specify) .....

NAME TITLE

COMPANY

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Write today to:
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Redwood City, California

AMPEX

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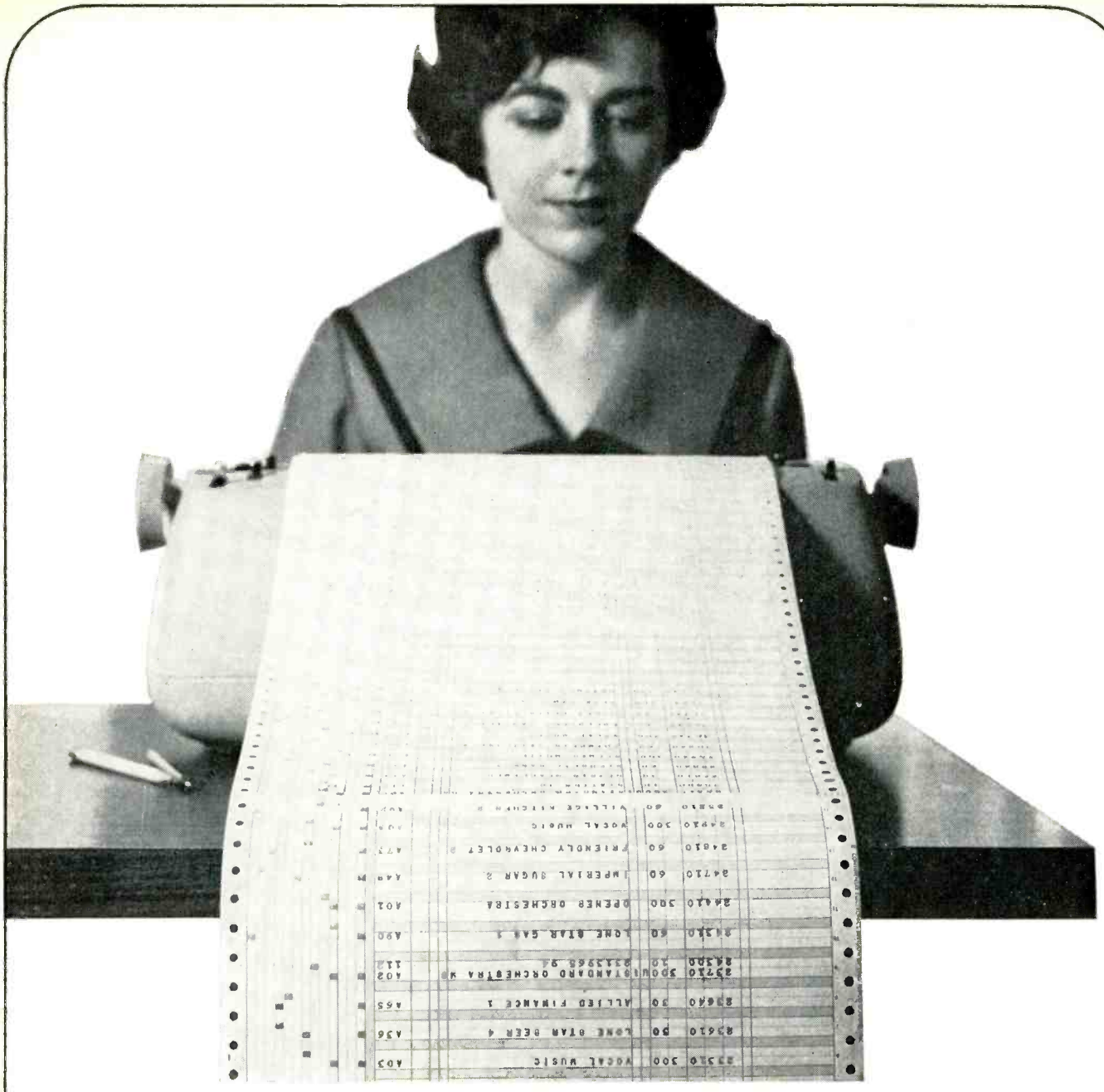

# add 3 ■ s to your Log

## and get automatic programming, logging and authenticating (only PROLOG can do it)

PROLOG uses your station log to give you any degree or combination of unattended, automatic, or manual-live operation you desire. PROLOG simply adds 3 squares ( ■ ) to the information you normally enter on the log. The entire log can be prepared on any standard typewriter, or you can use any of the auto-typing, Traffaccounting, IBM punch-card, and similar equipment in use today. PROLOG uses your established programming format; nothing changes unless you want to change it. That's PROLOG: simple and flexible!

For a 12-page brochure on PROLOG Systems, write to Commercial Sales Dept./Continental Electronics Mfg. Co./box 17040/Dallas, Texas 75217.

LTV Continental Electronics
A DIVISION OF LING-TEMCO-VOUGHT, INC.

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INTERPRETING THE FCC RULES & REGULATIONS

# Libel and Slander Applied to Broadcasting

THE LAW of libel and slander is exceedingly technical, and the reasons for some of its underlying principles no longer seem sound, yet these principles continue to exist and receive application by the courts. *Libel* is the publication of a writing which (1) exposes a person to hatred, contempt, ridicule or obloquy, or (2) causes or tends to cause a person to be shunned or avoided. *Slander* may be briefly defined as oral defamation. Both give rise to causes of action for damages, but libel, at common law and by statute in many states, also constitutes a crime.

Generally speaking, the legal distinction between libel (written defamation) and slander (oral defamation) is important to broadcasters because of the greater freedom in orally stating a matter than in writing and circulating it. In slander, unless proof of specific damage is made, the words must impute the commission of an indictable offense, unfitness in office, want of integrity or capacity in the conduct of a profession, trade or business, or affliction with a disease dangerous to society. There are other distinctions, in the various jurisdictions between libel and slander, which make it important to decide whether *radio defamation* is libel or slander.

## Radio Defamation

Broadcast defamation is directed to the ear, as is slander, rather than to the eye, as is libel; yet, in all probability, the rules of libel will usually be applied in cases of defamation by radio. It has been argued that defamation by radio should be considered in the category of libel because of the possibility of (1) its wider distribution and the consequently greater effect on the community, and (2) the supposedly greater opportunity for premeditation in its publication. Technically speaking, it is not necessary to resort to a historical background to sustain this contention, because it has been held that to read to a third person from a defamatory writing is to libel rather than to slander the party defamed. *The question is therefore reduced, it would seem, to a determination in each case of whether or not the person speaking the defamatory matter into the microphone was reading.*

In the cases which have considered defamation by radio, the law generally applicable to ordinary

### Summary of Broadcasters' Liabilities

1. Broadcasters are subject to suits for damages, actual and punitive, for any word or statement broadcast which brings another into disrepute.

2. The newspaper rule, "He who publishes, publishes at his peril," has been applied to radio in some jurisdictions so that (at least in some states) he who broadcasts, broadcasts at his peril.

3. The newspaper makes up its own copy and is circumstanced to protect itself against libel. The broadcaster has been held responsible even though powerless to prevent a defamatory statement being broadcast.

4. The broadcaster is not liable for defamation in a campaign or political broadcast—by a candidate for public office—because the courts have held that Congress forbids the broadcaster from censoring any such speech.

5. However, where a public officer's non-campaign or non-political speech is broadcast, the broadcaster is liable for defamation —the practical impossibility of the broadcaster exercising any substantial degree of control over the scope of the remarks notwithstanding.

6. The broadcaster may be liable for defamation broadcast by a speaker in a public or other place although neither the place nor the speaker is under the supervision or control of the broadcaster.

7. One court has held that the broadcaster would be liable for defamation broadcast by a speaker where such defamation occurred in a deviation from the manuscript submitted to the broadcaster, although the deviation was so short and occurred so quickly that the broadcaster could not protect himself.

8. Since broadcasting is in interstate commerce, the Government of the United States may claim the right to enact measures governing radio defamation, including exemptions in favor of broadcasters from liability in proper instances. Under existing circumstances, the States assert the right to regulate radio defamation on the ground that it falls within the police power and is a subject of local concern. It seems that Congress may fully and exclusively regulate the matter of liability for radio defamation and thereby substitute one universal rule for several diverse rules.

If the broadcaster has used due care to avoid the airing of libelous remarks, he is protected under laws of many states. In some states, such as Florida, "the exercise of due care shall be construed to include the bona fide compliance with any federal law or the regulation on any federal regulatory agent."

cases of libel and slander has been followed by the courts. While there is no consensus of court opinion on the subject, if the defamatory matter is read from the manuscript, it may be judged according to the rules of libel. If it is rendered extemporaneously, it may be considered as falling within the field of slander. However, the radio listener hears only the spoken word, and does not know whether it is read from a manuscript or spoken extemporaneously. Thus, a new element is introduced by radio broadcasting.

## Absolute Rule of Liability

In treating of radio defamation, *the courts have put the broadcaster in the legal category of the newspaper.* As "he who publishes, at his peril," it has been held that *he who broadcasts, broadcasts at his peril.* This rule follows general principles, but disregards the fact that in its intrinsic nature the broadcasting business is unlike any other. When such rules are applied by the courts to both media, imperfect analogies are used; but, because both the newspaper and the broadcasting station disseminate information to the public, *the rules applied to newspapers are likely to be applied to radio broadcasting*, except in unusual circumstances.

*The newspaper rule is that of absolute liability.* Thus, the newspaper is liable regardless of every consideration of excuse—except for limited exceptions. The newspaper creates its own copy and knows in advance what it is to publish. It is in a position to censor what it publishes and nothing which it cannot delete, either as a matter of policy or from pure whim or caprice, goes into its publication. For these and other considerations, the absolute-liability rule has been applied. Therefore, "he who publishes, publishes at his peril."

The wisdom of that rule is not questioned when limited to a business such as that of the newspaper, because logic and good sense demand its application, but logic and good sense seem to require a different rule for radio broadcasting. The newspaper rule is a misfit in the radio business; yet the courts, prone to adhere to analogy, seem unwilling to differentiate. Consequently, if a sensible rule is to govern, it must be made as a matter of substantive law or court decision departing from existing precedent.

## Commercial Programs

Although the broadcasting business is comparatively young, it possesses established practices and methods of doing business. It is maintained by private capital, and the bulk of its income is derived from advertisers. Noncommercial activities consist of the dissemination of educational and entertainment material supplied by the broadcaster at his own expense.

As one engaged in interstate commerce, the broadcaster is regulated by the federal government. The right to broadcast exists only as long as the service meets the demands of "public interest, convenience, and necessity." As the ultimate responsibility for proper service is laid upon the broadcaster, he must have the right

of editorial selection of the material broadcast. Therefore, the broadcaster may require that commercial programs be reduced to written form, called "continuities," and be passed upon by the station before they are broadcast. The broadcaster may delete improper matter contained in the continuity. Where the advertiser deviates from the continuity given to the station for prior review and utters defamatory matter, the advertiser alone should be responsible.

Where the broadcaster (1) produces his own material, or (2) has the opportunity to review the material produced by or for the advertiser, the broadcaster is clearly responsible for any libelous or slanderous statements.

## Deviations in Practice

The broadcaster should not be required to exercise a degree of prudence beyond the limit of reason. He is not a libel lawyer, nor might an expert in libel law be expected instantly to apprehend that a given statement deviating from the continuity is libelous. The practical fact is that the speaker may suddenly "ad lib" and, before a few seconds have passed, most grievously injure the reputation of another. The speaker should be liable, and he is liable; it does not seem that the broadcaster should be held liable in such instances, because he is powerless to prevent the dissemination of the statement. He has no reasonable means to protect himself. *Yet, although he may have exercised the utmost care in approving of the speaker, and may have done everything possible to obtain proper material, he remains liable in damages under* existing court rules.

## Political Speeches

The second and more pronounced injustice has occurred with respect to political broadcasts. On programs broadcast on behalf of a qualified candidate for public office, the speaker exercises full right of free speech and the broadcaster must not censor his speech. The act which fixes the rights and duties of the broadcaster provides that:

". . . **such licensee shall have no power of censorship over the material broadcast under the provisions of this section.** (Sec. 315, Communications Act of 1934, Title 47, Ch. 5, U.S.C.A.)

While there may be a difference of opinion among lawyers as to the exact limitation of this prohibition, most broadcasters place no limitation on what the speaker can say. As a consequence, whether or not a manuscript is submitted in advance is not material. In practice, some stations require the manuscript in advance and others merely require it to be filed after the speech is rendered. In many instances the speech is rendered extemporaneously. In others the manuscript is practically worthless because of the numerous interpolated remarks of the speaker.

Since the broadcaster is prohibited from editing political broadcasts, his only means of protecting himself is through libel and slander insurance. Recent court decisions appear to have

changed this rule to free the broadcaster of liability in political cases.

One of the landmark decisions by the Commission, concerning the liability of a station for the broadcasting of defamatory remarks in connection with a political broadcast, is contained in the *Port Huron* (WHLS) decision adopted June 28, 1948. 4 P. & F.RR. 1. The majority opinion held that, once a station decides to carry broadcasts by a candidate, it must offer, *without censorship*, equal opportunity to all candidates to use the facilities; that "Congress has occupied the field in connection with responsibility for libelous matter in broadcasts under Section 315" and that, accordingly, a station is "relieved by operation of federal law from any responsibility for libelous material." The Commission recognized that the State of Nebraska had reached a contrary conclusion in the case of *Sorenson v. Wood* (1932), 123 Neb. 348. There, it was held that Congress did not intend to prevent a broadcaster from censoring libelous remarks and that he was liable for the remarks of a candidate in the course of a political broadcast.

In a March 1950 case involving Stations KYW, WCAU, WPEN, WFIL, and WIBG, a Philadelphia federal judge held a broadcaster to be not liable for defamatory statements made during the broadcast of an uncensored political speech. The ruling was based upon the decision of the Commission in the *Port Huron* case.

The basic tenet of the *Port Huron* case was not directly challenged until 1956. Station WDAY-TV Fargo, N. D. was sued by the Farmers Union on the grounds that the Union had been libeled because a candidate on the air had charged that the union was tainted with communism. The station's defense was based on the Commission's *Port Huron* decision, and it was upheld by the North Dakota Supreme Court and by the U. S. Supreme Court in 1959.

The Section 315 "immunity" granted to broadcasters in the WDAY-TV case was extended even further in the New York Times Case decided in March 1964. A Montgomery, Ala. police commissioner had recovered $500,000 in damages for libel in an Alabama court against four Negro ministers and the New York Times. On review, the U. S. Supreme Court ruled that commentators and newsmen who criticize public officials, whether by "editorial opinion" or by paid commercial, cannot be sued for libel, *provided malice is not proven.* (Malice is present when the broadcaster knows the libel is recklessly made or knows in advance that a statement is defamatory.)

It is evident that in the field of political broadcasts, (1) the broadcaster is not responsible for libelous statements made by a candidate for political office, and (2) the recent New York Times case has extended the "315 immunity" to the area of editorialization and comment concerning public officials—so long as malice is not present. However, due to inconsistencies in case law, it still seems advisable, where local law does not provide complete protection, for the broadcaster to obtain his own protection via libel and slander insurance.


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# Appraising an Existing CATV System

**The newly emerging cable operating company, deeply involved in franchise hearings for its first major systems, will quickly learn that it pays to have an operating system or two. Here's how to figure what they're worth.**

by Robert B. Cooper, Jr.

ONE OF THE early mistakes made by many new entrants into CATV is to spray the surrounding countryside with franchise applications. This practice may be altogether necessary today, at a time when hundreds of non-cable towns are rapidly giving in to franchise hearings and lettings, but all too often the experienced operator competing in a franchise hearing will stand the new entrant on his ear by asking, before the City Council, ". . . and how many cable systems do *you* operate?"

Admitting that you have no operating systems is an excellent way to lower your own competitive position several pegs on the franchise ladder.

The solution is to purchase an operating system or two of your own, preferably in the general region in which you are making applications for new franchises.

Various sources such as *Television Factbook* and *Broadcasting Yearbook* list *known* operating systems in the country today. It has been my own experience that there are roughly an additional 30% systems operating, other than those listed in such reference manuals. Almost all such non-listed systems are small in size, although many are as old as seven to ten years. Most such systems have fewer than 250 subscribers, although their saturation (ie. ratio of subscribers to non-subscribers) is usually high to very high.

Most such systems are low band only, using early vintage equipment of the type which you would reasonably expect to find in stock at larger electronic parts distributors.

These systems are *not* NCTA members; *not* on the comprehensive reference lists of such firms as Bill Daniels & Associates, and many do not operate with the benefit of franchises (operating as many do in unincorporated regions). Many do not utilize Bell system poles, so you will not find a copy of their pole line attachment agreements on file at state PUC offices.

How do you find such systems? And when you find them, how do you convince the owner he should sell without arousing his suspicion too much?

There is no pat answer to the first question; the second we leave to your own persuasive powers.

To find an answer to the first question, you will need to do some sleuthing, Many low-band off-the-shelf systems utilize Blonder Tongue MLA type amplifiers, so the first stop is the regional or local distributor. Does he know of any small cable systems or any person or firm purchasing an unusual quantity of MLA amplifiers over the past several years?

You can't be certain that these systems will be using (72 ohm) coaxial cable. (My own experience is that roughly half of such unlisted systems are still using some if not all open-wire line!) So cable suppliers are usually *not* a good source of leads.

Many of the systems operating in unincorporated areas are on REA and/or county owned poles. Check with the REA if they have an office in your area, and the local county office. There may only be a single individual in the entire REA or county office who has any knowledge of this type of pole user, so don't give up the hunt simply because the office clerk can't be bothered with your request.

If you know the terrain in the general area of interest, look for back country hamlets boasting of from 300 to 3,000 population. Remember that CATV began as local enterprise. In many sections of the country systems are still operated as local enterprises. They seem to do remarkably well with MLA amplifiers and open-wire line, at a time when solid-state equipment and aluminum cable is the choice of operators in major markets.

## Typical Small System

Reference is made to Fig. 1, which depicts a system in a mountain town with a population of approximately 700. The antenna head-end site is some 750 feet above the valley town, which has an average elevation of 1950 feet. The mileage to the VHF channels

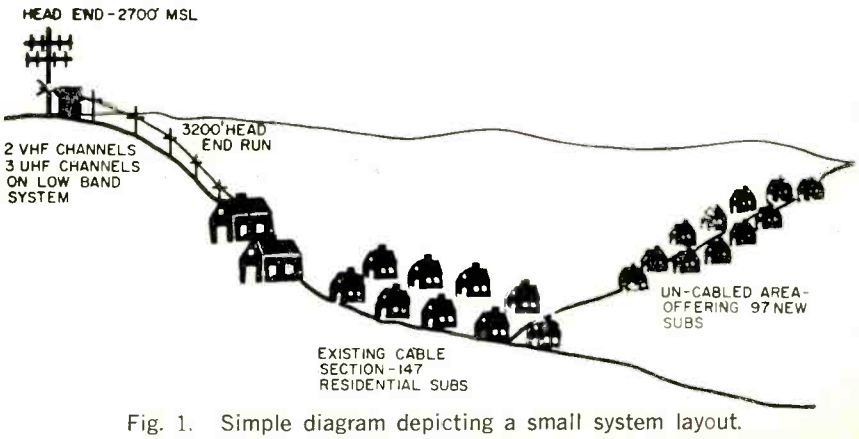


Fig. 1. Simple diagram depicting a small system layout.

**Mr. Cooper** is v.p. of operations for Valley Vision, Inc., Modesto, Cal. CATV operating firm, and Pres. of R. B. Cooper & Associates, CATV consulting firm.

## General Facts

| | |
|---|---|
| Attitude of Local TV Shops | Cable company has not and will not service TV receivers. Both local TV retailers subscribe to the cable and could not sell color without it. Relations very good. |
| Local Sales Efforts | Small advertisement in yellow pages. No direct sales or other advertising in past three years. |
| New Connections | Averages two per month with one disconnect every six weeks. Net gain per year last three years—15 per year or 10-12% per year. |
| Number of Usable Channels Available off-the-air at head end site | 18 |
| Number of non-network (independent) stations available | 3 (none) carried at present) |
| Franchise Situation | No franchise |

| | |
|---|---|
| Installation Charge | $25.00 |
| Monthly Service Charge | $5.00 |
| Second Set Charge | $2.00[1] |
| Motel Charges Per Set | $3.00[2] |
| Number of Residential Subs. | 148 |
| Number of Motel Subs | 27 |
| Total Monthly Service Income | $821.00 |
| Year System Was Installed | 1958 |
| Year System Reached 75% of Present Totals | 1962 |
| Total Cable in Trunk Miles | 3.25 miles |
| Total Trunk Amplifiers | 8 MLA Units |
| Pole Attachment Charges | $2.00 per pole per year |
| Total Un-Signed Homes Along Existing Trunk | 45 (30% of existing total) |
| Potential Un-Cabled Area | 97 additional homes could be reached with 3.0 miles of new cable |
| Off-the-Air Reception | Two snowy UHF channels in best locations in existing cabled area. Two Grade B UHF and one Grade C VHF, representing all 3 networks in uncabled area. |
| Translators | None |
| Possibility of New TV Station Serving Area | None |
| Public Relations of Cable | Fair to Good |

1. Standard contract lists second set charge as $2.00. As a matter of practice customer pays for second drop installation ($10.00) but does not pay fee for second set monthly.
2. During 7 months of the year only. During slow winter season, rate is dropped to $1.50 per set per month.

## Analysis of Original System Cost

| | |
|---|---|
| Head-End Equipment | $1,400.00 |
| Head-End Building | $ 100.00 |
| Trunk Line (Head-End to Plant) | $ 725.00 |
| 13,000′ Trunk Line Plant | $6,593.00 |
| (Cost Per Mile—Installed[3]) | ($2,028.00) |
| **Total System Cost** | **$8,716.00** |

3. Owner installed plant so cost per mile does not reflect computations for labor.

## Annual Operating Costs

| | |
|---|---|
| Pole Rental—$2.00 per pole, 90 poles | $180.00 |
| Equipment Replacement Costs (all tube-type equipment) | 600.00 |
| Electricity | 300.00 |
| Bookkeeping, telephone, billing (office located in home) | 900.00 |
| Mileage on paid for maintenance truck—10¢ per mile (no depreciation remaining on any equipment) | 480.00 |
| **Total Operating Costs** | **$2,460.44** |

## Annual Income

| | |
|---|---|
| Per Month Average—1964 | $770.00 |
| 12 Month Total—1964 | $9,240.00 |

## Annual Cash Flow Chart—1964

| | | |
|---|---|---|
| Income | $9,240 | |
| Expenses (direct) | | $2,460 |
| Tap Expense (24 at $25 each) | | 600 |
| | $9,240 | $3,060 |
| **Total Net Income Before Taxes** | | **$6,180** |

## Cost of Updating and Expansions

| | |
|---|---|
| Head-End Change-Out | $1,000 |
| 3.0 Miles New Plant, Installed | 9,000 |
| **Total** | **$10,000** |

| | |
|---|---|
| Previous Operating Costs | $2,460 |
| Additional Pole Rental | 180 |
| Additional Replacement Costs | 300[4] |
| Additional Electricity | 150[4] |
| Additional Bookkeeping | 300 |
| Additional Mileage for Vehicle | 300 |
| **Total** | **$3,690** |

4. Assuming solid-state equipment is used.

| | | |
|---|---|---|
| Previous Income | $9,240 | |
| Income 1st Year from 60% of 45 homes along cable | 1,620 | |
| Income 1st Year from 40% of 97 new cable homes | 2,340 | |
| **Total** | | **$13,200** |
| $25 installation fee times 66 new subscribers | 1,650 | |
| **Total** | | **$14,850** |

## First Year Picture—New Owner

| | | |
|---|---|---|
| Income | | $14,850 |
| Expenses (Direct) | $3,690 | |
| Direct Expensing of 66 new taps at $25.00 each | 1,650 | |
| Depreciation of Plant | 6,744 | |
| **Total** | | **$12,084** |
| Cash Flow (Income less direct expenses) | | $9,510 |
| **Net Income Before Taxes** | | **$2,766** |

used on this system is 140 miles over flat terrain. The distance to the UHF channels used is 60 miles. A total of five channels are fed to the low band equipment.

From the antenna site the 5-channel, low-band system feeds down 3,100 feet of RG-11/U trunk. 2,000 feet down the trunk is the first MLA "repeater amplifier." The antenna-to-town trunk is messenger strand supported on a combination of county poles and system set poles.

The antenna site equipment consists of home reception type off-the-air antennas, single-channel preamplifiers, a handful of adjacent channel filters, and a couple of UHF to VHF converters, all driving a workhorse line amplifier.

There are eight amplifiers in the system, including the head-end unit and the antenna run trunk amplifier. There are no bridging amplifiers or line extender amplifiers as such. All units are powered from local power company lines with direct meter box connections at the amplifier locations.

This system makes use of county owned poles and a few local *power* utility poles. No Bell system poles are in service. Power company poles use standard "J" hooks for cable and strand support connections, while the county poles require crossarms which one of the county officials thought up all by himself! There was no requirement for this; he just liked the idea.

Now your first reaction may be, "This isn't such backwoods systems—things are reasonably modern here!"

You are partially correct. The signals produced on this particular system are clean and even color has about the same fidelity you would expect to find in a good quality Grade B home installation.

Let's evaluate this system, as I did recently, in dollars and cents. Just what is this system worth on today's market? Let's look at the facts and figures (see box).

Assuming you are able to talk the owner out of this small plant, you will of course be interested in the 45 unsigned potential subscribers living along the existing cabled section. The 97 potential *new* subscribers with an additional 3 miles of plant are also of considerable interest.

And you will want to evaluate the long-term future in making the system an all-band plant, replacing the RG-11/U with aluminum cable. (With 18 stations available off the air at the head-end a 12 channel system is a cinch!)

The 45 unsigned homes along the cable represent 45 times the $25.00 installation fee, plus the monthly income, if you can sell the people on subscribing to the cable. You have five channels to offer, all good quality, and these nonsubscribers receive two snowy UHF channels at best.

And what about the 3 miles of new cable and the 97 potential customers it could serve? In this uncabled area all three networks are available off the air (two on UHF and one on VHF), but the quality at best is Grade B (not color quality) and at worst is a poor Grade C.

But none of these 97 homes have any reception from the independent non-net stations, and you have three such stations available at the head-end site. Why not pull some of the duplicating network stations off the cable and substitute two independents?

The head-end changes to add these two independent stations, using reasonably modern modular equipment, will cost around $1,000. The cost to install the 3 miles of new cable and plant will not exceed $2,100 per mile *plus* labor. The entire project and additions, including labor, will run around $10,000. Plus, you will add something to the pole rental costs, electricity, and other expenses items.

Under your new ownership, the net income before taxes is under $3,000 (see box). However, the cash flow (i.e., spendable income) is more than $9,500. This is a direct result of the 5-year depreciation schedule allowed by the IRS; and in this case we have the cost of the plant (i.e., price paid to seller) *plus* the $10,000 spent in updating and expanding the plant.

## Arriving at System Value

There are more rules of thumb in the industry than you can shake a stick at, when it comes to determining system net worth. The basis for any computation is the individual subscriber. I prefer to begin with a marketable figure of $300 per subscriber, which is a reasonably close average of today's market value for a subscriber on an *all-band, all solid-state* system. Now let's back up from this figure.

Without all the calculations involved in making the point, let's assume (and this has been computed in this actual case) that the cost to modernize this plant to carry 12 channels with solid-state equipment would cost $100.00 per present subscriber. This *lowers* the net value of this system from $300 to $200.

Now let's consider that the system owner has no franchise (the area might become incorporated someday and then where will you be?), and that the head-end equipment is well below industry standard specifications. This is worth another $25.00 per subscriber, minimum, and lowers the value from $200 to $175 per subscriber.

Finally, consider the RG-11/U. Replacement is going to cost some one around $25 per subscriber sometime before the first year depreciation period is up under the new owner. This lowers the system net worth still further, to $150 per residential subscriber.

The motel customers are simply a matter of primary economics, too. With a 7-month rate of $3 per set, and a 5-month rate of $1.50 per set, we have an annual motel set income of $28.50. After a suitable pro-rata deduction for the cable, lack of franchise, etc. the value per motel connection is $100.

## Cash Flow on Larger Systems

Our "small system" example has been relatively simple and easy to understand. The factors contributing to a complete study for a larger system are essentially the same, only the numbers are different. Their inter-relationships, however, take on added importance as we get into a system of sufficient size to stand on its own two feet with a full time management and technical staff.

The measurement of a CATV system investment is a combination of factors including, but not limited to, (a) cash flow, (b) growth potential, (c) profit potential, and (d) resale value (projected) five or more years later.

The business of calculating cash flow and profit potential is a science in itself, and no reader should make the mistake of assuming that it is as simple as detailed here. This presentation has been designed to give the newcomer a basis for more graduated studies. ●

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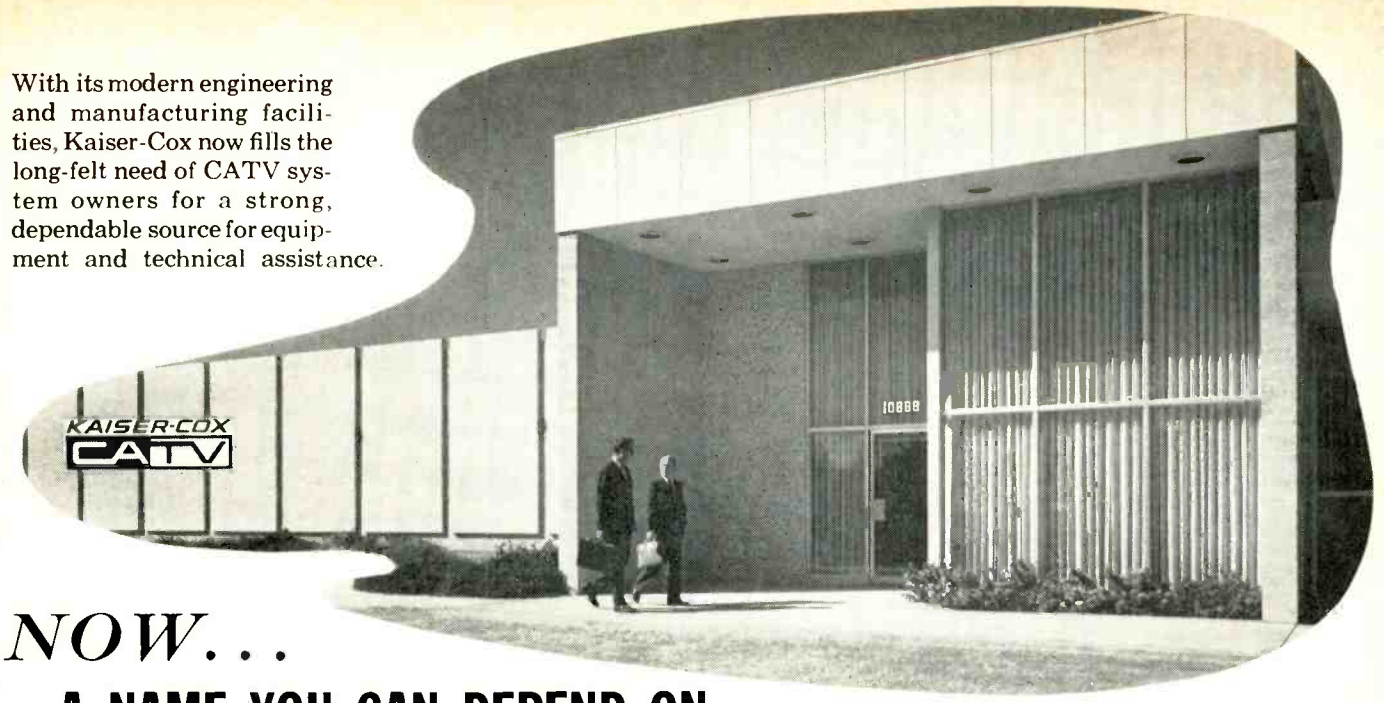


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# Conducting A Frequency Search

By John H. Battison

**Part 1—Some basic guidelines for the ambitious manager or engineer who wants to make his own allocations study.**

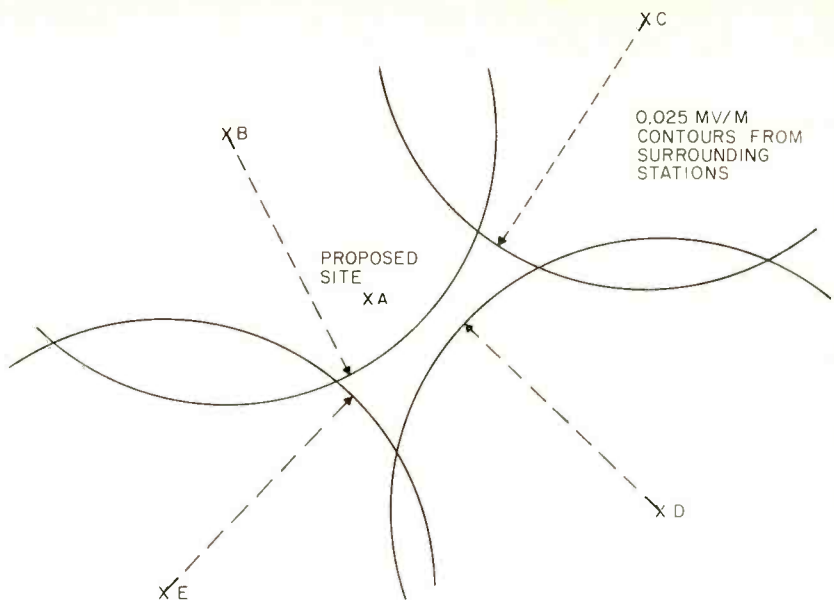



Fig. 1. Typical preliminary plot for a proposed station at "A". Stations "B," "C," "D," and "E" are co-channel (same frequency) stations. This particular frequency will not work at "A" since 'B"s 0.025 mv/m contour covers the area.

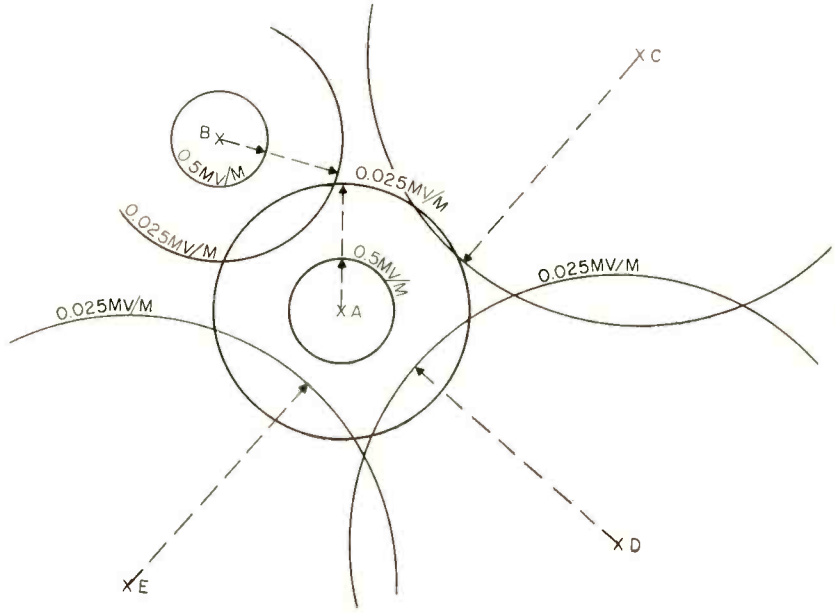



Fig. 2. With lower power at "B" (Fig. 1), the chosen frequency may work with low power at "A" since the 0.025 mv/m contour of "B" does not cover "A". The 0.5 mv/m contour of "A" will not present any co-channel interference, at least theoretically.

LET'S ASSUME you have decided to apply for a new station in a town without primary radio coverage. Let's further assume you have ascertained whether or not there is adequate support for the operation; generally, a town of five to six thousand people should be capable of supporting a small operation if it is economically planned and operated. The next step is to find a suitable frequency.

The easiest way to start is to look in the Radio Station Channel Allocation published by Cleveland Institute of Electronics, Cleveland, Ohio. The book uses a single page for each of the broadcast frequencies, and by means of suitable scales, indicates the size of the radiation pattern but not the actual coverage. From these listings, it's a fairly simple matter to form an opinion of whether or not a particular frequency will work. For instance, if in the area of interest there are no stations listed, it can be assumed that this *might* be good frequency. Similarly, in the case of directional stations, the direction and radiation power in the various lobes are indicated in general values.

Another way to conduct a search is to use the more tedious, but very accurate, manual method. First, plot on a suitable map the approximate location of the proposed station; for this purpose the actual location of the city can be used (final computations will use the actual transmitter site). The Department of Commerce has two maps available which are suitable for this purpose (see box).

Next, take a current copy of the Broadcasting Yearbook, start at 1600 kc, and list stations on each frequency within 120 miles of your site. The required distance will vary with both frequency and ground conductivity. As the frequency decreases the separation will have to be increased, and as the conductivity changes the dis-

**Mr. Battison** is a consulting engineer based at Annapolis, Md.

### Sources of Maps and Station Listing Data

A Sectional Aeronautical Chart (SAC) is available for all regions of the U.S.; a World Aeronautical Chart (WAC) is used for consideration of high power stations. Both are printed in color, with or without the aeronautical data overlay. For radio work, it is better to order the desired map "flat without overlay." Otherwise, it will come folded with the red overlay, which only adds to the confusion. Both are available from the U.S. Department of Commerce, Washington, D.C. A black-and-white WAC is available from Seabrooke Printing Co. Inc., 514 Tenth St, N.W., Washington, D.C. Cooper Trent, 1180 Nineteenth St. N.W., Washington, D.C. publishes the U.S. Frequency List, which contains the exact geographical location of each station (latitude and longitude), antenna height, class of station, radiation at one mile, and similar data. The list is published annually and amendment sheets are issued irregularly, but this data must always be verified by a final check with the FCC Reference Room to be sure the frequency is usable.

### Pertinent FCC Rules for AM Stations

| Reference | General Subject |
|---|---|
| 73.21 | Classes of Stations |
| 73.24 | Broadcast Facilities |
| 73.25 | Classes 1 and 2; Clear Channels |
| 73.26 | Regional Stations; Classes 3A and 3B |
| 73.27 | Local Stations |
| 73.28 | Assignment of stations to channels |
| 73.29 | Class-4 Stations on Regional channels |
| 73.30 | Station Location and Program Origination |
| 73.37 | Prohibited Overlap—Minimum Separations |
| 73.182 | Allocation Standards—Ground Wave Coverage |
| 73.183 | Ground Wave Coverage Computations |
| 73.185 | Sky Wave Coverage Computations (night applications only) |
| 73.187 | Daytime Radiation Limits Toward Class-2 Stations |
| 73.188 | Location of Transmitter |

There are other Rules that apply in specific cases, but in general the above will provide sufficient information for an inexperienced applicant to attempt a frequency search. FM and TV stations are covered in other Rules, but essentially their situations are different in that "Go, No-Go" Rules apply, and a frequency search would not be performed.

### Adjacent Channel Interference Rules

Adjacent channel interference, particularly in cases where it is rather severe, is likely to result in the denial of an allocation. The Rules state:

**There must be no overlap between the 0.5 mv/m contours of the proposed station and any station on a frequency within 10 kc.**

**There must be no overlap between 2 mv/m and 25 mv/m contours of the proposed station and any station on a frequency within 20 kc.**

**There must be no overlap between the 25 mv/m contours of the proposed station and any station on a frequency within 30 kc.**

In cases where a community is without existing primary service, the FCC will consider an application if it provides a **first** primary service to at least 25% of the interference free area within the 0.5 mv/m contour, and there is no overlap between the proposed 1 mv/m contour and any co-channel 0.05 mv/m contour.

tance will vary. For each station listed, compute the area covered by the 0.025 mv/m contour, which is considered the interference contour. Now, using the city where the station is located, draw a semicircle showing coverage to scale in the direction of the proposed station. This will give you an indication of how far you could transmit in the direction of existing stations and the interference problem you'll have.

It will often be necessary, in fact almost always, to repeat this many times before you arrive at what looks like a suitable frequency. And even then closer investigation will sometimes reveal that the frequency is no good.

## Mechanics of the Manual Method

In Fig. 1, stations C, D and E do not cover the desired city (A) with their 0.025 mv/m contours, and were it not for station B, whose contour does cover the city, that frequency might work at A. These coverages are based on the premise that all stations have the same ground conductivity paths to A. In many cases, more than one ground conductivity must be used to compute contour distances.

In Fig. 2, station B's power has been reduced so that it does not cover the proposed city. Now it's possible to draw A's 0.5 mv/m contour without any 0.025 interferring contours overlapping it. Now the 0.025 contour of A becomes important because it could overlap B's 0.5 contour. But as the figure shows, it does not. Therefore, this may be a usable frequency at A. The next step is to verify it and look into adjacent channel interference.

## Verifying the Frequency

The author prefers to continue his technical evaluation *after* ensuring that the frequency appears to be available. If a source of station information such as that mentioned earlier was used, it should now be verified by a telephone call or personal visit to the FCC Public Reference Room to check on actual operating or granted stations and pending applications.

Often the only available frequency has been applied for by someone else. If you are prepared to assume the cost of a hearing and the long drawn-out proceedings that invariably follow, you can merely instruct your engineer to file for the same frequency. He will, of course, need to provide the proper engineering, but once the frequency is known, the engineering is easy.

If, however, the applicant chooses to use his own frequency, then he must verify its availability. Verification is simple. It consists of looking in the granted stations file at the FCC to see if any stations, other than those shown in original reference material, are on the desired frequency. This check is required because the FCC maintains the only publicly accessible up-to-date listing file, and the data in publications is often several months old when it is published.

## Filing a Competing Application

If you are going to use a frequency for which there are other applicants, you must check for

the "cut-off date." From time to time, the FCC publishes a cut-off date for certain pending applications. These notices list conflicting applications which will be considered in a specified hearing, and once the cut-off date has been reached, *no further applications* on that frequency in that particular area will be considered. This means that if a frequency is available in the desired market, the only way you have a chance of getting it is to file an application *before* the cut-off date so as to be placed in hearing with the other applicant. The fact that you may be the last to file doesn't diminish your chances; the applicant who files first has no better chance than a last minute filer! In fact, one of the seemingly unfair things about frequency searches is that often an applicant will spend hundreds of dollars finding a frequency that will work in his town and file an application; then, right up until the cut-off date, anyone else who is qualified can file a competing application right on top of the original one, making use of the first applicant's work.

## Signal Coverage and Interference

Primary coverage refers to the area in which the ground wave is not subject to objectional interference. For other than Class 1A Clear-Channel stations, a minimum of 0.5 mv/m is required for suburban (non-city) coverage. For a built-up area (city or metropolitan area) to obtain daytime service at least 2 mv/m must be laid over the residential areas. In addition to these requirements, the whole city you intend to cover must be within the 25 mv/m contour or the FCC will not approve the grant.

This 25 mv/m requirement is the saving factor in many frequency searches; under the new AM Rules a grant will not be made in a city that already has primary service, *if* there is any interference at all to the proposed 0.5 mv/m contour. However, if there is no existing primary service, the proposed operation can receive interference up to, but not exceeding its 1.0 mv/m contour. So in many cases, it is important to prove that there is no primary service to the desired city.

Computing primary service can be a time-consuming process. First, you must list all the stations in the area that presumably could provide the service. Then radiation patterns, in the case of directional antennas, must be obtained. Where non-directional patterns are concerned, radiation values are needed for field intensity at one mile.

Armed with the radiation information, you must compute the primary coverage of each station in the direction of the proposed city. If the surrounding stations have directional antennas, the actual *measured* values of conductivity obtained during the proof of performance must be used. In cases where the stations involved have been operating for a long time, this may prove quite troublesome. The FCC Reference Room maintains up-to-date files of station records, but after a period of time, the earlier ones are retired to the Archives, and it requires several days notice (to George Simcoe, the very friendly and cooperative boss of the Reference Room) for these files to be obtained.

There is another way of acquiring technical data from the FCC files; it costs money, of course, but in many cases it is cheaper than travel and living expenses as well as loss of time from other activities. Cooper Trent maintains a consultation service, and if you tell them exactly what you need, they will research the necessary files and send you Xerox copies. Complete details should be provided to Cooper Trent, because often there is more than one set of field measurements, and if an early, rather than a more recent, set is used you'll end up with erroneous conductivity and coverage figures. The latest proof-of-performance always governs. Of course, if there are no directional antennas involved, the conductivity can be taken directly from the FCC Conductivity Map. However, certain precautions should be observed when using this map.

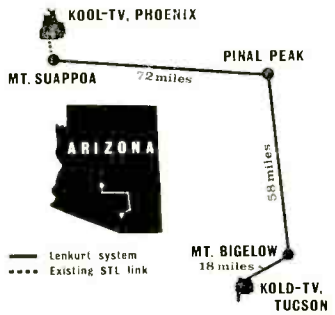
The concluding part of this article will cover the pitfalls encountered in using the M-3 conductivity maps, sources of M-3 maps, how to take advantage of conductivity changes, using ground wave charts, adjacent channel precautions, observing the station class Rules, and using existing interference to and from other stations to ease an allocation problem. ●

# What Can Microwave Do for Telecasters?

by A. R. Hillstrom and F. W. Layton

**STL, RPB, and intercity systems are springing up all over the country. Even two mutually-owned TV stations have found microwave a favorable link!**

MICROWAVE SYSTEMS are gaining increasing favor among telecasters as studio-transmitter-links, feeding program and control intelligence, remote broadcast pickup links, and intercity program and communication links. Maintenance costs are low and operating systems have proved extremely reliable. Microwave gear is not inexpensive, but




Lenkurt 76 TV intercity microwave system for KOOL-TV, INC., PHOENIX

Route of the KOOL-TV/KOLD-TV microwave link. Elevation is 7800′ at Pinal Peak and 8600′ at Mt. Bigelow.

the expenditure can be rapidly recovered as a result of its use—such as by eliminating common carrier charges, and providing service where common carriers would encounter difficulty, as in the case of a short notice connection, or in remote or inaccessible locations.

Recently a Lenkurt-built 7-kmc microwave system went into operation, tying together the TV studios of KOOL-TV Phoenix and KOLD-TV Tuscon, Ariz. (both are Autry-Chauncey properties). Station engineers, who installed the system, began their initial planning in June 1964, and completed construction in May 1965. Total cost for the facility, including all the microwave equipment, batteries, generators, buildings, towers, antennas, and installation, amounted to approximately $70,000.

Previously, KOLD-TV received its network feed through leased facilities, and had no direct connection to KOOL-TV. With the new microwave link, KOLD-TV has a network feed as well as a two-way connection with its sister station. Leased facility costs end at KOOL-TV. (Kool-TV is the key color station for the Arizona Broadcasting Network, and provides both regional and network programming for KBLU-TV Yuma.)

## How Will It Be Used

The intercity link, capable of full color transmission, serves as the primary CBS-TV network feed from KOOL-TV to KOLD-TV. (KOLD-TV has an off-the-air pickup site near Tucson as a back-up facility.) The system is also used to relay inter-station program feeds and regional network programming. It will be used extensively for intercity news and sports coverage, allowing more comprehensive use of personnel and facilities. (KOOL-TV has its own helicopter for spot news coverage.) Through use of the 2-way link, studio equipment at either station is available to the other for record-

### Applying for FCC License

☐ Microwave frequencies in the TV Auxiliary Broadcast Services, listed in Part 74.602, subpart F, include:
Band A: 1990—2110 mc (18,000-kc channels)
Band B: 6875—7125 mc (25,000-kc channels)
Band D: 12,7000—13,250 mc (25,000-kc channels)

☐ A broadcaster may apply for STL, intercity relay, or RPB facilities. The applicant must choose his own frequency. He, or his representative, must visit the FCC Broadcast License Div., Room 7204, and search existing assignments on each frequency for which he intends to apply.

☐ Each broadcaster is entitled to **three** assignments in Bands A and B, one of which may be exclusive. A **need** must be proven to obtain a 4th or 5th allocation. FCC Form 313 is used for all applications in the Auxiliary Broadcast Services. An application must be filed for **each** transmitter—three copies for the construction permit, and three copies for the license (a total of six copies for each transmitter). Construction permit and license applications may be filed simultaneously.

☐ If the transmitter is to be installed near an existing microwave installation, you will need to prove that no interference will result from the proposed operation. It is best to prepare an exhibit showing the allocations and frequencies on a topographical map.

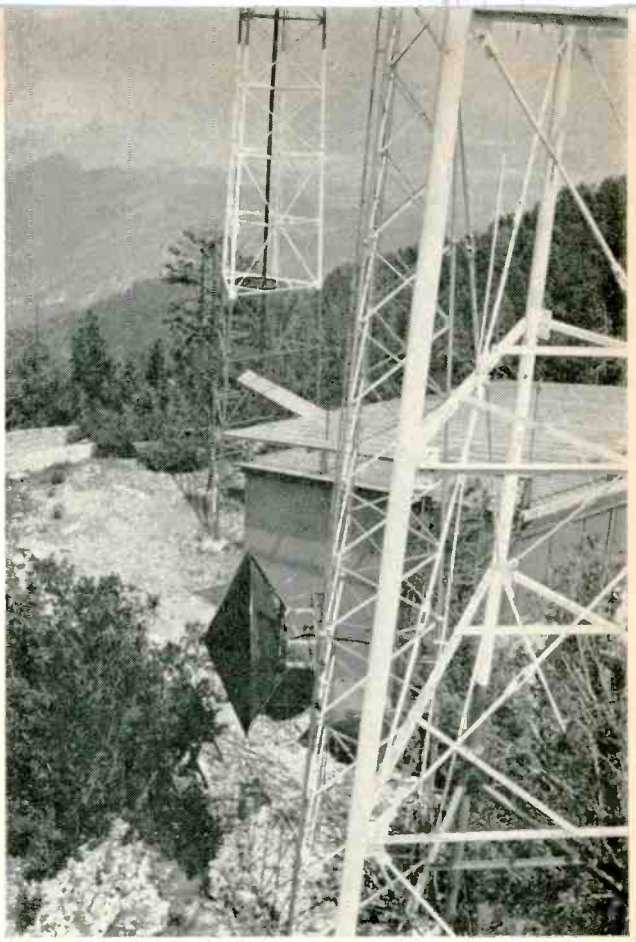
☐ If the sites involve Forest Service land, you must apply for Forest Service use permits. However, you must have your FCC licenses for each microwave station **before** the Forest Service will process your application.

☐ Application processing time will probably vary from 30 to 60 days, depending on the complexity of the application(s) and the pending work load at the Auxiliary Broadcast Service office.

☐ Unless absolutely essential, tower heights should not exceed 20′, since any application specifying higher towers must routinely pass through several more hands before it can be granted. Unaware of this requirement, applicants occasionally apply for a 25′ tower when a 20′ would serve just as well, resulting in unnecessary delay.

**Mr. Hillstrom,** Director of Engineering, KOOL-TV Phoenix, Ariz., and **Mr. Layton,** Senior Engineer, Lenkurt Electric, San Carlos, Cal., supplied the material on the KOOL/KOLD Link. Data on other applications prepared by BM/E staff.


Mt. Suappoa KOOL-TV transmitter site. Microwave signal is transmitted via a 10′ parabolic antenna (mounted on center tower) to Pinal Peak, a distance of 72 miles.



Mt. Bigelow site utilizes a 10′ radome-covered parabolic antenna to receive the signal from Pinal Peak. Area is sometimes covered with 12′ of snow during winter months.

Pinal Peak, another station at Pinal Peak transmits 58 miles to Mt. Bigelow, and the final station sends the signal the remaining 18 miles from Mt. Bigelow to KOLD-TV studios in Tucson.

The unmanned repeater site at Pinal Peak is served by commercial power backed up by a 5-kw generator and a battery bank which can operate the station for eight hours. Presently, a monthly visit by engineering personnel is all that is required to maintain the equipment—and it appears possible that such trips may be reduced to once every two or three months. Power line conditions at Pinal Peak are remotely monitored continuously, so that any impending problems may be spotted before they become serious.

In addition to commercial power, the Mt. Bigelow site, manned by KOLD-TV transmitter personnel, has an auxiliary 100-kw power plant backed up by batteries capable of operating the equipment for 30 minutes. At the mountain-top sites, stable power sources and a system relatively free of maintenance are essential because of the heavy winter snowfalls. Snow vehicles must often be used to reach Pinal Peak (elevation 7800′) and Mt. Bigelow (8600′) during severe winters. Snowfalls of 12 feet or more, accompanied by winds up to 100 miles an hour, are not uncommon at these two remote sites.

The system now has an FM program channel multiplexed above the video on the microwave channel, with provision for an additional program channel, which will carry radio programming from Phoenix to the Tucson studios.

## Operation and Maintenance

The microwave system is maintained and operated by station engineering personnel. No new people had to be hired, since adequate manpower was available at each transmitter site (KOOL-TV at Mt. Suappoa and KOLD-TV at Mt. Bigelow). Based on current indications, maintenance costs for the entire system will be very low—around $1,000 a year.

To familiarize themselves with the equipment, personnel assigned to the microwave system attended a one-week training school at the San Carlos, Cal. Lenkurt plant. The new system is solid-state throughout, with the exception of klystron's. During the fall of 1966, KOOL-TV plans to replace the tube-type STL link between the Phoenix studios and Mt. Suappoa site with solid-state equipment.

## What Else Can Microwave Do?

A microwave *STL* provides the TV brodacaster with a means of relaying high quality video and audio from studio to transmitter. The facility is completely under his control, thereby freeing him from dependence on an outside service. Economically, an STL is a sound investment. After the initial investment is amortized, the only cost is routine maintenance. There's the possibility, too, of including video and aural transmitter control intelligence, multiplexed on a subcarrier to isolate it from programming. In this case, logs could be kept by an automatic logger at the trans-

mitter, or telemetry data can be sent back to the studio via a subcarrier on the aural transmitter. On some bands, however, aural and secondary communications are not presently allowed.

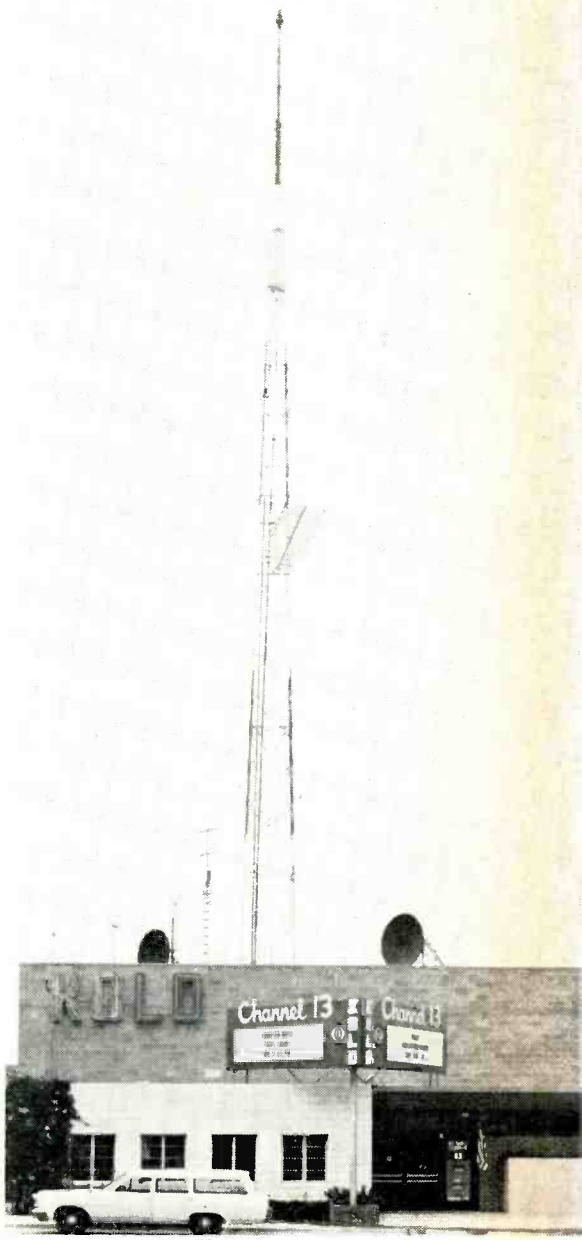
*Intercity links* offer an almost endless use of microwave facilities. A link between two or more stations for news, sports and special events—or even for network feeds—extends the coverage of each participating station. A group of stations, perhaps a state broadcasters' association, could all be served by a state-wide or regional system for news or sports feeds, or for any special event of area interest. Generally, in a system such as this, one or more of the microwave relay or repeater stations would be licensed to each broadcaster on the network. A private intercity link from the state capitol—or a jointly operated network feed from the capitol—will provide the broadcaster's audience with coverage of legislative and capitol news, inaugurations, and special events. Perhaps arrangements could be made with the weather bureau to provide a regional network with regular and emergency weather programs—offering viewers direct official reports and severe weather warnings, and presenting meteorologists with means of disseminating accurate first-hand information.

Educational broadcasters have been using intercity links, quite advantageously, for several years. For example, eleven Central Texas Schools have, since 1961, been feeding video taped lectures to classrooms in a cooperative venture known as Texas Educational Microwave Project (TEMP). The 16-hop Collins microwave system can be fed from four locations—the University of Texas studios in Austin or any one of the three

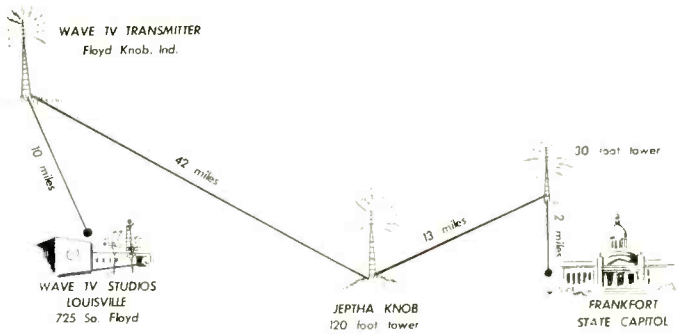
Available Auxiliary Broadcast Equipment

| Manufacturer & Model No. | Band A 1990-2110 mc | Band B 6.875-7.125 gc | Band D 12.7-13.25 gc |
|---|---|---|---|
| Collins Radio Dallas, Tex. | | MW-408A<br>MW-409A-1<br>MW-409B-1<br>MW-409B | |
| Lenkurt Electric San Carlos, Cal. | 76TV (basic) | 76TV (basic) | 76TV (basic) |
| Microwave Assoc. Burlington, Vt. | MA-2A | MA-7A | MA-13A |
| Raytheon Lexington, Mass. | | KTR-II<br>KTR-III<br>(also KTR-IV 4-gc narrow-band equipment) | |
| Sarkes Tarzian Bloomington, Ill. | TMT-1000 | | |

Authors Hillstrom (r) and Layton examine Lenkurt 76TV equipment at Mt. Bigelow KOLD-TV transmitter site.




KOLD-TV studio facilities in Tucson.




WAVE, Inc. Louisville, Ky. has applied for permission to build a microwave system which will provide, in addition to regular news reports from the capitol, coverage of legislative sessions, inaugurations, and other events of interest. An RPB microwave system in Frankfort will beam the signal to a relay station about 2 miles from the city, then a 3-hop 60 intercity link will carry programming to WAVE studios.

commercial VHF stations in San Antonio. A two-way round-robin between the University and the San Antonio distribution point demonstrates a rather unique feature. On one radio channel, video is carried up to 5 mc, with the associated sound transmitted on an FM subcarrier at 6.2 mc. At 7 mc, there are two single-sideband suppressed - carrier channels which provide a talk-back channel for use by maintenance personnel, plus a channel for fault-alarm reporting and control tones for remote switching. The system operates in the business service bands—6 gc for the intercity links and 12 gc for local and intra-city links.

Owned and operated microwave systems are serving telecasters well, providing increasingly valuable STL, RPB, and inter-city links. Not only do such links add to a station's efforts to provide the best possible service, but they also increase the savings in station operating and maintenance budgets.

*RPB* microwave application are manyfold. Remote pickups are possible anywhere a line-of-sight path is attainable, or if adequate setup time is available, passive reflectors may be used to get around or over obstructions. With the use of an omni-directional receiving dish at the studio, remote news pickups are possible from virtually any location in the station's area, regardless of how isolated the news scene may be. More permanent installations at stadiums and auditoriums offer an economical means of televising sports or any special events. Helicopter-borne units make for an extremely versatile mobile pickup—even to the point of televising a football game. In one instance, a permanent installation to broadcast church services was paid for by the *church* in a Southern state, which seems to be a logical expenditure since it will pay for itself many times over.

Georgia's 800-mile, 4-hop ETV microwave network, designed by Collins Radio to serve 11 state-owned TV outlets, went into service in September. Power splitters are used t three "Y" branches to divide the output of one 5w transmitter into 2½w beams, eliminating the need for separate transmitters. The 41-station system is simplex (one-way) except for a 2-way, 3-hop link between Atlanta and Monroe, the two originating studios. Capacity is one video channel with associated audio. Both 5w IF heterodyne and 1w remodulating units are used in two common-carrier bands (5.925-6.425 gc and 10.7-11.7 gc).

Many TV stations are becoming aware of the potential live programming possibilities inherent in the use of microwave. Serious thought will unearth many ideas. Multiple program channels, usually allocated above 6.8 gc, offer many versatile functions on intercity links, particularly. Using the first channel in the program mode, the second is available for numerous applications, such as a 15-kc FM service or four 4-kc channels which may be used for system maintenance, program cue lines, or data channels. The broadcaster's use of microwave is limited only by his imagination!

# Building an FM Station -- From CP to Sign-On

by Carl B. Haeberle and James W. Davis

**Part 2—Details of the production and transmitter studio layout and construction.**

IN MANY WAYS, our new FM facility was looked upon as an AM stepchild, so we were left to our own devious means of building the facilities with a fixed budget. Thus, we did much of the work ourselves, and resorted to many special innovations.

Construction labor was drawn from local resources—from building the production studio's raised platform, to painting the ceilings. As a result, we saved about $6,000—6% of our anticipated $100,000 total investment. This saving is mostly in labor; we found it possible to construct many items not available in prebuilt form. As an example, an estimate of $600 was given by one lumber company to construct the production room console table. The cost, after minor modifica-

**Mr. Haeberle** is production director and **Mr. Davis** is C.E., WAJR-FM Morgantown, W. Va.

Fig. 1. View of transmitting studio, showing console, turntables, and rack equipment.

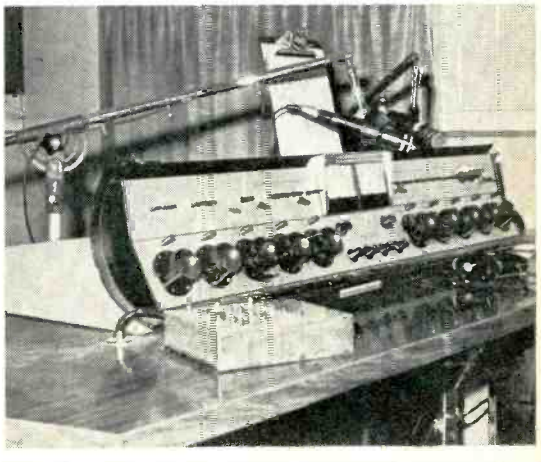


Fig. 2. Two views of the WAJR-FM production area. Rack equipment is in close proximity.

tion, was less than $150. The finished unit serves better than the one originally planned, since the wiring was installed during construction and modifications were made when "hitches" arose.

Construction of our studios was initiated as soon as the equipment was on order. At that time all dimensions and terminal points of the equipment were known. The transmitter building had to be completely remodeled prior to arrival of the new FM transmitter; thus, it took precedence over the production studio in most instances. Design and construction, however, were inaugurated for the two areas concurrently, so that similar construction phases could be tackled simultaneously. As the transmitter studio is engineer-operated, the engineers were consulted. Everything had to be put into a compact, efficient cube which would allow maximum use of necessary equipment with as many time saving innovations as possible. Due to our almost exclusive use of "student" engineers (students at the University), shifts are often long to accommodate class schedules. In spite of the fact that they are part-time students, they are outstanding and willing workers.

It was decided that a "U" shaped work area would best suit the needs of the operators. Three racks form the left leg of the "U" while the turntables form the right leg. The console is mounted facing the transmitters; a double-paned window allows all meters and warning lights to be viewed. In the racks we mounted transmitter monitoring equipment for both AM and FM, the tape deck, and the cartridge playback unit. The room is also provided with a specially built shelf unit immediately behind the "U" to hold logs, records for the day, and necessary programming tapes. An air-conditioning unit was installed to replace two windows. (The windows were considered a detriment to silence, plus, with a beautiful view of "those West Virginia Hills," something of a work deterent. The window areas were sealed inside and out with exterior grade 3/8" plywood sheeting, then treated as regular wall areas.)

We foresaw one major problem: By locating the studio near the 5-kw AM transmitter, a 50-kw FM transmitter, the associated antenna system, and the required cooling fans, we would undoubtedly swamp the audio equipment with RF and the studio with noise. At the outset, the studio area was stripped to bare floors, joists, and rafters, and a "quadruple" wall system was designed and constructed.

First, a rock wool insulation material was stapled between all joists and rafters and stuffed between door jams and joists. Next, a copper screen cage (using window screen type material) was built to completely enclose the area. It was stapled to all joists and rafters and laid on the floor. All seams and joints were then soldered and the system was connected at appropriate points to the station ground system. An industrial grade floor covering was installed over the screening on double felt mats. All of these were bonded together and to the concrete floor through the screen with mastic. Panels of Celotex were rough nailed over upper wall and ceiling screening. Finally, acoustic tiles were installed on the upper wall areas and the ceiling. Pegboard was used up to the 4-foot wall level to provide a more durable surface.

The room turned out to be "studio quiet," yet still live enough for quality air work if an emergency arose and the announcers were forced to work "live" at the transmitter studio.

## Production Studio Construction

Concurrent with construction of the transmitter-site studio, the production studio at the downtown offices began to take shape. Every effort was made to make the 15 x 11′ studio appear large and unobstructed. The room was painted in light tan tones with a white ceiling. The production area was raised seven inches by use of 2 x 6's and a double 3/4" plywood floor. The reason for the heavy construction was the stability required for lightweight tone arms. Other stations we visited during our research study had used 2 x 4 beams on 2 x 6 sill plates. These had developed—over a period of months—a bounce which had to be eliminated with structural reinforcement. The flooring was both nailed and contact-cemented

to produce as near a perfect bond as possible. Raising the floor allowed the racks to be placed away from the work area while still electronically accessible to the console.

Six 1" conduit pipes were run between the joists from the rack position to the console location. Four 1" conduit pipes were run from the rack position directly through the studio wall into the AM studio to interconnect the two. After completion of the floor area, a wall-to-wall carpet was installed in the interest of appearances and acoustics.

### Studio Console Table

The console table was constructed almost entirely with 3/4" birch plywood and cost less than $150. A hollow leg design proved structurally sound and ideal for wiring. In construction of the base legs, the major leg (larger of the two) was built with two removable sides. The fixed sides are doubled 3/4" plywood. These were bonded with contact cement and nailed from the inside, thus preserving the surface areas. These two fixed sides provide inside surface space for terminal points and wiring mounts. An auxiliary AC circuit provides light and power for maintenance work on the console or other equipment.

The top surface was constructed of two shaped 3/4" plywood panels. Prior to cementing the top panels together, a 2 x 4 the length of the top was fastened by a series of stove bolts to the bottom of the underside panel to help support the heavy console. After the 2 x 4 unit was in place, the two panels were contact-cemented and nail-locked together. The formica top was also installed by our own "carpenters," neither of whom had ever used a router. However, with five minutes briefing at the lumber yard, the project was handled with professional results.

The two turntables were placed at the side of the table 6" below the 30" table height. This level was found to be ideal after experimentation for visibility and cueing ease. Since that time we have discovered that NAB has adopted this height as a standard!

Boom mics were attached directly to the table top. Commer-

cial stands allow adequate flexibility; however, they give the appearance of giant storks. Thus, the boom, swivel unit, and the arm of two mic stands were mounted on vertical aluminum tubes (do-it-yourself 1″ tubes) which are attached to the table by means of a flange mount. Microphone chassis connectors were sunk into the formica top to provide termination for the mic cables. A second mic termination point, at the base of the major console table leg, allows minimum cable run to the open recording area in front of the platform.

In the interest of convenience and better production, we deemed it necessary to devise a means of starting and stopping tape machines and turntables from a central panel at the operator's finger tips. After pricing several individual units which are commercially available, we decided that the combined cost was prohibitive, plus the fact that the individual units would take too much space on the console table. With a little thought and an expenditure of less than $20, plus 6 hours construction time, a customized control center was built to handle all physical functions of tape recorders, cartridge machines, and turntables. The unit was first placed in an aluminum chassis box so the ideal location could be determined by experimentation before permanent mounting. (After a 4-month period of actual use, we have decided to mount the unit *in* the console table at the left of the operator, at approximately a 30° angle from the console front.) The unit is a simple 6″ rack plate lettered to indicate functions, and a series of *spst*, normally closed, momentary contact switches. The turntables are operated by power relays which activate the 100v AC motors. Thus, with one hand all the functions can be controlled in whatever order desired. Adapting the remote control to the equipment was simple since all wiring ran through terminal blocks located at the rear of all units except the turntables; a simple wiring change interrupting the line ahead of the mercury switches took care of the latter. To facilitate later modification, sub-terminal blocks were installed in the console table base leg and in the racks. A similar unit was built for the transmitter studio and mounted in a portable chassis box for ease of operation.

## Finishing Touches

In the near future, a foot-actuated time clock will be added to the production studio complex so that we can time longer-than-one-part recordings more accurately. The present wall-mounted clock, positioned so that it is visible directly over the portable copy board, is adequate to time a single spot or uninterrupted recording. However, to record a longer-than-one-part time segment, a stop clock is needed. The foot actuated unit will free the operator's hands for controlling equipment.

An ideal copy board should not block the operator's vision, and obstruct the open-aired, relaxed feeling desired. Thus, no copy board was installed at the time of construction. Instead, we contrived a simple clip board with two legs which gives the announcer a means of holding copy if required. The legs are leftover mounts from the thin speakers used in the control room. (The speakers were wall-mounted—thus four spare legs.) Another clip board serves as a portable news table with a means of holding script. The console table copy board fits on the console and immediately behind the double microphone array.

As the construction phased from structural to electrical and then to electronic, the staff engineers were called into service more and more. Many items—such as patch-panel wiring harnesses and pre-wired units—were built at the transmitter site while the engineer had only meters to read. These were then installed by the Chief Engineer.

By the fifth month of construction, meeting the original deadline of September 1st was an obvious impossibility. Added to this, the cartridge machines we had were reported "in construction" but experiencing technical difficulties beyond the control of the manufacturer. Due to time limitations involved, other units were ordered by telephone. Within 48 hours, the two machines were at the station, which permitted equipment installation to follow an orderly procedure. As the two studios began to look like functional facilities, we faced the next major phase—installing the transmitter and antenna system.

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*(to be continued next month)*

# BROADCAST EQUIPMENT

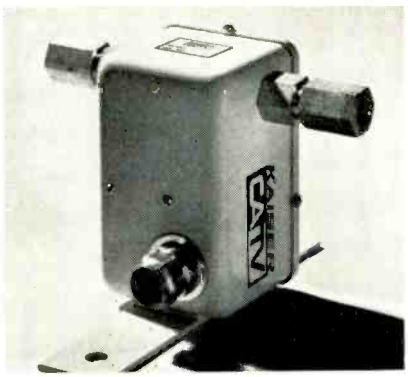
## Precision Audio Equalizers

The Cinema Plant of Hi-Q Div., Aerovox Corp., has developed 8 types of audio equalizers, said to provide a constant impedance of 500 to 600 ohms for an unbalanced line. Toroidal coils in a bridged-T configuration pick up a minimum of hum. Precision wirewound resistors provide stability and low noise level. Type 6813 is specifically designed to compensate for normal nonuniformity of nonloaded telephone lines. A variable dip filter, Type 7052, removes undesirable sounds such as camera noise, gas jet hiss, cricket chirps and generator drone from recordings. It is also suitable for harmonic distortion measurement, since it provides sharp selectivity for nulling out the fundamental.

*Circle 58 on Reader Service Card*

## CATV Bridging Amplifier

Kaiser Aerospace & Electronics, Phoenix, Ariz., has announced a new mainline bridging amplifier,

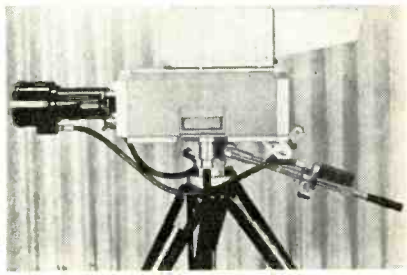


Model KBR-4, with high output levels, matched input and output, and end-mounted fittings. The messenger-mounted weatherproof unit is said to permit four 75-ohm outputs with low trunkline insertion loss.

*Circle 59 on Readers Service Card*

## Portable Field Camera

RCA has shown a new portable TV camera which can be carried to field assignments as two "suitcase" units after its detachable 8" viewfinder has been slipped off. The TK-33 camera is



fully transistorized and uses a new 3" long-life target I.O. The camera weighs 58 lbs. and the viewfinder weighs 22 lbs.; each can be carried separately with built-in handles. The camera is designed for almost entirely automatic operation, with but a single knob for iris control at the auxiliary control position.

*Circle 53 on Reader Service Card*

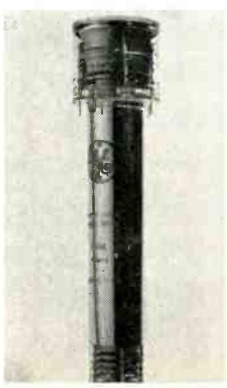
## Portable VTR

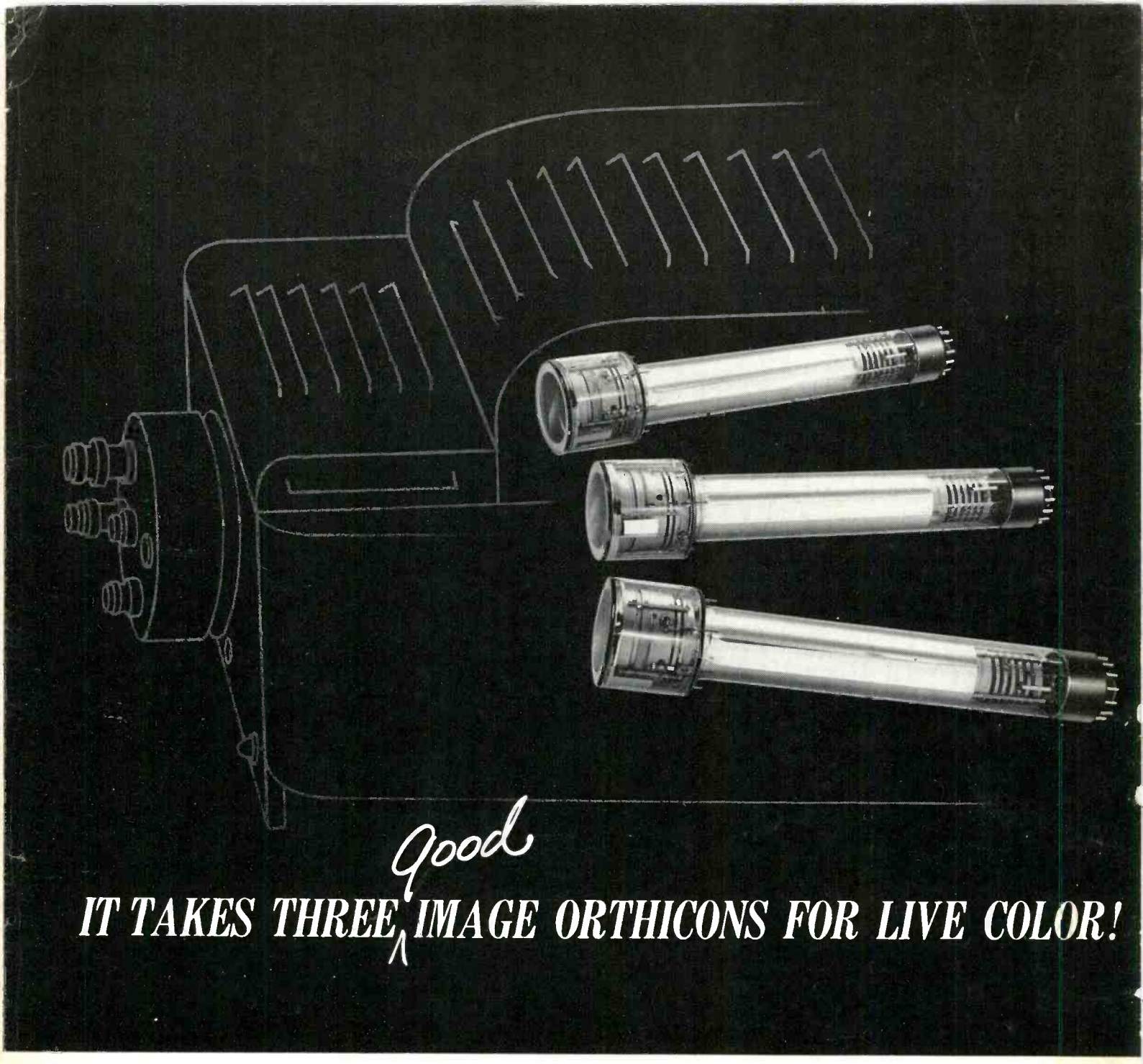
Dage TV Co., Michigan City, Ind., has introduced a new portable VTR — the DV-300 — which features a built-in 4½" video monitor and a built-in VHF tuner which permits direct off-air recording. The unit, using 1" video tape, operates at a linear speed of 5.91 ips. A variable speed slow mo-

## Low-Light I. O.

A low light level image orthicon, developed by G.E., Schenectady, N.Y., is said to offer improved quality remote color TV pickups and lower costs in converting local studios from b&w to color. The Z7866 will produce good-quality color with 50-100 ft. candles illumination, and b&w with 25-50 ft. candles. The 3" tube has peak-to-peak signal/RMS noise ratio of 40 to 4:1 and is expected to have an operating life of about 4000 hours. Price is $1975.

*Circle 93 on Reader Service Card*





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**RCA'S IMAGE ORTHICONS FOR COLOF**

| Type | Light Levels | Field Mesh | Precision Construction | Matched Sets | Targets |
|---|---|---|---|---|---|
| 4415<br>4416 | Black and White | Yes | Yes | Yes | Glass |
| 7513 | High | Yes | Yes | 7513/V1 | Glass |
| 7513/L | High | Yes | Yes | Yes | Non-stick |
| 8092A | Low | Yes | Yes | | Thin-film |

Complete information on the RCA Camera Tube line is available from your local RCA Broadcast Tube distributor ... ask him for booklet CAM-600.

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*Circle 34 on Reader Service Card*

tion playback is provided in both forward and reverse directions. An F-300 adaptor is said to add broadcast quality to the unit, and produces a minimum of 330 lines of horizontal resolution. Slow motion speed is continuously variable in both modes; additionally, a stop frame permits stopping the picture for as much as an hour. A remote control panel is available as is an optional VHF receiver-monitor with pulse-cross circuitry. Price is $12,450 plus $2,700 for a process amplifier.

*Circle 54 on Reader Service Card*

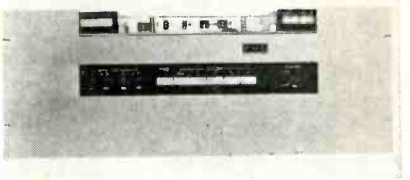
## Color Film Processor

The Color Labmaster, produced by Houston-Fearless Corp., Los Angeles, Cal., incorporates many significant improvements in automatic color film processing. The four basic models will process 16mm, 16/35/70mm, and 35/70 mm, and its modular construction allows custom tailoring of each installation to individual requirements. Addition and relocation of solution tanks can be made for future expansion as well as changes due to chemistry and new emulsions.

*Circle 55 on Reader Service Card*

## 4-Channel Cart-Type Recorder

KRS Instruments Div. of Datapulse. Inc., Pasadena, Cal., has introduced its Data-Stact MD-2 rack-mounted cartridge tape recorder which uses a single 1200′ cartridge to record or reproduce up to 4 channels or two standard I.R.I.G. channels on ¼″ standard-base tape. Miniature, solid-state, interchangeable plug-in circuit cards are used for FM or direct record/reproduce electronics. Tape speeds of 15/16, 1⅞, 3¾, 7½, 15, or 30 ips are available. A built-in cue tone signal provides reference and timing signals on any or all channels. Price is $1,975 for single channel FM; $3,135 for one channel direct and three FM record/reproduce channels.

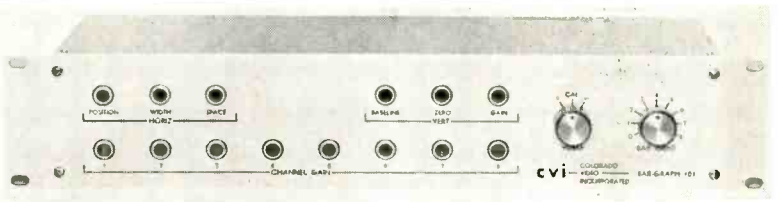


*Circle 70 on Reader Service Card*

## Coax Line Simulators

Kaiser Aerospace & Electronics, Phoenix, Ariz., has announced a new design in coax line simulators for CATV systems. The pocket-sized KSL-25 and KSL-20 units provide a convenient substitute for long lengths of coax cable in performing alignment and checkout of CATV amplifiers. Model KSL-25 simulates 25 db of cable (at Ch. 13) and Model KSL-20 simulates 20 db of cable (at Ch. 13). The latter also simulates 75-ohm coax, with low VSWR and smooth response throughout the 50-250 mc range, and it is capable of passing AC power. Attenuation is within 0.5 db of 75-ohm coax (Ch. 2-13).


*Circle 74 on Reader Service Card*

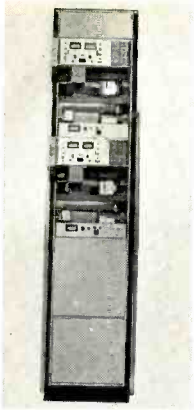


## Bar Graph Generator

A bar graph generator, designed for CCTV systems by Colorado Video. Inc., Boulder, Colo., provides a graphic display of 8 separate input signals in the form of a series of vertical bars—each proportional in height to the associated input voltage. The bars can be individually controlled and spaced, mixed with normal TV images, and two or more units used in parallel. The company says that each channel is distinguishable and groups identified by size, location, or video polarity. Price is $1250.

*Circle 75 on Reader Service Card*

## Remodulating 1w Microwave



Collins Radio Co., Dallas, Tex., has announced a 1w remodulating microwave system which meets broadcast requirements for studio-transmitter color video. The MW-408D operates in the 6.875-7.125 gc band and employs the "unitized" powering concept said to virtually eliminate rack-to-rack cabling and greatly reduce intra-rack cabling. Power consumption and heat is lowered significantly by non-dissipative regulation in the 24 or 28v battery supply. A complete hot standby, space-diversity or crossband-frequency diversity terminal can be mounted in one 7′ rack, requiring only front access. The transmitter uses a klystron producing a full 1w output, with crystal-referenced AFC which maintains control within 0.002%. Receivers are solid-state with crystal-controlled local solid-state oscillators.

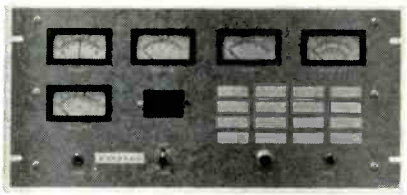
*Circle 52 on Reader Service Card*

## Compact FM Transmitter

Visual Electronics FM-250-A FM tranmsitter, introduced at IEEE Broadcast Symposium Sept. 23, is said to be smallest unit available for this power. Shown demonstrating the unit, working into a dummy load, are George Wagner, Sales Mgr. (l.) and designer Peter Tyrrell. Measuring 42″ high, 24″ wide, and 30″ deep, there is sufficient space in the bottom third of the cabinet for an SMX stereo generator. The unit is aircooled, uses PFM-10-A exciter, 4CX250A final amp, silicon rectifier power supply, and can be powered from 110v or 220v source. Price is $3,350, delivery 30 days. Visual's transmitter line includes other FM models up to 20 kw, and AM models to 50 kw, with local or remote control.

## Remote Xmitter Control

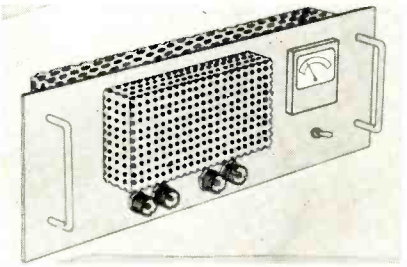
Schafer Electronics, Burbank, Cal., has announced a transmitter remote control system incorporating 26 metering circuits and 40 control functions. The Model 500 system is designed for two metallic lines (6000 ohms or more). Each of the required functions has its own meter, in addition to a multimeter with scales for reading current on more than one tower, plus scales for line and filament voltages, tower lights, and any other necessary function. Function selection is accomplished by pushing the "Advance" button and any number of functions may be skipped by holding the button until the number of the desired function appears on the readout screen. The reset button returns the relay to "home," automatically connecting the modulation meter across the line. The transmitter unit has calibration controls for each metering function and a time-delay fail-safe relay. The manufacturer states that the system will control a combination of AM, FM, and TV transmitters.



*Circle 92 on Reader Service Card*

## CATV Power Supply

Viking, Hoboken, N.J., is offering a remote 6-amp power supply



which provides 30v AC from either of two connectors. The manufacturer says that output voltage is regulated to within 1% for power line variation of 95 to 130v AC and within 2% for load variations between 2 and 6 amps. The Model 580 supply has a built-in automatic reset circuit breaker, an RF power filter providing a minimum of 60 db isolation between power line and RF terminals, and a meter to constantly monitor output current. The unit may be wall, rack, or panel-mounted. Price is $77.

*Circle 86 on Reader Service Card*

## CCTV Switching System

An automatic multiple distribution TV switching system for closed-circuit systems has been developed by Dixon Industries, Inc., Gaithersburg, Md. The

Master Program Switcher is said to be capable of switching up to 20 inputs to one to 100 outputs. The equipment features modular crossbar switches, solid-state switch controls, complete unity gain, and auxiliary power system.

*Circle 87 on Reader Service Card*

## Color Phase Equalizer

A color phase equalizer system, designed to provide the bandwidth limiting and phase equalizing facilities required for vestigial sideband color TV transmitters, has been developed by Ward Electronic Industries, Linden, N. J. The Ta-860 system consists of plug-in modules which mount in a 5 1/4" rack frame; the number of modules is determined by the facilities required. In addition to the basic system TA-850, available units include TE-851; 4.75 mc low-pass filter, TE-861 LF (VSB) phase equalizer, TE-862 HF (transmitter) phase equalizer, (these units, including rack frame and module extender, cost $2900). A TE-863 notch diplexer phase equalizer is available at $550, and a TE-864 receiver phase equalizer.

*Circle 66 on Reader Service Card*

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# LITERATURE of INTEREST

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**Transmitter / antenna** engineering data to assist in preparing Section V-C, Form 301, for TV station applications, from G.E. Includes sample forms, graphs, tables, etc. **139**

**Spectrum Analyzers** booklet discussing nature of signals, heterodyning, various outputs, operation of Tektronix plug-in analyzer. **190**

**I. O. camera** channel B3096, Mark IV Marconi, described in detailed catalog from Ampex. **192**

**Ruggedized tube types** listed in Sylvania publication describing reliability of Gold Brand line. **116**

**Microphones** for broadcast/recording/PA listed in illustrated brochure from Electro-Voice. Prices, specs included. **185**

**Titling, special effects** equipment for 16/35 mm professional use described in folder from S.O.S. Photo-Cine-Optics. **184**

**Weather Channel** for CATV and broadcast use described in brochure from TeleMation. **159**


**FM stereo** pamphlets from Gates Radio, with answers to the 21 most - often - asked questions about FM exciters and stereo. **132**

**Sync generator** that produces EIA standard sync, blanking, H-drive, V-drive signals. Technical bulletin on Telemet Model 3519A-1. **191**

**STL, intercity** equipment for 950-mc range described in catalog and price sheets from Marti Electronics. Antenna, transmission line, accessory data included. **183**

**"The Jerrold CATV Story"** a booklet discussing systems, services, and equipment. **170**

**Microwave CATV,** broadcast towers illustrated in literature from Ft. Worth Tower Co. shows installations and applications. **171**

**Audio recorder/reproducer** information sheet from Ampex lists specifications for AG-350 console. **162**

**CATV systems brochure** includes technical data on head-end, trunk, distribution, special products, from Spencer-Kennedy Labs. **141**

**Differential operational** amplifiers, low/high voltage, fast feedback chopper stabilized, economy models. Catalog from Melcor Electronics includes outline drawings, schematics. **157**

**Teleprompter systems,** TelePro projectors, lenses, shown in literature packet from TelePro Industries. **187**

**Delay lines** for pulse or CW from 60 cps to 20 gc, power ratings to several kw, discussed in bulletin from Andrew Corp. **189**

**Motor-generators,** 25-1200 cycles, up to 1200 kw, 4160 volts, with synchronous or induction motor drive, in Kato Engineering brochure. **153**

**Remote control systems** for broadcast transmitters in brochure from Rust. Includes sampling devices, accessories. **167**

**Micro sync generators** for monochrome or color TV cameras detailed in Cohu Electronics bulletin. **149**

**CATV coax,** Anaconda "Sealmetic," specified in 8-page brochure, includes cable data, handling-installation facts, connectors. **120**

**TV cameras,** modular design, all transistorized, broadcast quality, for open and closed circuit use, listed in a brochure from Sylvania. **122**

**Remote control for FM** stations, Moseley Associates Type II and III STL, detailed in 4-page brochure. **121**

**CATV equipment** catalog, 18 - pages, includes distribution equipment, head-end systems, weather/view system from CAS Mfg. Co. **131**

**Microwave** Path Engineering Considerations, 64-page booklet published by Lenkurt Electric, includes data on routes, sites, propagation, and example calculations. **143**

**TV Translators,** VHF and UHF, listed in brochure from EMCEE. **128**

**CATV line amplifiers** and distribution equipment literature package; CATV Electronic Transmissions Systems booklet from Entron. **198**

**Passive repeater** configurations, design considerations, specifications, in Microflect engineering manual. Includes calculations, charts, etc. **173**

**VHF transmitter,** 2.5-kw AM, 5-kw pulse, for communications, satellite command, etc., in 120 to 155 mc range, illustrated in brochure from American Electronics Labs. **112**

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