

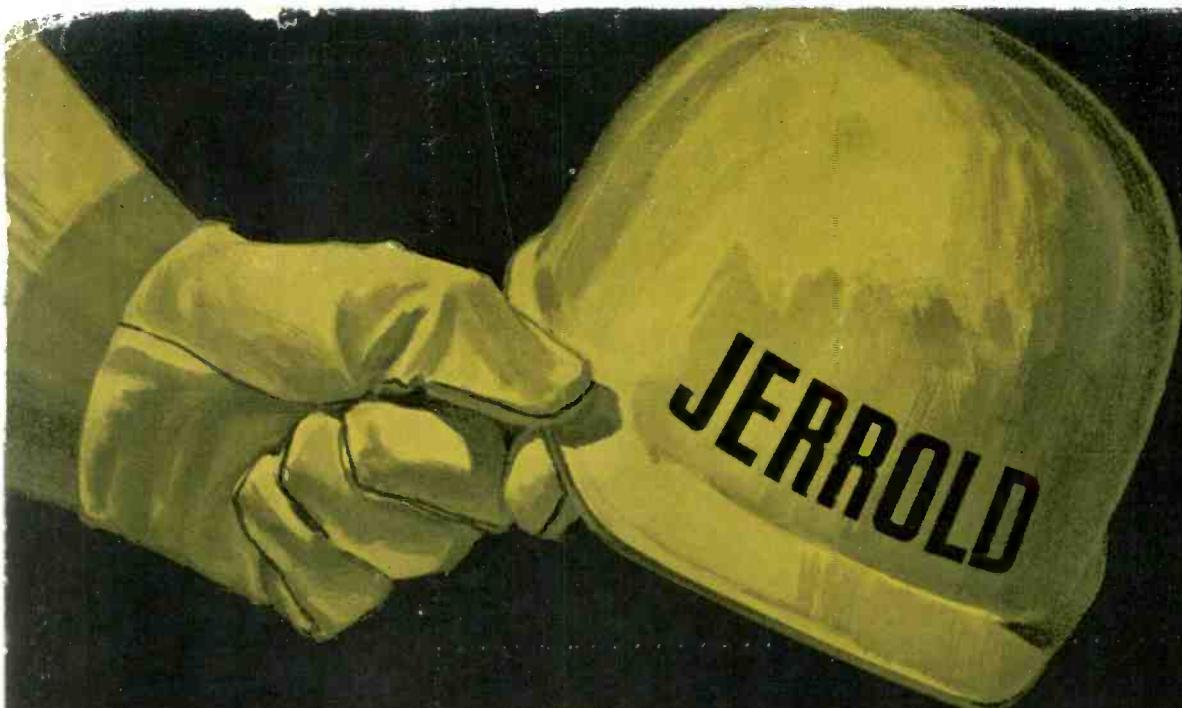
A MACTIER PUBLICATION / AUGUST 1966

BROADCAST

THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING



DM-1-AI-25-2
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BM/E

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- 6 Broadcast Industry News**
Timely reports on events, companies, and people.
- 14 Interpreting the FCC Rules & Regulations**
An in-depth analysis of the AM-FM program duplication rule.
- 21 Broadcast Applications for Microwave**
Here's how microwave units are finding their place in AM and FM operations.
- 24 The Challenge of Non-Network TV Programming**
With the number of non-network hours to be filled these days, locally scheduled programming is gaining in importance.
- 28 Studio Design for Image**
Look the way you sound. Design for quality and efficiency—but design for image compatibility, too.
- 32 Beyond-the-Horizon TV Reception**
How tropo-scatter pickup systems are improving CATV head-end reception.
- 38 NCTA Convention Report**
A review of the 15th Annual Convention, Miami Beach, Fla.
- 42 Broadcast Equipment**
Reports on newly introduced products and components.
- 50 Broadcasters Speak**
- 62 Names in the News**
- 65 Literature of Interest**
- 66 Classified Section**
- 67 Index to Advertisers**
- 68 Management Roundtable**
Sterling Quinlan projects his view into the future of UHF.
- 69 Reader Service Card**

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MACTIER PUBLISHING CORP.
820 Second Ave., New York, N.Y. 10017, 212 MO 1-0450

Publishers also of:
EEE—the magazine of Circuit Design Engineering
ELECTRONIC PROCUREMENT
VOLT/AGE—the magazine of Electrical Apparatus Maintenance

Radio broadcasting has long grown out of the "amateur" class—yet, it's surprising to see how many stations operate from studios that look like "ham shacks." Think of the impact on advertisers who might drop in, or listeners, or an important on-the-air guest. Ken Clausen of KQWB carries the studio design theme a step farther (see page 28). He feels plant design should fit the station image, to the point where personnel "live the part." Your studio may not look like our "pop art" cover, but *any* effort is a start in the right direction.

BM/E, the magazine of Broadcast Management/Engineering, is published monthly by Mactier Publishing Corp. All notices pertaining to undeliverable mail or subscriptions should be addressed to 820 Second Ave., New York, N.Y. 10017.

BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities. These facilities include AM, FM, and TV broadcast stations; CATV systems; ETV stations, networks and studios; audio and video recording studios; consultants, etc. Subscription prices to others are: U.S., its possessions and Canada—\$5.00 one year, \$9.00 two years; elsewhere \$7.50 one year, \$14.00 two years.

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**This is the new FM Volumax.
It prevents FM overmodulation without distortion.
It eliminates SCA crosstalk.
It solves your pre-emphasis problem.**

**It is yours absolutely free.
(for 30 days)**



Overmodulation. An FM station engineer's headache. Use a clipper and you get distortion. Use a common limiter and you get pumping. You could reduce modulation levels. But that's not the answer.

So CBS Laboratories developed something new. A solid state FM limiting device that replaces common limiters and clippers. And it is unconditionally guaranteed to pre-

vent FM overmodulation and SCA crosstalk *without distortion*.

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Use it 30 days. After that, send it back if you can part with it. We'll even pay the freight. Or keep it for

only \$695. Double that if you want the stereo model.

AM broadcasters were quick to respond to our free 30-day Audiamax and Volumax offer. Now with the new FM Volumax we can make you the same offer. Be the first on your band.

CBS LABORATORIES
Stamford, Connecticut. A Division of
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BROADCAST INDUSTRY NEWS

Small Business Viewpoint: TV

The television industry as it exists from a small business viewpoint was described for the House Small Business Subcommittee on Regulatory and Enforcement Agencies. In a statement prepared for the subcommittee's hearings concerning the FCC, Tvb President Norman E. Cash explained that the Bureau "is very much in sympathy with the small businessman because, while TV is a big business, it is composed of a number of small businesses." He noted that the average TV station, for example, has only 54 full-time employees. About 16% of the stations employ only 26 people and 30% of the stations earned a profit of under \$50,000 in 1964. "And, as the FCC reports, 92 TV stations reported no profit in 1964.

A major portion of the TV industry, therefore, is a small business itself." Mr. Cash pointed out that in terms of gross time sales, local TV represents the fastest growing segment of total TV. In terms of station revenue, local advertisers account for about 25.4% of the total. "Much of the future growth and strength of TV rests in the hands of the small business man. In some areas, the very life of TV depends upon him already," said Mr. Cash.

Fairness Doctrine Provisions Blasted

In comments filed with the FCC, a group of 12 broadcasters and the RTNDA said the Commission's proposal to adopt two fairness doctrine provisions (concerning editorials and personal attacks) violates the 1st Amendment and vowed they would carry

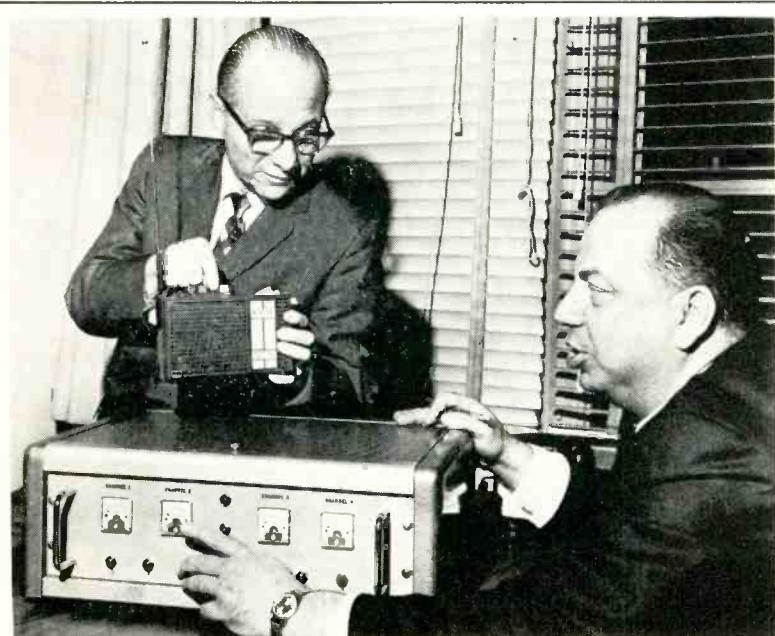


Exchanging official key of ownership of KEWB Oakland, Cal., are Edward Urner (l.), formerly general manager, and Varner Paulson, v.p., Metropolitan Broadcasting div. of Metromedia, Inc. Mr. Paulson is new general manager of the station, purchased from Crowell-Collier Co. for \$2½ million.

the fight to the Supreme Court. The proposals would require broadcasters to allow equal time to politicians editorially attacked, force them to submit tapes or scripts prior to broadcast, and to submit to unwanted editorial control.

SCA Monitoring Delay Asked

A 6-month postponement of the FCC's proposed rules requiring FM stations to monitor subcarrier generator frequencies has been requested by the NAB. If granted, the new rules would take effect Jan. 5, 1967. NAB told the Commission that subcarrier frequency measuring equipment is back-ordered several months and is therefore not readily available. At deadline, both McMartin and Rust Corp. contacted BM/E to report the availability of new subcarrier frequency monitors in time to meet the deadline.

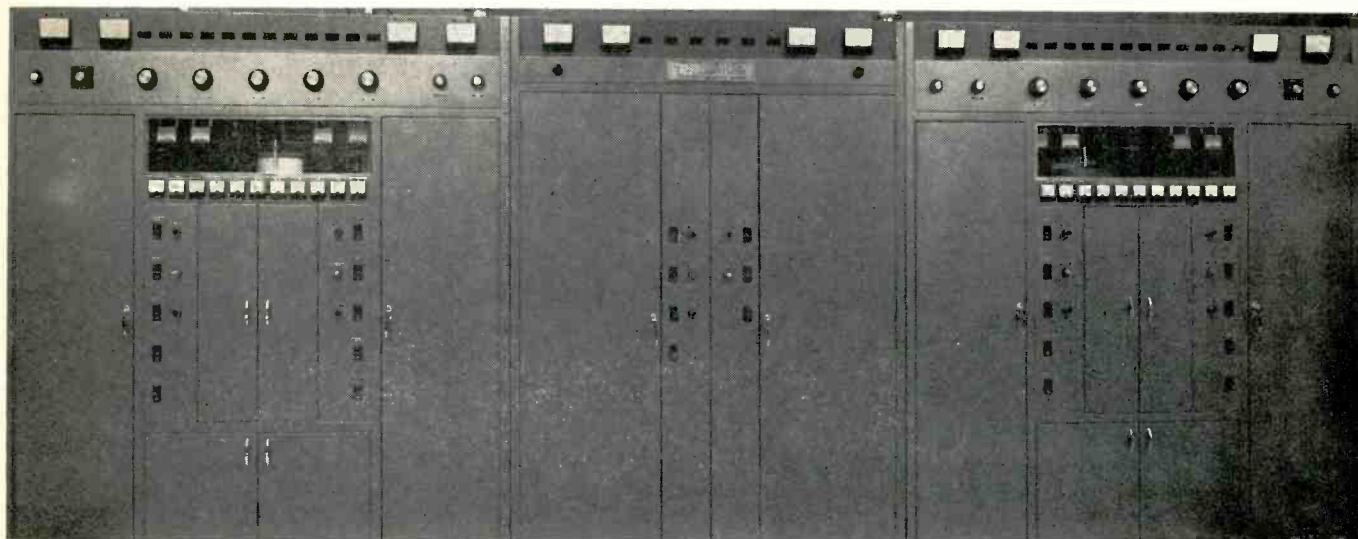


Educating Systems, Inc., N.Y.C., has received a patent on an instructional materials program service adaptable to FM or CATV systems. Without disturbing the normal entertainment service of an FM signal, 4 educasting channels are piggybacked on the carrier. A special student receiver is used to pick up the channels. The 4-channel tapes are prepared by International Correspondence Schools. Norman S. Livingston (l.), who conceived the system, is shown operating a Sylvania-built receiver, and Ira Kamen, director and consultant, is adjusting the subcarrier generator. Educasting has received FCC approval as an SCA service on WFIL-FM Philadelphia and WUSV-FM Scranton.

Cable Firm Acts to Conserve Copper

A new composite conductor which incorporates relatively small amounts of copper has been announced by W. T. Smith, V.P. in charge of engineering

Why has TOWNSEND ASSOCIATES Captured Over 30% of the UHF Klystron Transmitter Market?



There may be many other reasons, but we know we are:

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. . . to employ the New Generation of klystrons
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T . . . to employ isolators and R.F. attenuators
. . . with remote control

Townsend Associates is a youthful organization formed by broadcast engineers who have a thorough understanding of the broadcaster's needs. Our lower manufacturing and merchandising overhead results in superior products at attractive prices.

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Now through the use of WILKINSON voltage sensitive Line Surge Protectors you can protect your equipment from line surges that may exceed even twenty times the normal line voltage.

A WILKINSON pulse compensated Line Surge Varistor, is placed across a line of its rated voltage. Should a surge or increase of voltage occur, the resistance of the varistor decreases at log scale as the voltage increases, thus acting as a momentary load or short circuit to the surge. WILKINSON Line Surge Protectors draw little or no current and are capacitor compensated for microsecond surges, thus damping all line disturbances as well as excessive voltage increase.

A small investment in WILKINSON Line Surge Protectors is your assurance that your valuable broadcast equipment will not be damaged due to line surges.

AVAILABLE IN 3 MODELS!

Model S1A-1	120 V. single phase	\$ 89.50
Model S1A-2	220 V. single phase	\$169.50
Model S1A-3	220/240 V. three phase	\$259.50

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and research, Superior Cable Corp., Hickory, N.C. Product applications were developed in conjunction with the Metals and Controls Div. of Texas Instruments, Inc., producers of the new copper-aluminum conductor which contains only 10-20% copper in cross-sectional area. The new alloy is the end result of a series of highly complex manufacturing processes developed for production of the new composite metal U.S. coins.

According to Mr. Smith, "Existing copper supplies are inadequate to meet existing demands and the need for copper will continue to increase in the years to come . . . It appears that only technical advances such as the new copper-aluminum conductor can provide a practical and immediate answer to the problem . . ."

\$3.9 Million for "U"

Shasta Broadcasting Corp., Fresno, Cal., has sold KJEO-TV, Channel 47, to Subscription Television, Inc., for \$3,900,000, including remote pickups. Receiving the largest sum yet paid for a UHF station, Shasta will own 27% of Subscription Television common stock. The transferee formerly operated a wired pay-TV system.

Fall Conferences

The NAB has announced its 1966 Fall conference schedule: Thurs-Fri., Oct. 13-14 Dallas, Tex., Statler Hilton Hotel; Mon-Tue., Oct. 17-18 San Francisco, Mark Hopkins Hotel; Thurs-Fri., Oct. 20-21 Denver, Colo., Denver Hilton Hotel; Mon-Tue., Oct. 24-25 Minneapolis, Minn., Radisson Hotel; Thurs-Fri., Nov. 10-11 St. Louis, Mo., Chase Park Plaza Hotel; Mon-Tue., Nov. 14-15 New York, Waldorf Astoria, Thurs-Fri., Nov. 17-18 Charlotte, N.C., Queen Charlotte Hotel; Mon-Tue., Nov. 21-22 Jacksonville, Fla., Robert Meyer Hotel.

"Dual Service" for Standby Power

Business and industry can now make money on standby power generating equipment thanks to a recent development called "dual service," according to a spokesman for the Caterpillar Tractor Co. In many areas of the country, where fuel rates are favorable, air con-



Station personnel from the U.S. and Canada attended a recent 4-day course at the General Aniline & Film Corp., Binghamton, N.Y. The courses are designed to provide TV photo staffs with the know-how to handle and process Anscochrome color films, including the AR-2 process which develops from wet to wet in 22 minutes. Checking TV color news films are (l. to r.) Dewey Stinson, WTVW Evansville, Ind.; Kenneth Mertz WNEM-TV Saginaw, Mich.; George B. Keyes, GAF; Robert Simmons WWNY-TV Watertown, N.Y.; Kenneth Schauble, WJET-TV Erie, Pa.; Dean Moore, Condor Films, St. Louis, Mo.; and Donald Gillies, Best Film Industries, Toronto.

ditioning equipment powered by internal combustion engines can be operated at considerably lower costs than electrically driven units. For a relatively small additional investment, a generator can be attached to the other end of the engine. In the event of a power failure, an automatic clutch disconnects the compressor and the generator takes over the emergency electrical load.

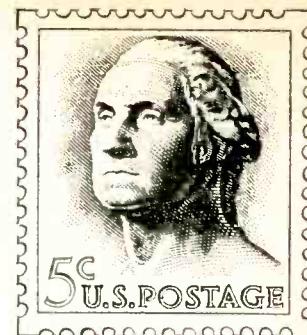
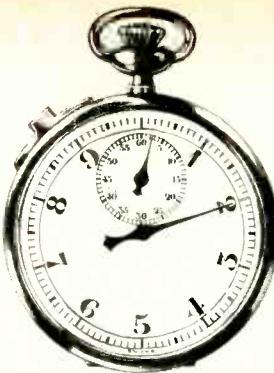
Canada to Fla. Relay

The first major sports program ever to be televised live from Canada direct to central Florida will take place Saturday, Aug. 20 from 7 to 10 PM (Orlando time) when the Orlando Panthers open their regular season against the Montreal Beavers. The game will



be carried on WFTV (ABC) and will be played in Montreal's Expo Stadium. Signing the agreement is Elmer Cook, Panther gen.

TAKE AND



(TWO MINUTES & A FIVE CENT STAMP)

and we'll custom design the most advanced DC Remote Controlled **AUDIO CONSOLE!**

Fill in the form below and we'll custom design a Ward Console tailored to meet your requirements.

NEW CONCEPT

All Ward's solid-state Audio Amplifiers and Relay Switch Matrix are rack mounted. DC controlled from the Control Panel. System permits paralleling control panels to one set of electronics. Centralized location of electronics facilitates and speeds testing and servicing.

LATEST DESIGN

Completely solid-state design, using silicon transistors throughout.

- Only system to feature completely solid-state remote controls (no LDR).
- Automatic Gain Control Action on Submaster Attenuator.
- Optional preselect facilities on input amplifiers.
- Compact Control Panel design.
- Illuminated Push-Buttons are controlled by the tally circuitry.

All this plus 60 db crosstalk across the entire audio band . . . regardless of the size of your console.



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- Number of Microphone Inputs
- Number of Microphone Preselects
- Number of High Level Inputs
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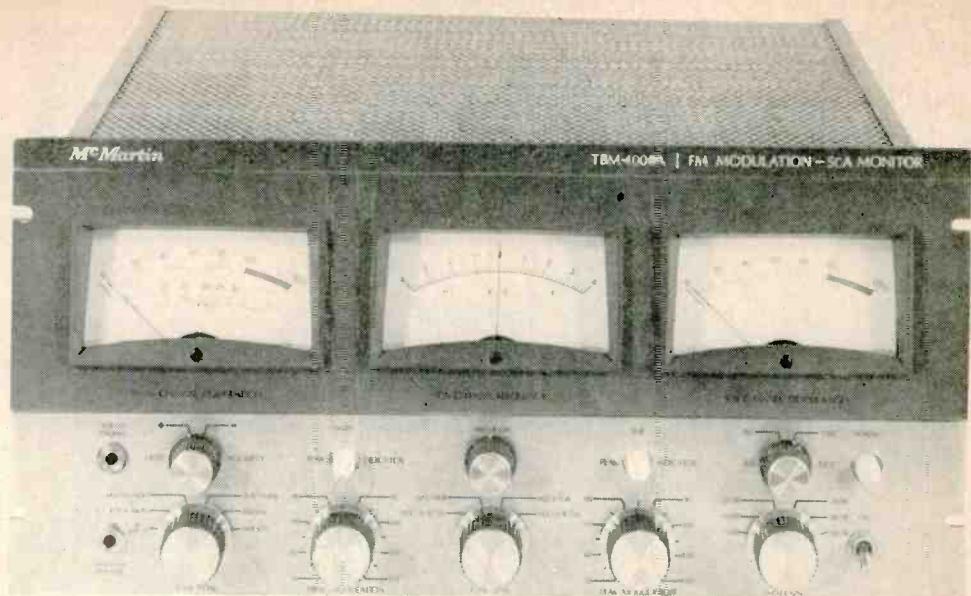
Specify Monitor Requirements (✓ off below)

- Control Room Cue Speaker
- Control Room Audio Speaker
- Director's Speaker
- Announce Booth
- Foldback (to audience)
- Talkback (to talent)
- Public Address
- Reverberation Unit
- Camera Headsets (Pgm. Audio)

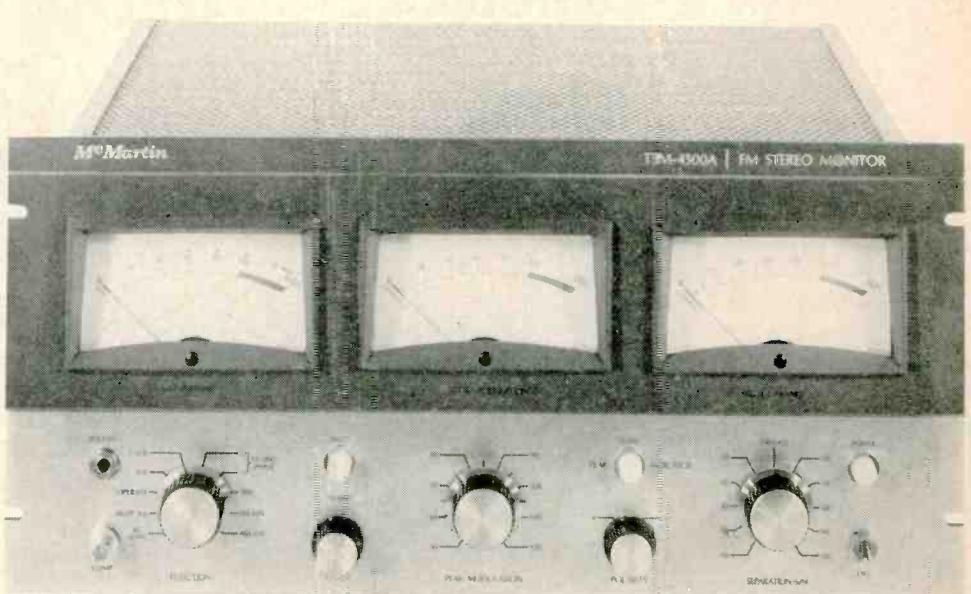
Why not also send us a copy of your Audio Cross Point Functional Diagram — or call us to discuss your particular audio switching needs.

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**TBM-4000A SCA
Multiplex Monitor**



**TBM-4500A
Stereo Monitor**



The extras make the difference

Both monitors incorporate all the latest FCC requirements (Docket #15404, May 25, 1966) and are now ready for delivery. Both are solid-state (with some Field Effect transistors); and both have plug-in modules, and three meters for easier reading of essential information.

It's a pleasure to use the TBM-4500A because it does so many things so well—some not even required by the FCC. The unit's accuracy can be checked internally by reading the phase angle between the 19kc and 38kc signals to within 1° (compared to the FCC's 3° requirement). The new unit gives you a third meter (also not required by the FCC) that allows simultaneous reading of left, right and total modulation. AM

and FM signal-to-noise ratios and cross-talk and separation readings can be made directly from the monitor. The 19 kc pilot injection can be read without affecting modulation. These features, and many others make the TBM-4500A a completely self-contained modulation monitor for stereo operation.

The TBM-4000A also exceeds FCC requirements. With three meters the operator can simultaneously read main and sub-channel modulation and SCA frequency. Direct reading of SCA sub-channel injection at any time is also provided. Cross-talk or noise readings into either sub-channel can be made directly with tone or program modulation. To make sure you're sending out

the very best SCA signal, use the McMartin TBM-4000A, the monitor that gives you extras that make for easier, more efficient operation.

Workmanship on all McMartin products is guaranteed *forever*; we make this bold warranty because 20% of our people are in final testing. Write or call for complete details about these new monitors.

McMartin

McMartin Industries, Inc.
605 North 13th Street
Omaha, Nebraska 68102

Circle 10 on Reader Service Card

TBM-3005 Frequency Counter



0.002% Accuracy

Effective October 31, 1966 the FCC will require SCA and stereo operators to take daily measurements of the 19 kc pilot and SCA sub-carrier frequencies. McMartin's new TBM-3005 solid-state, rack mounted Frequency Counter has a 5-digit columnal count; a 7 cycles to 125 kc range; uses an internal tuning fork oscillator; and has an accuracy of 0.002%. With the wide frequency range, the TBM-3005 can be used for several other applications, too.

SPECIFICATIONS

Display	5 digits vertical
Full Sensitivity	10 cycles to 100 kc
Sensitivity	0.35 v rms min.
Input	BNC connector
Input Impedance	0.1 mfd in series with 150 k, 50 pf shunt
Signal Amplitude Range	0.35 v rms to 250 v rms
Pulse Response	To 4 microseconds
DC Isolation	Signal may be up to ± 500 v dc from ground
Frequency measurement accuracy	\pm one count \pm time base accuracy
Time Base—Internal	$\pm 0.002\%$ at 20°C to 30°C
Gate Time	1.0 seconds
Frequency Resolution Power	0.1 kc 117 v, 60 cps, 12 watts
Size	Standard 19" rack x 7" h x 6" d
Weight	11 pounds

McMartin

McMartin Industries, Inc.
605 North 13th Street
Omaha, Nebraska 68102

Circle 11 on Reader Service Card
August, 1966 — BM/E

mgr.; seated next to Cook is Malcolm W. McClellan, pres. McClellan & Associates (who will produce the telecast in conjunction with Sports Network, Inc); and standing is Joseph L. Brechner pres. and gen. mgr., WFTV. Initial cost is in excess of \$15,000 for telephone cables, cameras, tape equipment, and crews.

\$1 Million VTR Contract

The Columbia Broadcasting System has contracted for 11 Ampex VR-2000 color VTRs, increasing the total to 31. The network will use the VTRs to record original color programs and for time delay of live programs.

Classified Ads Given Trial

The FCC has granted assignment of KGLA(FM)'s license to the McLendon Pacific Corp., allowing the Los Angeles station to be operated with all-classified advertising and public service announcements for a trial period of one year. In an accompanying letter, the Commission said the 1-year grant was made under terms of the Communications Act which provides for the study of new uses for radio in the public interest. At the termination, and at any desired time during the trial period, the assignee will submit a report on the operation including reactions of the public, a statistical breakdown of the types of ads carried, and required financial information. McLendon paid \$400,000 for the station.

LA's 10th TV Station

KMTW-TV, Kaiser's 3rd UHF facility to go on the air in the past 18 months, began operating June 30 on Channel 52 with transmitter facilities located on Mt. Wilson. Operation is limited while several new programming concepts are considered. Kaiser Broadcasting Corp. holds an option for Zenith's subscriber TV system in the market.

MATV Promotion

Blonder-Tongue Labs., Inc., has launched a nationwide advertising and promotional campaign in support of its On-Channel TV systems. The campaign, designed to demonstrate the new



Heliax flexible waveguide for use in emergency restoration of 6- and 11-gc microwave systems available from Andrew Corp. Types EW56 and EW107 are being packaged on portable aluminum reels in various predetermined lengths with end fittings attached. In the event of failure, a transmission line section can be replaced quickly.

all-channel (2-83) master antenna system, will explain how schools now installing ETV systems, and how apartments, hospitals, nursing homes, etc., can provide for all-channel capability. A 75-page design manual is available at \$2 per copy.

Color VTR Order

Rust Craft Broadcasting Co. has placed the first multiple-unit order for RCA highband color TV tape equipment for medium-sized TV markets. Six TR-70 VTRs are part of an \$850,000 color equipment package which also includes 7 TK-42 RCA color cameras for the 5-station group.

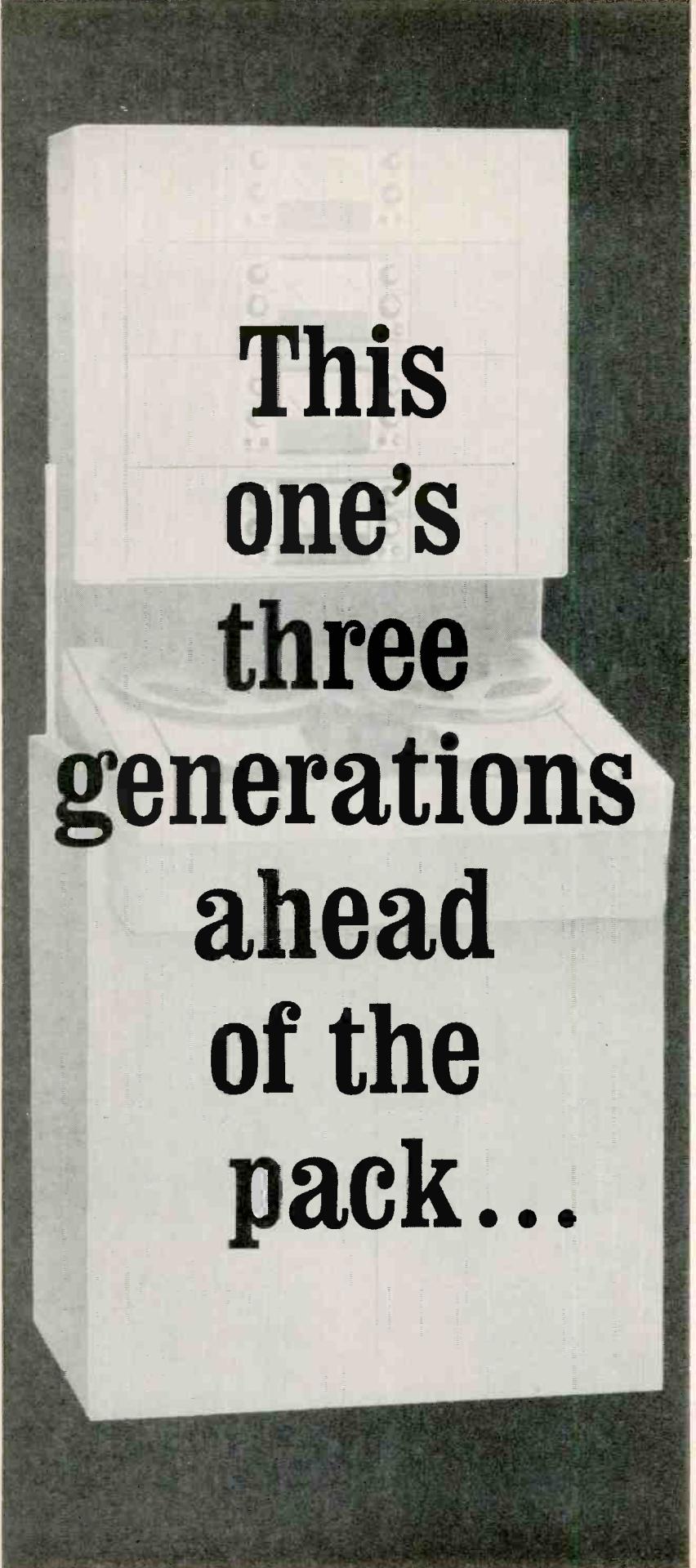
CATV Consulting Firm

International Telemeter Corp., Los Angeles, Cal., a division of Paramount Pictures, has announced the formation of Amplivision Corp. The new firm will

Continued on page 62



Viking Industries, Hoboken, N.J., has acquired 30 acres of land in Freehold, N.J. for a new cable plant. Construction of the one story building is under way. Cable production is scheduled to begin in Sept.

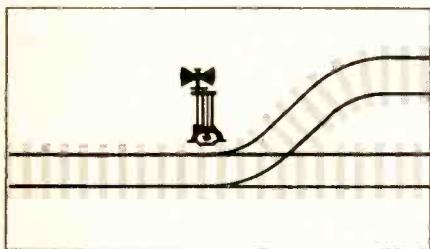


This
one's
three
generations
ahead
of the
pack...

Because the new 3M Professional Tape Recorder, through its "Dynatrack" mastering system, has increased signal-to-noise ratio 15 db. So its third generation dub is the equal of anyone else's master! What's more, it makes a 10 or more decibel difference in measurable noise on your finest LP pressings, whether Bach or one of the noisier moderns. . . . And because, for a while the supply will be somewhat limited, we've tried to keep it secret, but perhaps you've heard rumors about this extraordinary innovation in recording-playback instruments. Those who *have* heard it rub their ears and say we've succeeded listenably well. When you *do* have a demo you needn't plug in the oscilloscope — this difference you *hear!*

It is true that 3M's new Recorder is quieter than both the Rolls Royce and the Ford — not to mention any and all tape recorders on the market today. And it *is* true that it incorporates two radically new electronic and mechanical principles. If you were expecting a Big Blast — sorry! May we suggest you read on quietly, critically, yet we hope with mounting excitement about the new 3M Professional Tape Recorder? . . .

15db more dynamic range is yours with the new 3M Professional Tape Recorder. Or to give you the whole bit: this recorder's unique two-track technique extends the weighted dynamic range of audio tape systems to at least 80 db below third harmonic distortion. *This is another way of saying our third generation dub equals anybody else's master.*



Always a clear track. You're always on a virtually distortion-free track (less than 1% harmonic distortion) with this new 3M Recorder. A single signal is recorded simultaneously on two separate tracks. One track is recorded at normal NAB level, the other at a higher level. When these tracks are played back they will approach distortion at different times due to the difference in recording levels.

The high or "H" track, recorded at normal (NAB standard) level, handles the higher level signals. The low or "L" track has a pre-emphasized higher level signal — high frequencies as much as 15 db more, to better record lower sound levels.

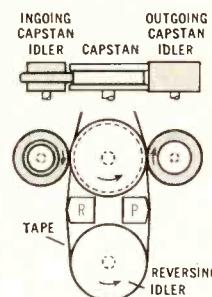
On very soft sounds usually lost when recording at NAB levels, the low or "L" track puts out a clean, undistorted signal. However, when the low or "L" track approaches distortion, an automatic circuit anticipates and switches to the high or "H" track — noiselessly and in milliseconds. The

reserve volume capability of the "H" track thereby provides an extension of the dynamic range.

Flutter tamed by 3M "Isoloop". The "Isoloop" system on the new 3M Recorder has the lowest flutter of any recorder ever built in the audio field! It's a closed loop system, in itself unusual. And what is really unique is control of the "Isoloop" by a differential capstan that generates and keeps tape tension constant within the loop (using techniques first developed by 3M for telemetering instrumentation recorders). This tight, closed loop around the tape heads isolates tape passing over them from the rest of the tape transport. The tape path in the loop is very short. Unsupported tape is reduced to 3½ inches. Less tape free to shimmy and shake over the heads! Result of this nonsense tape support: a flutter rate that would discourage a butterfly — considerably less than that produced by ordinary professional recorders. Complete elimination of compliance arms, filters, etc.

Complete NAB compatibility. Yes, your present pre-recorded tapes will play with new brilliance on the 3M Recorder. You can also record standard tapes, to be played on ordinary (NAB-standard) machines. Conversion from the expanded range of the new 3M Professional Tape Recorder to conventional NAB recording is fast. Just change 2 plug-in circuit boards in the front panel.

Does it have everything? Every big and little thing we could think of to make this *the* Recorder that advances the "state of the recording art". Recording amplitude linearization for further reduction of harmonic distor-



tion. Phase correction for dub after dub of crisp, clean sound. Silicon solid-state circuitry. Modular electronics. Epoxy glass circuit boards. Overdub sync is available. Photoelectric tape position sensing. Interlock safety tape control — go directly from "fast forward" or "rewind" into "play". Automatic tape lifters for rewind. Impossible to snap, break, spill or stretch tapes. Precision tape splice locating, marking. Construction: only finest American parts.

Availabilities: the complete Console, pictured at the left. Truly portable units complete in two shock-mounted carrying cases. You may purchase the track-switching electronics, or the "Isoloop" tape transport separately.

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INTERPRETING THE FCC RULES & REGULATIONS

The AM-FM Program Duplication Rule

THE PREVIEW ISSUE of BM/E (Dec. 1964) featured an article entitled "Is The 'AM Freeze' Really Over?" That article dealt with the development and effects of the imposition and lifting of the much-discussed "AM Freeze." The Commission's July 15, 1964 Report and Order (FCC 64-609) lifted the "freeze" and adopted the previously reviewed "go/no-go" engineering standards. In addition, the Report and Order covered, as an integral part of the AM and FM channel allocation problem, the matter of AM-FM program duplication. Nearly two years have passed since the so-called "AM-FM non duplication rules" were adopted; the Commission has made numerous extensions of the effective date of these rules. Over 100 petitions for exemption were filed, and nearly all were denied; most of the licensees have been forced to adjust to the new policy.

Background of the Rule

Over a period of many years the Commission has repeatedly expressed its view that the widespread practice of AM-FM program duplication was never regarded as an *efficient use* of the FM frequency; however, little was done to rectify the situation and it was rather ignored as a temporary expediency to aid the economic establishment and growth of the FM service. In short, the Commission wanted to permit FM to develop and survive until such time as there were sufficient FM receivers and audience to support independently programmed FM stations.

In its July 1964 "Freeze Order" (FCC 64-609), the Commission, in adopting the AM-FM duplication rules, observed as follows:

We . . . concluded that AM-FM program duplication had served whatever purpose it could in most cases, and that the time had arrived to begin a gradual change in policy, regarding duplicated AM-FM programming in the same community.

More generally, our proposals were based upon the view that the time had come to move significantly toward the day when AM and FM stations should be regarded as component parts of a total 'aural' service for assignment purposes . . . eventually, there must be an elimination of FM stations which are no more than adjuncts to AM facilities in the same community.

These quotations have a marked bearing upon recent articles in this column (May, June, and July). Therein, the Commission's interest in *diversification of programming* through diversification in broadcast ownership was discussed in detail. The myriad reasons for this view will

Thrust of the Rule

The thrust of the AM-FM program duplication rule is stated aptly in Section 73.242(a) of the Commission's Rules and Regulations:

"(a) After August 1, 1965, licensees of FM stations in cities over 100,000 population (as listed in the latest U. S. Census Reports) shall operate so as to devote no more than 50 per cent of the average FM broadcast week to programs duplicated from an AM station owned by the same licensee in the same local area. For the purposes of this paragraph, duplication is defined to mean simultaneous broadcasting of a particular program over both the AM and the FM station or the broadcast of a particular FM program within 24 hours before or after the identical program is broadcast over the AM station."

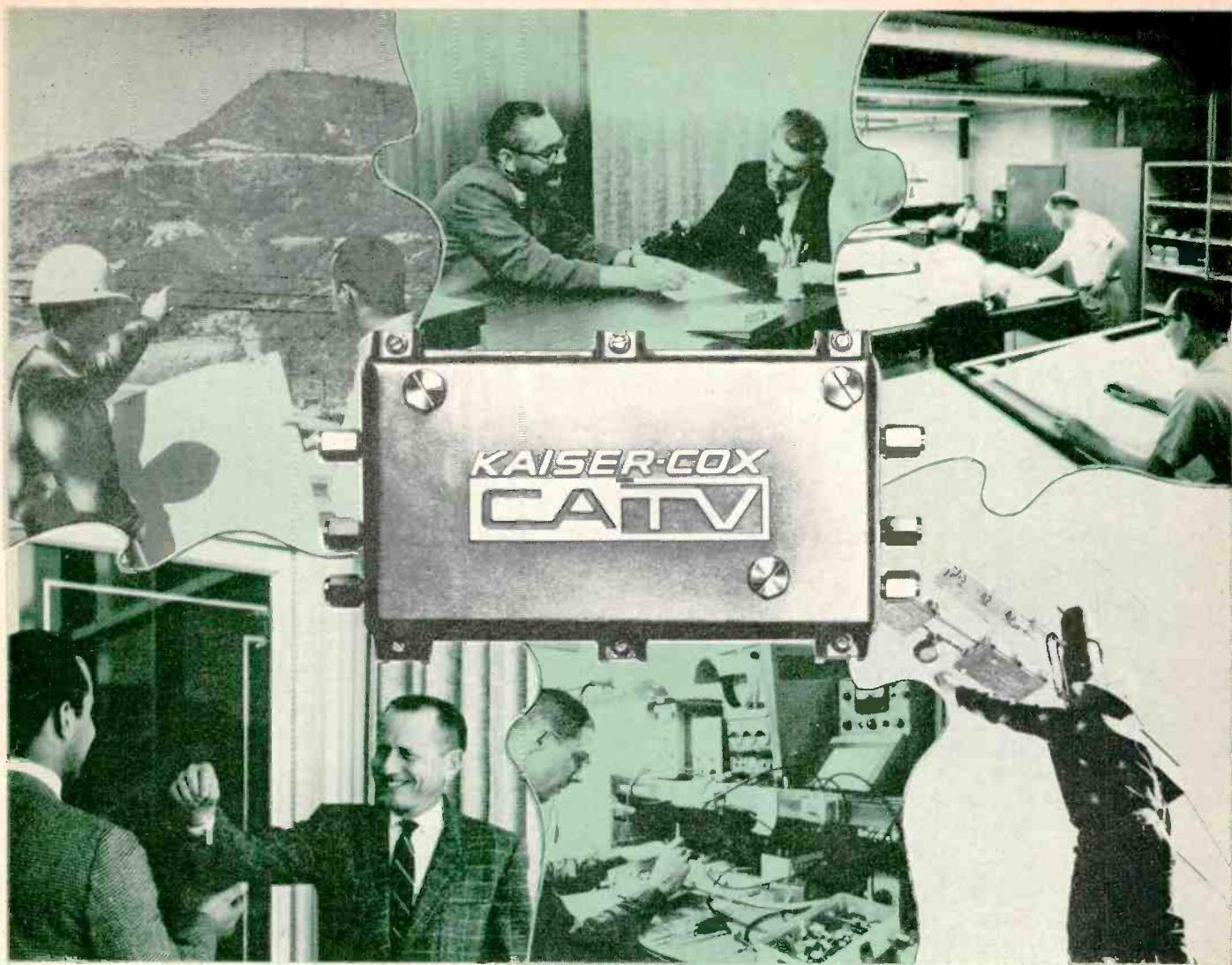
not be repeated here. Suffice it to say that the Commission's policy in the matter of AM-FM program duplication illustrates a close parallel to its views pertaining to concentration of control of the mass media.

Complete Split in AM-FM Foreshadowed

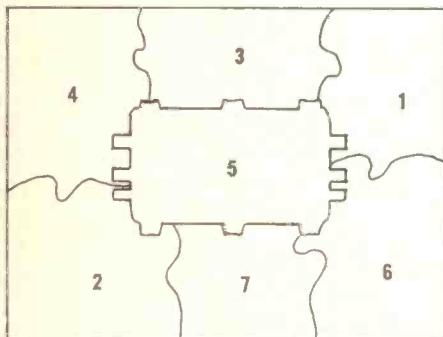
For many years the Commission has sought to utilize every opportunity to promulgate rules and policy which will foster diversification of (1) programming sources, and (2) station ownership. Naturally, the achievement of one of these goals is most difficult, if not impossible, without the achievement of the other. In the case of the AM-FM duplication rules, the Commission seeks to enhance the *variety of program fare* available to the public. However, it seems quite obvious the "50 percent" program separation—between AM and FM in markets with 100,000 or more population—far from accomplishes this goal.

In fostering its "gradual change" in policy, it is not unreasonable to expect the Commission to (1) increase the percentage requirements for program separation between AM and FM stations, and (2) decrease the size of towns to which some form of AM-FM program duplication rule is applicable. Moreover, a careful reading of Commission releases on point seems to indicate that, ultimately, the Commission—to achieve its desired objective of maximum diversity of program fare—will be inclined to adopt rules designed to promote *separate ownership of*

This section, providing broad interpretations of FCC rules and policies, does not substitute for competent legal counsel. Legal advice on any given problem is predicated on the particular facts of each case. Therefore, when specific problems arise, you would be well advised to consult your own legal counsel.



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August, 1966 — BM/E

15

AM and FM stations in the same community. Clearly, maximum variety in program fare can best be obtained through the widest variety of programming sources and *views*, and the latter can best be achieved via separate ownership. While a rule—precluding the sale of jointly owned AM-FM stations in the same community to *one* buyer—may be years in coming, it would appear inevitable. Thus, it seems appropriate for all broadcasters owning (or contemplating joint ownership of) AM and FM stations in the same community, to review the problems and effects of the AM-FM program duplication rule now in force.

Waiver Requests Denied Across the Board

When the AM-FM program duplication rules were adopted in July 1964, many licensees read with avid interest Section 73.242(c). The latter created the impression that requests for exemption (waiver) might fare well—provided the licensee was doing something exceptional with its AM that could not be offered the listeners on an FM-only basis. While the Commission's staff was not encouraging, many believed that the Commissioners might assume a more lenient and understanding position. As a result, over 100 hopeful licensees filed requests for permanent exemption from the rules. These pleadings were predicated upon every conceivable ground (e.g., economic hardship, unusual programming contributions, hours of operation, etc.). After several extensions of the effective date of the rules to petitioners and many months of deliberation, the Commission denied 68 of the requests flatly and granted exemptions to 27 stations that operated daytime-only, three full-time stations that had vast differences between the daytime coverage and “programming of a truly unique nature” (all foreign-language), and 12 stations that were basically insolvent. The latter received only extensions of two years. The 68 petitioners denied relief were accorded extensions of eight months to comply.

While most of the petitioners presented no “novel” programming to support a grant, many established “unusual,” but not unique, programming formats. Some of these, such as “all talk” formats, were the only ones in their markets, and hence, the only FM talk formats in the markets. Nevertheless, such requests were denied. The Commission has moved dauntlessly toward its goal—maximum variety of programming sources and fare. Unfortunately, in this *rare* instance, the Commission appears to have “bitten its nose to spite its face.” It is significant to note that economic hardship arguments were accorded little or no consideration—except for insolvents. Why? The Commission had carefully analyzed these ramifications *before* adopting the rules. In any event, there is no relief in sight for the affected AM-FM stations, and none likely for those affected by future rules designed to augment the goals involved. So, the industry must learn to live with these rules and to expect more of the same in the future.

Understanding the Rules

There seems to be a general misunderstanding of the non-duplication rules by many licensees.

First, as to *computation of time*, Section 73.242 (a) prohibits duplication for “more than 50 per cent of the average broadcast week.” The Commission has specifically stated that this is not intended to mean *every* broadcast week! (See FCC 66-252, released March 15, 1966.) It is the Commission's intention that, *over a period of a year*, FM duplication of AM should average *no more* than 50 per cent. Thus, in a given week, month, or quarter, the licensee might duplicate a great deal more or less than required! It is the *annual* average of no more than 50 per cent duplication that must be achieved. This annual evaluation gives the licensee flexibility to adjust the amount of duplicated and separate programming to reflect seasonal variations.

Second, as to *computation of time*, the 50 per cent applies to all broadcast time. That is, if the licensee operates its FM 20 hours per day, its annual average of separate FM programming should be 10 hours per day; if the licensee reduces the hours of FM operation to 16, the amount of separate FM programming would be reduced to 8, and so on. In brief, the FM non-duplication time can be easily determined by dividing the total FM broadcast hours by two.

Third, as to *programs exempt from the rule*, coverage of elections, “space shots,” special events of national and/or regional importance, and the like are regarded as non-duplicated or separate programming—despite the fact that they are presented simultaneously.

Fourth, *stations in the same local area* are those commonly-owned AM-FMs located in the same community and perhaps those in nearby communities. Until the Commission advises a licensee that its commonly-owned FM in a nearby local area,” it would not appear imprudent to ignore the rule. However, *this should be done only after discussion with the licensee's qualified legal counsel*.

Limited Scope of the Rule & Practical Application

Since the rule requires only 50 per cent program duplication during the average broadcast week, based on annual computations, the licensee is afforded wide latitude in compliance. Additionally, the rules only prohibit simultaneous duplication. The Commission has defined “*simultaneous broadcasting*” as that being “*within 24 hours before or after the identical program is broadcast over the AM station*. There would appear to be myriad methods of achieving compliance without incurring disastrous hardships.

The licensee conceivably could tape 50 per cent of its AM programs and broadcast same over the FM beginning 25 hours later. To wit, Monday's AM shows could be Wednesday's FM programs and so on. While the Commission would not “cheer the licensee on” for compliance in this manner, *the rules clearly permit it*. In fact, in paragraph 13 of FCC 66-252, while denying most of the petitions for exemptions, the Commission observed:

“ . . . With modern techniques, recording and re-broadcast is a successful and very widely used form of presentation of significant programming . . . The public may well benefit from having such programming available twice.”

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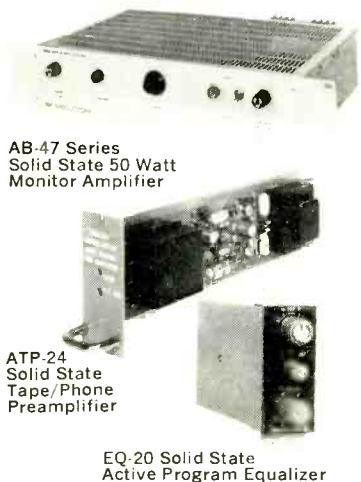
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Of course, the Commission is referring to re-broadcasts of live concerts, public affairs, local live shows, and the like—not pure regurgitation of "rock 'n roll" music. Nevertheless, the rules permit pure re-broadcast of AM fare over FM—the nature of the programming notwithstanding—provided, however, that it is 25 hours before or after broadcast over the AM.

Other licensees are complying with the rules by reducing the amount of FM broadcast hours. Such an approach will not aid the public or increase the licensee's "stock" at the Commission, but it remains another method of easing the burdens of compliance.

Many experts do not believe that the AM-FM program duplication will achieve the goals the Commission seeks. Moreover, it is commonly felt that the instant rules will result in a proliferation of the airwaves with music, music, and more music on a medium (FM) that is already predominantly a vehicle for music. Obviously, FM stations in most markets cannot support the kind or size of staffs and operations available to AM operations. Accordingly, many short cuts will be used to comply. The previously "all talk and information" FM stations will also tend to constitute another music voice on FM. In other words, *due to the laws of economics, it is unlikely that there will be an increase in the variety of programming available on FM*; if anything, there will be a decrease of same. That is, some unusual programming will give way to more music.

Over a period of many years, the Commission may yet achieve its objectives by (1) tightening the AM-FM program duplication rules, (2) making same applicable in smaller markets, (3) increasing the percentages of required separate programming on FM, and (4) taking steps to reduce the number of jointly owned AM-FM operations in the same local area. At present, it appears that the instant rules and future measures will increase costs and problems for FM operators. Fortunately, the rule now in effect should not be too injurious to most of the licensees involved.

Minimum AM Power Increased

By Report and Order, the FCC amended its broadcast rules to increase the minimum power of Class IV AMs from 100 to 250w, day and night. The 9 existing 100w stations can apply for increases; five applicants for 100w, including two in hearing, will be exempted.

1st CARS Grant

Santa Maria Valley Cable TV, Inc. has been granted the first CARS microwave relay license to bring signals of several Los Angeles TV stations to its CATV system in Santa Maria, Cal. The system will operate on 12,700-12,925 mc with 1w.

FCC Appointments

Veteran Commissioner Rosel H. Hyde has been appointed Chairman of the FCC by Pres. Johnson, and Nicholas Johnson, (no relation) a 31-year old lawyer, has been designated as the President's choice to bring the Commission up to full membership.

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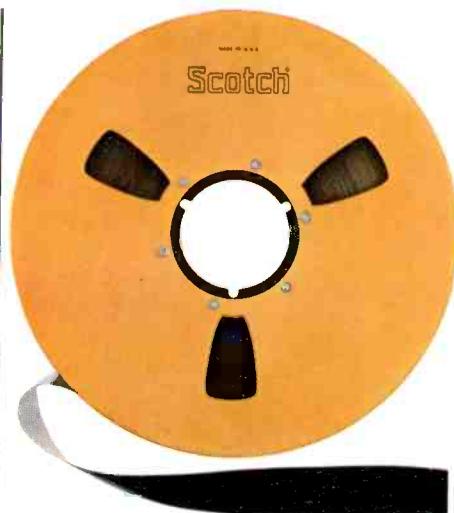
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August, 1966 — BM/E

Broadcast Applications for Microwave

by Robert B. Cooper, Jr.

Part 2—Microwave units are finding their place in AM and FM operations. Here's how.

Generally, there is a tendency among broadcasters to associate the use of microwave with TV or CATV. However, FM stations are advantageously using microwave, and even in AM, the popularity of microwave service is growing as equipment costs go down.

Where Can It Be Used?

The situation in Fig. 1 presents a problem. The studio, to be convenient to other services, is located at A. The transmitter site, however, is some miles distant at B. The remote site may have been chosen for a number of reasons—some technical, others economical. Naturally, if

audio signals are to get to the transmitter, a path must be provided. Therefore, the question is: Can a microwave system be used to relay program material from A to B and can it compare favorably, cost-wise, to a leased line from the telephone company?

Leased Lines vs Microwave

An AM or FM studio facility seldom requires as much physical floor space as a complex TV operation. As a consequence, a downtown studio location, convenient to advertising accounts and services, is often desirable. Not always, however, is it possible to so locate a single or multiple tower AM-FM array near the studio location.

In such situations, the local telephone company usually stands ready to serve the broadcaster with a leased line. Terms for a leased line vary from area to area, and from one telephone company to another. A typical telephone company "quote" appears in the accompanying box. Depending upon the nature of the urban or rural region where the line will terminate, and the amount of work and equipment additions required to service the studio-to-transmitter leased-line link, the telephone company will usually include, as a condition of the contract, a fixed minimum lease term (a period of ten years is not unusual).

Standard broadcast-quality lines are known as Equivalent Class lines, designed to pass the audio spectrum from 50 to 15,000 cycles within 1 db at 1,000 cps, generally installed and maintained by special telephone company personnel familiar with broadcast requirements.

Let's analyze a typical 5-mile leased line. The broadcaster pays a flat rate of \$6 for the first mile and \$4.40 for each additional

mile, per month, for a total of \$23.60 per month. For purposes of discussion, let's assume this broadcaster was able to negotiate a leased-line service only by signing an irrevocable 10-year contract. In 120 months of operation, he would pay \$2,832 to the telephone company.

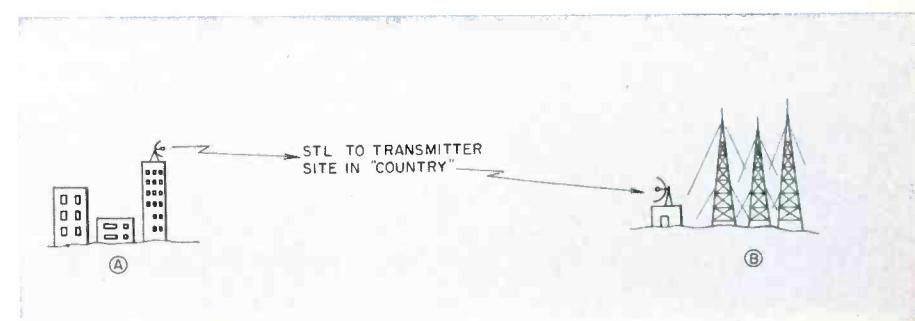
The question simply is this: How much microwave will \$2,832 buy? The answer is, *not much!* But this does not necessarily rule out microwave for this broadcaster. At this point he should sit down with his CPA and analyze his tax position. Is he better off paying \$23.60 per month as an operating expense, or investing in microwave equipment as a capital expenditure, and taking advantage of a generous depreciation schedule?

Most microwave manufacturers know that they have a considerable untapped market just skirting the lower edge of their present pricing schedules in medium and small size broadcast operations. As microwave STL (studio-to-transmitter link) prices decrease and microwave equipment becomes more compact and more reliable, greater inroads will be made in this marketing region. The real breakthrough, price-wise, is yet to come, however.

Uses in FM

Many FM broadcasters must look at microwave in slightly different ways. There are two excellent reasons why FM broadcasters utilize microwave to a greater extent than their AM brethren. One is quality; the other is distance between transmitter and studio.

Let's talk about quality first. There are some FM broadcasters who utilize, with seemingly excellent results, leased lines between studio and transmitter. Some even run stereo through



Mr. Cooper is pres. of Sierra-Pacific Radio Corp.

leased pairs and claim that cross-talk, distortion and frequency response characteristics are suitable for the critical ear of the FM audiophile. Many others say no, it is not possible to maintain the necessary degree of "fi" on leased lines.

It is entirely possible that the super-critical FM broadcaster, concerned with his air sound, can find room for complaint with a standard balanced line or pair (in the case of stereo). It is also the experience of the author that, except in perhaps large telephone company offices, necessary experienced personnel *generally* are not available to set up and maintain a long balanced pair adequate for stereo FM studio-to-transmitter links.

There is a case, and a good one, for microwave STL in FM, and it becomes more pronounced when the FM broadcaster plans stereo, or is in an area where experienced telephone company personnel are not available.

In addition to quality, the FM broadcaster, like his TV counterpart, is extremely conscious of antenna height above average terrain. For this reason he will usually seek out an elevated location for the tower and transmitter. Frequently such a location will be in an inaccessible area where telephone lines have not been installed, or where existing lines are intermixed with various rural telephone services such as a "farmers telephone service." This service may be adequate for calling the doctor or vet, but it will never handle stereo audio channels. Suddenly to a broadcaster planning a new FM station or modernization of an existing station, microwave becomes extremely important.

Putting Microwave to Work

KOSO (FM) recently took to the airwaves utilizing a 950-mc

Leased-Line Costs

Local service leased lines are usually considered permanent fixtures or permanent service lines by the telephone company, and subject to long term tariff regulations. Because of the nature of the service and maintenance responsibility, long term contracts of 10 years are usually required. In such a contract the lessee guarantees to pay the cumulative total of a 120-month contract whether the full term is utilized or not. When sold, such an obligation usually goes with the station under most Bell contracts.

Most AM stations utilize class "A" lines, although "AA" and "AAA" lines are available. These terms, based upon Bell Long Lines, concern the frequency response of the lines. All lines are designed to be maintained flat to within 1 db ($\frac{1}{2}$ db) over the range chosen, centered on 1,000 cps.

Class "A"	100 to 5,000 cps
Class "AA"	50 to 8,000 cps
Class "AAA"	50 to 15,000 cps

Rates vary from area to area and from one telephone company to another, dictated, for the most part, by prevailing tariffs. "Typical" rates are \$6 for the first mile; \$4.40 for each additional mile in the Class "A" category. Rates are higher for Class "AA" and "AAA" lines.

studio-to-transmitter link (Fig. 2) manufactured by Moseley Associates. The studio is located at A. Eleven miles by air, almost due west on top of Mt. Oso, stands the KOSO (FM) tower. The natural 3,200-foot elevation at the transmitter site affords a coverage pattern that blankets over 14,000 square miles of California's San Joaquin, Sacramento, and Santa Clara Valley country.

Fig. 3 shows the makeup of the twin-channel signals. Main-channel audio is transmitted from the studio to Mt. Oso on approximately 945 mc while second-channel audio is transmitted on 951 mc. Multiplexed on the 945-mc channel is an unmodulated 26-kc subcarrier and multiplexed on the 951-mc channel is an unmodulated 67-kc subcarrier. Before reaching the main transmitter carrier, the 26-kc subcarrier is modulated with second-channel audio, while the 67-kc subcarrier is modulated with metering data taken directly from the Bauer transmitter. This 2- to 4-kc range metering data is trans-

mitted on the air on the 67-kc subcarrier. The subcarrier generators are located at the studio so they may be observed.

At the studio site, a McMartin off-the-air receiver tuned to 93.1 mc feeds the KOSO (FM) signal into a phase comparator and demodulating unit. The demodulating unit recovers the metering intelligence on the 67-kc subcarrier and a meter panel, mounted above the on-air operator, provides a direct readout of all FCC required metering functions from the transmitter some 11 miles away. A control system allows the operator to remotely raise or lower voltages and turn the transmitter on and off.

FCC requirements still insist that an engineer inspect and log transmitter meter readings at Mt. Oso 5 days per week, but the need for constant supervision on the mountain is eliminated by remote metering and control. Since the mountain is a 90-minute drive by jeep from the studio, and the economics this FM operation will not support a full-time resident transmitter engineer, this method of remote control made it possible for KOSO (FM) to attain a wide coverage area and bring the first FM stereo to several hundred thousand people who would otherwise not have this broadcast service. Microwave made it possible, for there are no telephone lines available to this remote mountain peak.

All FM broadcasters may not be blessed with such a nearby mountain peak, but the opportunity to double or quadruple

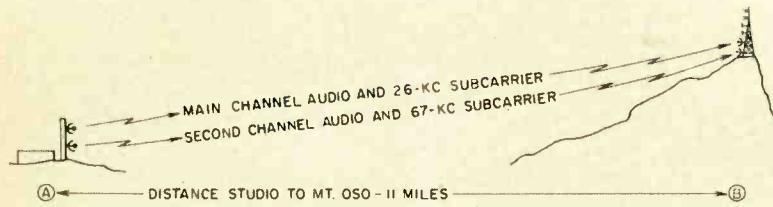


Fig. 2. KOSO(FM) STL employs two microwave transmitters at the studio to relay two stereo channels and two subcarriers to the remote transmitter location.

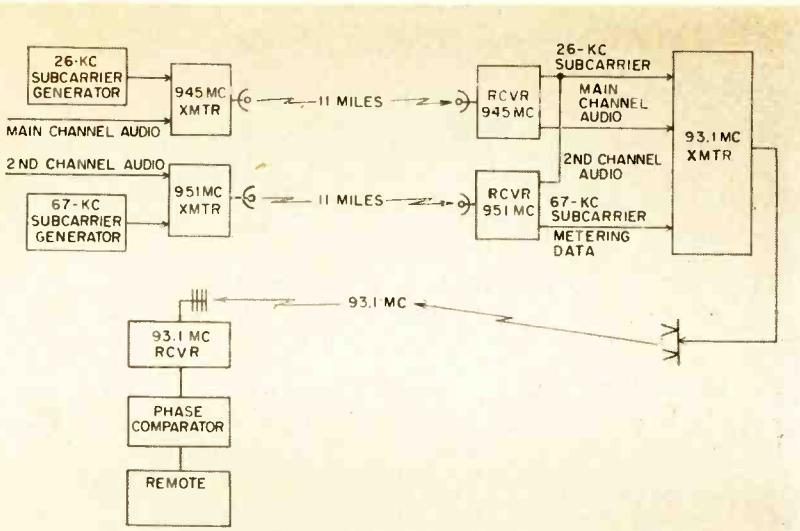


Fig. 3. At the KOSO(FM) transmitter site, the main carrier is modulated with main channel audio; the 26-kc subcarrier is modulated with second-channel audio; the 67-kc subcarrier is modulated with metering data for relay back to the studio via the station's radiated signal. A stereo receiver at the studio feeds frequency and modulation monitors and the metering data on the 67-kc subcarrier is fed into direct readout circuitry.

your coverage by using microwave remote control of a mountain top transmitter certainly should not be overlooked if such a natural elevation is available in your area.

What Does It Take?

At the outset, understand that no two microwave systems are alike. Even so-called " ballpark figures" are misleading because what seems like a *minor* change to management can amount to a 25% change in price very quickly. To arrive at an accurate figure for your own projected application, you would be well advised to call in several microwave suppliers and ask for bids. There are two types of bids—equipment only and a turnkey job. Usually AM and FM microwave requirements are such that any reasonably competent engineer can unpack the equipment, mount it in the racks, connect antennas, transmission lines and transmitter-receiver units, and make it work the first time. Generally, a turnkey (complete and installed) system will cost 10 to 15% more than the equipment alone.

For discussion purposes, the KOSO (FM) microwave system will be our basis for a cost breakdown (see box). At the studio location, KOSO(FM) has two separate microwave transmitters, two separate transmission lines, two 6-foot microwave "Pa-

reflector" antennas, a 30-foot tower for the antennas, plus the interconnection equipment for the audio circuits linking the two microwave transmitters. Not included in this equipment listing is the off-air remote-metering receiver equipment. This was part of the Moseley package, but is not actually microwave equipment, per se.

On Mt. Oso are two more microwave antennas mounted on the side of the KOSO(FM) tower, two lengths of $\frac{7}{8}$ " transmission line, two basic receivers, and the required equipment to

Synopsis of KOSO(FM) Microwave System

The general figures shown here are pertinent only to the unique KOSO(FM) requirements. Stations not requiring complex remote metering (no subcarrier, etc.) would of course require less equipment. Price shown reflects total costs, installed, using KOSO (FM) engineering.

Units Included:

- 945-mc transmitter & receiver
- 951-mc transmitter & receiver
- Four 950-mc 4' dish antennas
- 200' $\frac{7}{8}$ -inch solid aluminum line
- 26-kc subcarrier generator
- 67-kc subcarrier generator
- Phase Comparator
- 30' tower (for studio installation)
- Misc. cables, connectors, etc.

Total Cost: \$12,240

couple them into the FM transmitter.

The total equipment price, installed by KOSO(FM) engineering personnel, was just over \$12,000. A 5-year depreciation schedule will allow just under \$2,000 per year to be depreciated.

This is, in truth, two systems in one, however. There are two transmitters, two receivers, four antennas—in fact, double of everything, plus the intricate remote control function channel which allows the studio operator to raise and lower voltages and adjust the transmitter or shut it down and turn it on at will. This, then, is a pretty deluxe system and is probably more complex than the average FM broadcaster's requirements; certainly it is a lot more complex than the average AM broadcaster would require. A simple studio-to-transmitter link to carry one audio channel over a moderate distance can be installed for under \$5,000 using 950-mc equipment.

In crowded metropolitan regions of the country, the old (and original) 950-mc STL band is in some disfavor with broadcasters who have been using it for many years because of interference and crowding. As a consequence, many radio STL users are moving to higher frequency microwave bands where crowding is less of a problem. This has placed a certain amount of used 950-mc equipment on the market, and a sharp buyer can sometimes find serviceable equipment packages (i.e., transmitter and receiver) for as little as \$1500.

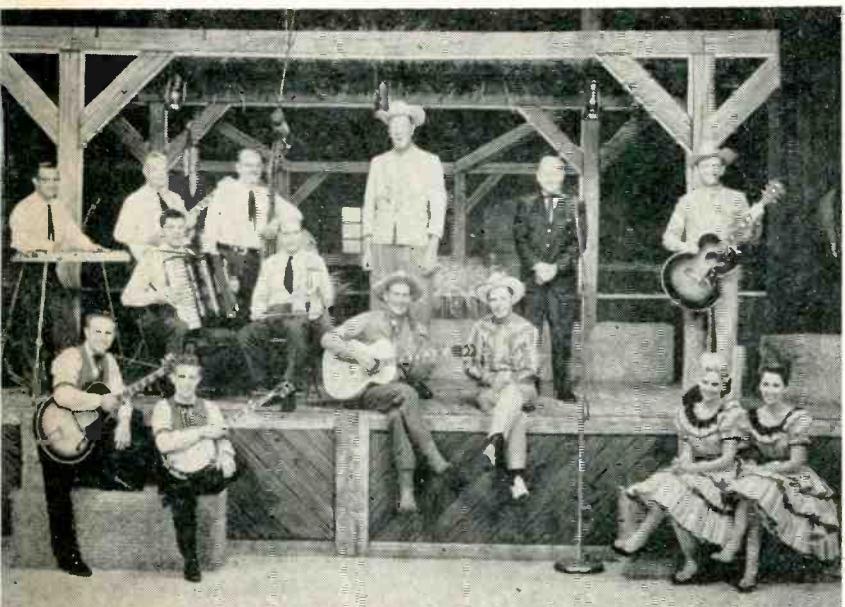
Conclusion

Many AM, FM, and TV stations are discovering the advantages offered by microwave STLs. In each case, of course, existing conditions will determine economic feasibility. There is one additional advantage, above everyday convenience and economy, that every broadcaster with remotely located transmitters should consider. A station-owned STL is less susceptible to outages caused by violent acts of nature which rip down power lines. If standby power is available at studio and transmitter locations, the STL-equipped station could weather many conditions where it might otherwise be off the air long enough to pay for a pretty fancy microwave system. ●

The Challenge of Non-Network TV Programming

By Charlie Buffington

With the number of non-network hours to be filled, locally initiated TV programming presents a many sided problem—even to the seasoned telecaster.



WGN-TV's Barn Dance, a radio favorite for three decades, is also seen in color in 50 other markets.



Ticket requests for WGN-TV's noontime Bozo's Circus are backed up to July, 1969.

SUCCESSFUL TV programming can and does challenge the keenest yankee ingenuity and test the perseverance of the most ambitious entrepreneur. It takes an expert—in a field where experts are few—to produce, buy, or by some means, come up with TV programming which will lure an audience sufficiently large to attract advertiser investment. The demand for individuals with such ability will increase as the ratio of local-to-network programming increases. And as more and more stations hit the air, particularly U's, the increased non-network programming will obviously place greater demands on the creative capabilities of TV programmers.

Actually this situation is not entirely new to the broadcast industry; the advent of more and more radio stations forced greater emphasis on non-network programming—a challenge which has been dealt with quite successfully. However, the demands of TV are greater than those ever imposed on radio, primarily because of the need to satisfy the sense of sight as well as sound. Audiences expect more from TV—so do advertisers. In spite of seemingly high odds, some of the hardier TV operators have succeeded in competing directly with network programming on a full time basis. These pioneers have contributed a wealth of knowledge to this high-stake business.

TV Programming Philosophy

Basically, operating a TV station is not too unlike operating any other business. If a grocer doesn't stock merchandise his customers will buy, at a price that is both competitive and profitable, his business will be short-lived. His success depends directly on knowing what will sell and what won't—and at what price. While he can't possibly satisfy the whim of every individual for a specific product, he earnestly hopes that he can sell them a substitute item of comparable quality and price. Depending on the nature of his neighborhood, the grocer may find it wise to specialize by stressing certain products which he may know to be superior to a competitor's, or he may cater to the ethnic trade if he feels the potential in his area warrants such an approach. Regardless of his methods or philosophy, he must know his existing and potential clientele or all efforts toward a successful operation will be in vain.

By the same token, it doesn't seem likely that anyone attempting to program a TV station can achieve any measure of success if it ignores the tastes of its potential audience. Therefore, for a TV station to be successful, an overall programming plan, or philosophy, should attempt to satisfy the needs and wishes of potential viewers, based on an accurate assessment of what they will watch. There are areas where specialization may be appropriate, others where

Credit and appreciation for contribution to this article is due the following: Mel Bailey, program manager, WNEW-TV New York; Ben Berentson, v.p. & station manager, WGN-TV Chicago; Donald Heller, v.p. & assistant manager, WPHL Philadelphia; Sterling C. Quinlan, pres., WFLD Chicago; John Shanley, director public relations, WOR-TV New York.

ethnic needs must be served, and still others where variety or mass audience programming is necessary.

Initially, you might say, we'll simply program what the others do *not*. Theoretically, this sounds sensible—but *only* theoretically. "Holes" in the program fare already offered may exist for a reason! Actual experience, or a sensitive finger on the public pulse, may show that interest in certain programming is nil—or next to it. So, to base a program structure solely on what others are *not* doing may be catastrophic.

So that the station's storehouse is stocked with merchandise for which there is a demand, a keen awareness of community needs and interests based on ethnic makeup and other demographic characteristics is required. Supplementing this knowledge must be the ability to produce or buy suitable program material, and at the right price. Sufficient time and diligent effort spent in gathering information which indicates the "marks" of a community will surely pay off. To develop a program inventory with hit-and-miss methods would be a risky venture at best.

There seems to be two principle philosophies prevalent among major TV programmers: One is to set rigid minimum program standards, promoting first-rate service and knowingly risking a greater investment in program material; the other is to compete tooth and nail, on a program-by-program basis, if necessary, in an attempt to build an immediate audience *the least expensive way*, with less regard for so-called program quality or image.

While the term "audience fragmentation" may be distasteful to some, it is involved at least to some degree in the goals of any TV program format. One programming philosophy looks upon fragmentation in a manner different from the other. WFLD Chicago, for example, tries to give the total audience a wider choice by luring viewers who are watching TV less because they are enjoying it less. Another method of aiming for the total audience is to attempt to out-program competition by presenting a different type or a better program in a given time period. Many stations using the latter approach apparently try to out-program while striving to maintain a specific image; others with a different view of image seem to place more emphasis on profits. In other words, a low-budget feature may do well enough to compare favorably, in terms of *net* revenue, with a high-budget, big-name attraction. The bank account can't tell the difference when a high-budget feature with attendant ratings produces the same net revenue.

Image-conscious stations strive to program material in line with their ideals, compromising only where economics absolutely demand. Such is the case with WPHL Philadelphia, guided by management that feels sacrificing image as a matter of policy may force the sales staff into a position where they have to work from an apologetic or defensive approach. While WPHL has become known as "the sports station" in Philadelphia, they carry only big league and wide interest collegiate spectator sports, rather than scholastic or "sandlot" competition which tends to have a more limited audience appeal.

Of course, the number of signals available in Philadelphia had a direct bearing on the degree of WPHL's devotion to image and emphasis on consistent program quality. Even if only subconsciously, the single- or two-station market operator may feel a certain snugness because his signal is the only one, or one of two, available signals. In some areas where this situation exists, the development of CATV may force TV operators to give up such "ivory tower" thinking.

Program "Formats"

The term "format" is more generally associated with radio, and some TV people object to its use in connection with TV programming. For some stations, particularly new U's and independents, it may be appropriate to develop an audience "approach," a format which can be

PROGRAM SCHEDULE/WFLD CHICAGO CHANNEL 32						
MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
					GREAT ART IN THE AIR (c) LOVE AND COLORATH(c) (sustaining)	5:15 PM
5:45 PM		JUNIOR ALL STARS				5:45 PM
5:55 PM	THE BIG PLAY (NFL HIGHLIGHTS) (sustaining)	NEWSCOPE				
6:00 PM					BREAKFAST OF WEEK(c) (sustaining)	6:00 PM
6:30 PM		SCARLETT HILL			SURFS UP (c)	6:30 PM
7:00 PM	PROFILES IN COURAGE (c)	THE SPECIAL SHOW GEORGE PIERROT PRESENTS(c)	FIRING LINE WITH WILLIAM BUCKLEY	CONVERSATIONS WITH ALVAREZ	CHARLIE CHARLIE CHAPLIN	CHARLIE AND RONALD BACORE SHOW
7:30 PM				(sustaining)	FRACTURED FLICKERS	STORMWARS
7:45 PM		NEWSCOPE				
8:00 PM	POLO FROM OAK BROOK	WFLD SPORTS SPECIALS ALL STAR GOLF	LIVE BOWLING FROM RIDGE BOWL	ALL STAR GOLF (c)	AUTO CAR RACING FROM O'HARE STADIUM	WFLD SPORTS SPECIALS LIVE WITH A MIND OF THEIR OWN (c)
8:30 PM	CHAMPIONSHIP RACING (c)			PICKET BILLIARDS(c)		THE BEST OF THE BBC
9:00 PM	SHOOTING & FISHING(c)	SPERIMENTAL (c)				
10:00 PM			NEWSCOPE			NEWSCOPE 10:00 PM
10:30 PM			BILL VEECK SHOW		FIRING LINE WITH WILLIAM BUCKLEY	INTERNATIONAL SHOWCASE(c)
11:00 PM	TBA (c)	LEGENDS OF A LIFETIME (c)	A NATION AT WAR	JAZZ SCENE USA	TELEVISION USA	THE BEAT(c)
11:30 PM				NEWSCOPE		NEWSCOPE 11:15 PM
11:55 PM	KALEIDESCOPE AND NEWSCOPE					NEWSCOPE 11:45 PM

June, July, August, 1966

This heavy news and sports schedule is indicative of WFLD's program slant toward the male audience. WFLD feels men are watching TV less because they are enjoying it less. Sports personality Bill Veeck hosts a Monday-through Friday feature at 10:30 PM. While a variety of sports subjects are included, the show is not limited to sports, but pursues a variety of subjects with any number of guest studio panelists, depending on the subject. In cases where an important guest can't make it to the studio, he is put on the show by means of telephone. Weekend programming is also slanted toward the male audience with a variety of sports, documentaries, and adventure programs.

used as a guide in developing and maintaining an image.

Even though it may not be referred to as such, many stations employ what would probably be called a "variety" format, devoting certain portions of their schedule to programs specifically designed for children, housewives, teens, etc. It's a fairly common approach used by network affiliated and independent stations alike. WGN-TV Chicago, for example, specializes in children's programming during early morning, noon, late afternoon, and early evening hours, featuring program hosts with whom children can identify. Mid-morning and mid-afternoon programming is geared for appeal to housewives; early evening hours are devoted to family programming; and late evening hours are filled with adult appeal features.

WOR-TV New York, on the other hand, uses a different approach to variety programming, seeking to reach a wide range of viewers by combining public service, sports, variety, musical, and children's tv programs with outstanding feature films, carefully selected and presented in appropriate time periods. WNEW-TV New York also follows a variety format with heavy emphasis on feature motion picture films. The better known Hollywood productions have paid-off quite well in competition with network programming, according to station spokesmen.

In large metropolitan areas, some stations have found it profitable to devote part or all of their programming to ethnic groups. For example, WNJU-TV Newark, N.J. devotes 70% of its prime time to Spanish and 30% to Italian and Jewish speaking audiences in the Newark-

New York market. Daytime programming is New Jersey oriented. KMEX-TV Los Angeles is another station which serves a Spanish-speaking audience.

In smaller markets, particularly, local emphasis is vital for both independents and network-affiliates. As with local radio, local TV will find its niche by offering highly community-oriented programming which outside stations can't and won't offer.

Format Specialization

The era of format specialization may be lurking at the edge of the spotlight. While true variety programming will probably always exist to some degree, it seems that more than a few stations in all size markets will find it profitable to specialize—at least at the outset. We may see news, talk, sports, and teen-oriented formats

The list of possibilities open to an imaginative and enterprising operator seems endless, and as equipment technology advances, it should foster more creative local programming with less expensive, less bulky equipment.

“Package” Programs

"Package" programs are the life-blood of many stations and, in fact, there are few who don't use at least some, even among network affiliates. The variety of program types offered by film and tape producers, including first-run and off-network material, provides a wide selection for independent programming. The only problem is which program or series will, within budgetary limits, attract the most viewers at specific times.

The logical approach in package program buying is to survey available material suitable to the station's programming standards in each category. Then, guided by budgetary bounds, it's a matter of selecting the most desirable and those most likely to enhance image and audience. First-run feature selection is a matter of judgement, based perhaps on results in other markets; however, many off-net programs which perhaps failed to establish a favorable rating due to network scheduling will prove to be audience builders when run at a more favorable time; therefore, off-net programming can't be judged solely on its previous network rating.

Rigidly formated stations will find a great deal of material available from package producers and syndicators. Talk shows, such as the Joe Pyne Show produced by Hartwest Productions, are going over quite successfully. Metromedia stations WNEW-TV and WTTG Washington have found the series to be a good Sunday late-viewing audience builder. Music and musical variety programs seem to be increasing in number. Contemporary music programs, such as Hollywood A Go-Go (Four Star), Big Bands (WGN Continental), country music programs such as Star Route (Medallion), Country Music Caravan and Country A Go-Go (Colorvision). Barn Dance (WGN Continental), and KLPR-TV Oklahoma City productions can be integrated with local productions to develop any desired image. Many successful children's programs, both entertaining and informative types, are available.

Feature films, situation comedies, game shows, documentaries, sports, outdoor, and hunting and

17 WPHL-TV PROGRAMMING							JUNE JULY AUGUST
THE BEST SEATS IN THE HOUSE							
DAYTIME							
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
CARTOON CAPERS			TEST PATTERN			CARTOON CAPERS	8 AM
SGT. PRESTON OF THE YUKON						CALVIN AND THE COLONEL	8:30
BOSTON BLACKIE			THE NEW JACK LA LANNE EXERCISE SHOW			THE JETSONS	9
LONG JOHN SILVER				BERTIE AND GRANNY		MONTY MCGEE	9:30
FOREIGN LEGION			LIVE PUPPET FUN STARRING LE BEATER AND SUNNY DEE			ROUGH RIDERS	10
TALES OF THE VIKINGS						MACKENZIE'S RAIDERS	10 AM
HARBOR COMMAND			CARTOON CAPERS			RICHARD CARLSON	10:30
TRROUBLE SHOOTERS			DIVORCE COURT			MARY CHALLENGE	11
RIVERBOAT			DOMESTIC RELATIONS E-POSED IN HEART RENDERING DETAIL			MAN INTO SPACE	11:30
DARREN MCRAE IN						TOMBSTONE TERRITORY	12
A. A. ALLEN		SWINGIN' COUNTRY WITH RUSTY DRAPER, ROY CLARK AND HOLLY REED	NBC NEWS 12:55PM (COLOR)			MEN OF ANNAPOLIS	12:30
REVIVAL HOUR						WEST POINT	1:30
FULTON J. SHEEN		LOVE THAT BOB STARRING ROBERT CUMMINGS				FALL MAN	1 PM
I LED 3 LIVES		LET'S MAKE A DEAL (COLOR)	NBC NEWS 1:55PM (COLOR)			ROBERT LEE COLEMAN	1:30
RICHARD CARLSON						OUTDOOR SPORTSMAN	2
MAN CALLED X		JOHN TRENT'S MOVIE MATINEE				(COLOR)	2:30
JOHNNY STACCATO		CELEBRATED VOT-ON PICTURES	FEATURES FOR WOMEN, INTERVIEWS AND COMMENT			TOP STAR BOWLING	3:30
JOHNNY STACCATO						CLUB SEVENTEEN	3
LOCKUP						WILLOW GROVE PARK	3:30
MAC DONALD CAREY		HIGHWAY PATROL STARRING BRODERICK CRAWFORD				LARRY BROWN	4
HEAVYWEIGHT WRESTLING						GENE KAYE	4:30
WASHINGTON D.C.		BRAVE STALLION (FURY)				EDDIE NIXON	5

17 COLORFUL WPHL-TV PROGRAMMING						
AFTERNOON/EVENING						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
HEAVYWEIGHT WRESTLING WASHINGTON D.C.		WEE WILLIE WEBB'S CARTOON CLUB FANTASTIC 6TH MAN ANIMATED CARTOON ADVENTURE SERIES	FLASH GORDON, PORKY PIG, BUCK ROGERS, LOONEY TUNES			COMEDY THEATRE I LOVE LUCILLE EAST SIDE KIDS
THE FOOTBALL GAME YOU MISSED (COLLEGiate)			THE PIONEERS (DEATH VALLEY DAYS)			SATURDAY SERIALS
			TALES OF WELLS FARGO WITH DALE RIBBERSON			CORONADO 9 YOU CAN RUN
			ASTRO BOY ANIMATED CARTOON ADVENTURE, JETRICK			
SWORD AND SANDAL THEATRE	ROLLER SKATING CHAMPIONSHIPS FULTON J. SHEEN	TERROR THEATRE	M SQUAD LIVE MARSH	HEAVYWEIGHT WRESTLING WASHINGTON D.C.	BAT MASTERS GENE MARSH	ARREST AND TRIAL CHUCK CONNORS REIN CALLAWAY
GREAT MUSIC FROM CHICAGO	MONDAY NIGHT MOVIE	THE PLAY OF THE WEEK	SUSPICION TOP STARS IN DRAMA DE HUMAN INTRIGUE	FOR ADULTS ONLY	MIKE HAMMER DANNIE McDAVITT EAST SIDE / WEST SIDE ORANGE C. SCOTT	THE BASKETBALL GAME YOU MISSED (COLLEGE)
SINK OR SWIM/ DENTIST SPEAKS EXPLORING SPACE (COLOR)			INTERNATIONALLY ACCLAIMED MOTION PICTURES		FRIDAY NIGHT MOVIE	BULLFLIGHTS FROM MEXICO CITY NARRATED BY SIGNY FRANKLIN
			WEATHER / SPORTS CAROUSEL AT 6PM	THE 11 O'CLOCK MOVIE		
1 PM						
2 PM						
3 PM						
4 PM						
5 PM						
6 PM						
7 PM						
8 PM						
9 PM						
10 PM						
11 PM						
12 MID						
1 AM						

Though billed as the "sports" station, WPHL-TV offers a variety of programming aimed at achieving a total audience image. As this summer schedule indicates, weekday programming is directed toward children and housewives, with adult-oriented programming dominating the late evening schedule. The only regularly scheduled sports features are Monday and Thursday nights; the remaining time is devoted to drama. Weekends offer more sports programming with replays of outstanding collegiate football and basketball, bullfights, etc.

**WNEW-TV Advance Program Log for Week of
May 29—June 4**

Sunday, May 29, 1966

7:20 Call To Prayer
 7:30 The Christophers—"Importance of Nursing Career"
 7:45 Light Time—"Acceptance of Failure" Movie
 8:00 Faith to Faith—"The Church and Its Authority"
 8:30 King and Odie
 9:00 **COLOR**—Wonderama with Sonny Fox
 1:00 Five Star Movie—"Indian Scout" 1950
 2:59 News Headlines
 3:00 Metropolitan Movie—"The Petrified Forest" 1936
 5:00 Wide Country—"A Guy for Clementine"
 6:00 Sunday Playhouse—"Public Enemy" 1931
 8:00 The Lieutenant—"Alert"
 9:00 Breaking Point—"No Squares in My Family Circle"
 10:00 Opinion in the Capital
 10:30 **COLOR**—The Joe Pyne Show—Discussion
 12:30 News Headlines
 12:32 Sign Off—Call to Prayer

Monday, May 30, 1966

8:20 Call To Prayer
 8:30 Faces and Places in the News
 8:45 King and Odie
 9:00 Sandy Becker Show
 9:25 Morning Report
 9:30 Yoga for Health—Richard and Diane Hittleman
 10:00 Peter Gunn—"The Blind Pianist"
 10:30 Bat Masterson—"Last of the Night Raiders"
 10:55 News Headlines
 11:00 Astro Boy—"The Wacky Machine"
 11:30 Cartoon Go-Go with Fred Scott
 12:00 Romper Room with Louise Redfield
 1:00 Cartoon Go-Go
 1:05 King and Odie
 1:02 Mid-Day Report
 1:30 Afternoon Movie—"Rimfire" 1949
 2:50 Afternoon Report
 2:59 Community Report

3:00 Peter Gunn—"Keep Smiling"
 3:30 Soupy Sales Show—Comedy
 4:00 **COLOR**—Chuck McCann Show
 5:00 **COLOR**—Sandy Becker Show
 5:30 Horse Race from Garden State Park—New Jersey
 6:00 **COLOR**—Winchell—Mahoney Time—"What's New?"
 7:00 Outer Limits—"The Man Who Was Never Born"
 8:00 The Rogues—"Run for the Money"
 9:00 Movie Greats—"Strange Cargo" 1940
 11:00 Faces and Places in the News
 11:10 The Merv Griffin Show—Variety
 12:40 News Headlines
 12:45 Sign Off—Call to Prayer

Saturday, June 4, 1966

8:55 Call to Prayer
 9:00 Cartoon Go-Go
 9:30 Jungle Jim—"Land of Terror"
 10:00 **COLOR**—Chuck McCann Show—Children's Variety
 11:00 Soupy Sales Show—"The Best of Philo Kvetch"
 11:30 Upbeat—Don Webster as host
 12:30 Speak Out! with Sonny Fox
 1:30 The Thin Man—"A Plague of Pigeons"
 2:00 Saturday Playhouse—"Bandit Queen" 1951
 3:30 East Side Comedy—"Trouble Makers" 1948
 4:30 Bat Masterson—"Tempest at Tioga Pass"
 5:00 Lawman—"The Press"
 5:30 True—"The Moonshiners"
 6:00 **COLOR**—Across the 7 Seas—"I Live in Australia"
 6:30 **COLOR**—Westinghouse Adventure—"Destination: Patagonia"
 7:00 Battlefield—"Bataan" 1943
 9:00 Saturday Evening Movie—"The Assassin" 1953
 11:00 The Alan Burke Show—Discussion
 1:00 News Headlines
 1:02 Senate Report
 1:07 Sign Off—Call to Prayer

This WNEW-TV program schedule features a heavy movie-drama content, particularly during evening hours. Variety is introduced during segments devoted to children and housewives on weekdays. The Saturday night Alan Burke Show and Sunday night Joe Pyne Show present provocative discussion type programming for late evening viewers.

fishing types provide stations with an almost limitless array of material, and it seems safe to assume that the available material in all categories will increase.

Recently, several station groups and networks have entered into or are considering production deals with film producers, even to the point of co-producing feature films. It's also reported that some syndicators are making off-network feature movies available to local stations.

Individual stations and groups are trading material without syndication, in many cases. WFLD provides some of their sports programs to other stations, and uses programs from WOR-TV and WPIX-TV New York and WKBD Detroit. WGN purchased "Excercise with Gloria" from the Triangle Group and the Mike Douglas Show from Westinghouse. Some local WGN shows are syndicated through WGN Continental

Productions, and certain news and public affairs documentaries are made available to other stations.

Thus, program exchange between stations seems to be a logical way to improve program fare and reduce costs by sharing production expenses. Though in its embryo stage, more and more stations should find it mutually profitable to work out exchange deals to offset production costs and, at the same time, provide their viewers with a better program fare.

Local Origination

There doesn't seem to be any reason why local programming shouldn't increase in quality and quantity as the state of the art advances, both from technical and talent standpoints. As programming emphasis becomes more and more

Continued on page 64



While the on-air operator may feel like a fish in a bowl, glass walls allow visitors a clear view of complete control room facilities.

\$18,000 Modern Studio Design

By Don Clausen

Modern radio — modern facilities. This setup is designed to look and fill the part.

AS A MANAGER or owner, have you ever felt that your operation just did not have the image you desired? Perhaps you feel that your physical plant does nothing to rectify this situation. As an engineer, have you ever felt that maybe your production and announcing staff have something when they say that the studios are not functional? If you answer yes to either of these questions, read on, for maybe in the following is the special twist you need.

Management's point of view is always the money, "How can I get the best for the least?" The engineer's point of view, on the other hand (if he is at all honest with himself), is how to get the super bug mobile "8" with dual exhaust

Mr. Clausen is Chief Engineer, KQWB, Fargo, No. Dakota

flop-over tubes in chrome sockets. By mild discussion, in the proper vernacular, these problems were resolved at KQWB.

Design for Image

In programming one strives for a particular sound, be it middle-of-the-road, fast staccato tempo, etc. Eventually, this sound becomes synonymous with the call letters of the station; therefore, it helps if the physical plant reflects a similar image. We are a fast-paced station with many a beady-eyed, bubble-gum chewing visitor.

To "show our sound" we decided on a glass-walled control room. No acoustical problems have been encountered with glass walls, primarily due to control room size and sound absorbing wall-to-wall industrial type carpeting (type used in auto

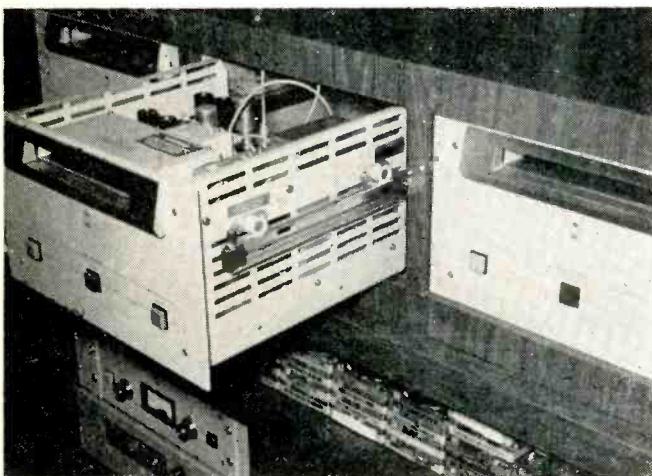
showrooms). Remodeling costs were minimized since the building structure required no major remodeling. The studio area is located in what was a large meeting hall; therefore, only glass partitions had to be built. Much of the \$8,000 remodeling cost was traded out with the builder.

Outside the control room, directly above the visitor's viewing wall, is a speaker fed from an off-the-air crosspoint through a separate amplifier. In this way, visitors can see the operator as well as listen to the sound without the bothersome level changes that would occur if the off-the-air feed was tied back to the program monitor.

Equipment Layout

From a cost point of view we found that it is always cheaper to go for an equipment package deal. Also, having one manufacturer's gear tends to lower overall parts inventory. (This is especially true of transistorized gear.) A few exceptions were made in our case as the result of engineering preference; thus, a Fairchild reverb, CBS Audiomax, and RCA mikes were used to supplement a Collins Radio package.

The cartridge machines are mounted on heavy-duty pull-out slides so that the machines are easily accessible for maintenance. These are available from any supplier of hi-fi turntable accessories at about \$3-4 a pair. The only problem with such an enclosure is heat dissipation. By use of "Whisper" muffin fans (about \$5 from most wholesalers) this problem was solved.



Slide-mounted cart machines provide easy access for cleaning and maintenance.

Costs

Collins package, including console and cart machines	\$6900
CBS Audiomax units	\$1300
Fairchild reverb	\$ 985
Console desks and wings	\$1200
Cart mounting slides (pair)	\$3 to 4
Whisper muffin-type fans (each)	\$5
Remodeling studio area including glass partitions	\$8000

However, control room mike relays kill the AC line feed when the control room mike is open, since no fan, even of whisper quality, is quiet enough for on-air work.

Since the cartridge machines get the most use, they were placed on the right side of the operations console. When you consider the number of taped commercials, promos, public service announcements, etc., vs. record plays, proper cart machine location becomes obvious. Most people are right-handed, and even if they are not, they still have a habit of handling cartridges with the right hand and records with the left. Thus, by placing the machines on the right side at shoulder level, no hand crossover is encountered.

Also, along the same line of thinking, the remote starts for the cartridges were placed on the right side of the operational desk. The same follows for on-air cart mixers which are on the right side of the console for symmetry and ease of operation. Directly below the cartridge machines a space was designed for promos and other special cartridges. Thus, all jingles are readily available at a moment's notice and there is no confusion with any commercial copy. Commercial tapes are kept on a large "lazy susan" and are pulled and replaced as needed.

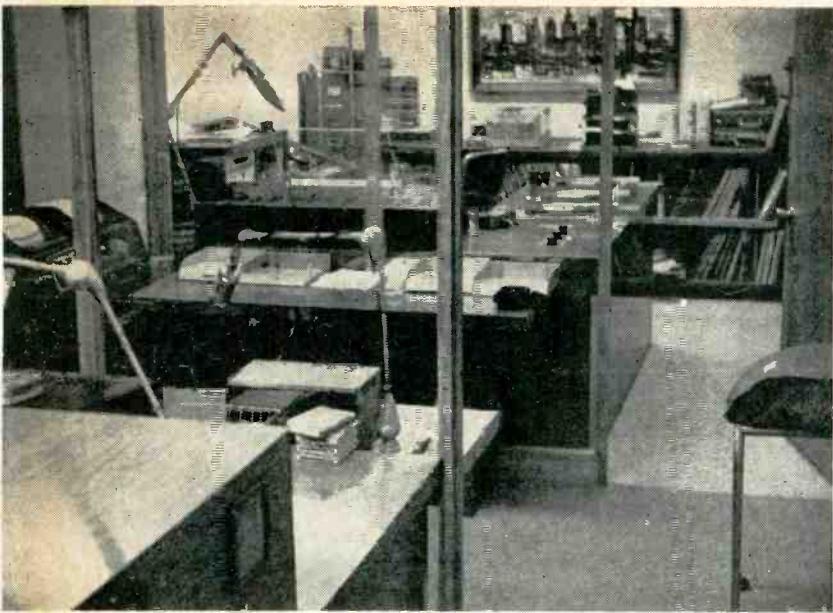
The left-hand console is devoted to the three turntables; likewise, the three turntable starts are located on the left side of the operations desk. There is a deviation from normal practice in that the turntables are numbered from left to right. For example, the table farthest from the operator is labeled number one; the #3 table is nearest the operator. In the same manner, the starts for the tables are left to right. It may appear awkward to use #3 table the most, but once one gets used to this system, his mind reacts more readily to a normal left to right sequence than to any other.

All rack equipment is mounted in either the left or the right console wing. A sheet of plate steel is attached by wood screws and white glue to the backs of the console wing rack cutouts. Approximately $\frac{1}{4}$ " of lip overhang was allowed on each side of the cutouts by making the opening in steel plate smaller than the cutouts.

The control room speaker is of a thin-line design mounted on the ceiling directly above the operator. The sound distribution is better from this point than it would be from any other. Also, with an overhead mount it is out of the way and blends better.

Operations Desk

The main operations desk and wings were designed by the Chief Engineer and built by a local cabinet shop, for about \$1200 including labor. One thing quite noticeable in many custom designs is the lack of desk surface area in front of the console. After all, the operations desk is exactly that—not only is the board controlled from the desk, but logs are kept on it, copy may be corrected on it, announcements may be taken down on it, and the evening announcer may eat his lunch on it! So with these points in mind, KQWB's desk was designed with a husky $18\frac{1}{2}$ " from console front to desk edge. No undue fatigue has resulted from this extra length, and the added inches appear well worth the effort.

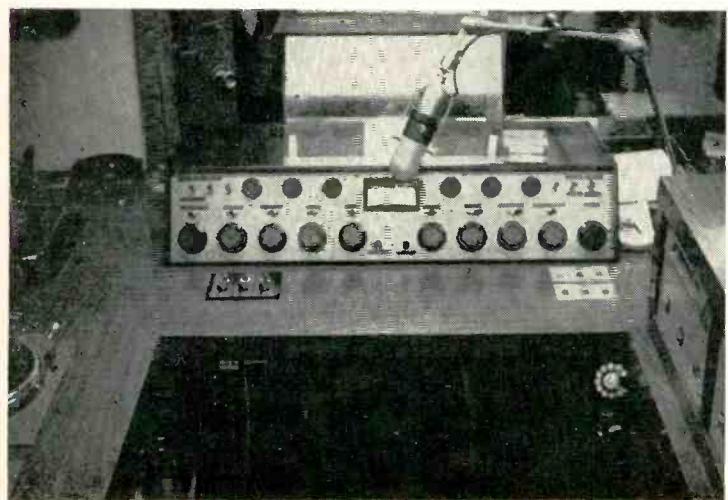


Glass walls divide control room, news room, and production studio.



Turntables are mounted on left console wing where patch panel and audio terminal gear are located.

Turntable remote start switches on left and cart machine remote start switches on right facilitate better production.



The console wings and operations desk are custom fabricated of $\frac{3}{4}$ " plywood for strength and then covered with wood-grain formica. Although more expensive, formica is better suited than veneer as it will not stain and will take terrific abuse.

The production studio is a mirror image of the main control room and may be placed on the air by one patch cord. Likewise, the main control room may be used for recording facilities. All of these functions are accomplished by an elaborate patch system with every input and output in each studio appearing at their respective patch panels.

While on the subject of patch panels, it might be appropriate to mention that the standard procedure seems to be one of installing the patch panel and then wiring it in the rack. This leads

The Manager's Opinion

Larry Lakoduk, General Manager, says, "The investment in new studios, offices and equipment was one of the most important and beneficial decisions we made after purchasing the station in 1965. We wanted more than the bare necessities—not only a functional work base but a showplace. Too often, you hear, 'What difference do beautiful and well equipped studios and offices make? It is what listeners hear that counts—not what they see.' There's more to it than that. What's important is the attitude of your employees, your customers, and yourself. If you are just biding your time, new and efficient studios are not for you. If, however, you want to make progress, you can't afford not to have the finest and most beautiful studios in your market."

"Soon after completion of the studios and offices, about 200 local businessmen attended an open house party which was a huge success; it was the beginning of a changed attitude toward the station. A public open house drew a crowd of about a thousand.

"I feel that our intended goal has been realized. Our 15 staff members are proud of our station; they work harder, more efficiently. The businessman on Broadway has a good impression of us; this is reflected in a 30% increase in billing. We have raised our rates four times in the past year—which, incidentally, more than repays the investment."

to increased errors in wiring. Also, because of the shortage of space, it makes for sloppy installation. KQWB's patch panels were wired on a jig before installation. After the patch panels were installed, it was then a simple matter of tying everything into respective tree connections.

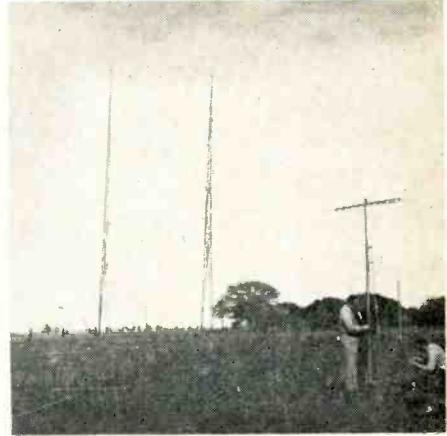
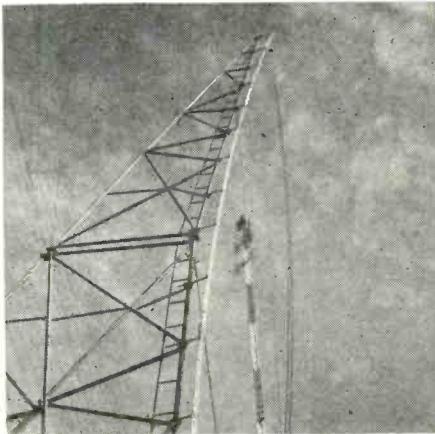
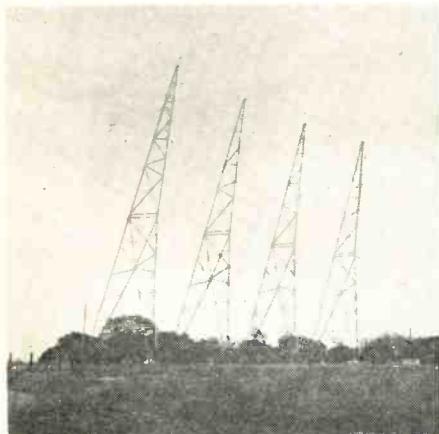
All cables in the consoles are laced with G.C. cable ties and hung on truck tarp hooks (available at any hardware store). All 110v power lines were run through conduit to the building mains. Three rows of plug mold on the side of the console are also tied directly to the mains.

All in all, if one plans well ahead of the game with cooperation from production through management and engineering, a fine installation can be realized. Why not let your imagination run up a physical plant that reflects your true image?

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Beyond the Horizon TV Reception

By Jack M. Threadgill

Tropospheric scatter receiving antennas—a boon to CATV.

RELIABLE beyond-the-horizon reception of TV signals is a reality, thanks to the development of tropo scatter antenna systems. As a mirror or prism reflects or refracts light, so do tropospheric clouds reflect or scatter RF energy back to earth. RF energy also is diffracted beyond the horizon, around the curvature of the earth and over hills and mountains. A high gain parabolic antenna may be used to pickup these reflected signals. However, before installing such a system, it is advantageous to investigate the path loss (loss in signal strength as distance to transmitter increases). The tropo system designer must consider three methods of over-the-horizon propagation:

1. Smooth Earth Diffraction—for paths extending slightly beyond the horizon (see Fig. 1).

2. Knife Edge Diffraction—for paths with one or two high obstacles (see Fig. 2).

3. Tropospheric Forward Scatter—for paths extending well beyond the horizon (see Fig. 3).

The profile of the great circle path must be drawn and studied to determine which type of over-the-horizon propagation exists. For the tropospheric forward scatter condition, the resulting

path distance, antenna heights, and line-of-sight distance from the transmitting antenna are variables which determine the scatter angle (see Fig. 3). The scatter angle θ is the basis for determining the path loss for the forward scatter condition. As the scatter angle decreases, the resulting path loss decreases; therefore, more signal exists at the CATV head end.

Another factor which determines the path loss for the forward scatter condition is the mean yearly surface refractive index. This is a property which differs throughout the world and is computed from special maps prepared by the National Bureau of Standards.

From the path profile, losses for knife-edge diffraction can also be determined. The path loss depends basically on the distances to the obstacle with respect to the height of the obstacle (see Fig. 2). Total path distance and frequency are also considered in determining the path loss for knife-edge diffraction.

Losses for smooth earth diffraction depend mainly on three distances (see Fig. 1):

d_1 —distance from the lower antenna (normally the parabolic screen) to the horizon.

d_2 —distance from the higher antenna (normally the transmitting antenna) to the horizon.

d_3 —distance beyond the line of sight of either antenna. Normally,

some calculation error will occur for distance d_3 , since it is assumed the earth is perfectly smooth. Smooth earth path loss also depends on the total path distance and frequency.

Large Parabolic Receiving Antenna

With the high path loss present in over-the-horizon propagation, it is necessary to use an antenna with extremely high gain and directivity. A parabolic reflector can be used to concentrate the signal of a broad wave front into a very small area. This is because a parabolic curve has one focal point, as shown in Fig. 4.

The gain of a parabolic antenna depends largely on the electrical area of the reflector, expressed in wavelengths. The formula for gain of a parabolic is:

$$G = 4 \pi A / \lambda^2$$

Where:

G =numerical power gain with respect to an isotropic radiator;

A =effective area, and

λ =wavelength.

The effective area is approximately 50% of the actual area. From the above formula, it can be seen that if the physical area is constant, the gain will increase with an increase in frequency.

Parabolic Antenna Installation

The parabolic antennas installed in Marlin, Tex. by SPADECO (Space Diversity Engineering Co., Inc.), a subsidiary of Fort Worth Tower Co., are made up of a series of A-frame towers as shown in Fig. 5. The parabolic face on the A-frames consists of small aluminum wires strung horizontally across the A-frames and spaced every four inches. Tests using two-inch spacing showed no increase in gain.

The A-frames were laid out on a true parabolic curve. Two antennas were built for the purpose of space diversity and will be discussed later. One antenna is 90' wide and the other is 150'. Both are 80' tall. Marlin was found to be an excellent site for testing parabolic antennas because of its location with respect to the TV stations (see Fig. 6). This made it possible to check reception of VHF and UHF signals at three different distances.

The parabolic curve was designed to place the focal point (signal pickup point) approximately 150' in front of the re-

Mr. Threadgill is Vice-President, SPADECO, Inc. (Space Diversity Engineering Co., Inc.) Fort Worth, Texas.

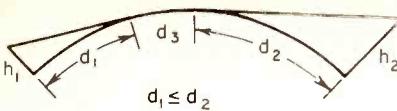


Fig. 1. Smooth earth diffraction extends a signal slightly beyond the horizon.

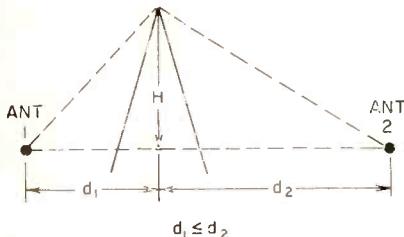


Fig. 2. Knife-edge refraction is caused by a high obstacle in the signal path. It occurs in much the same way that sound waves bend around a corner.

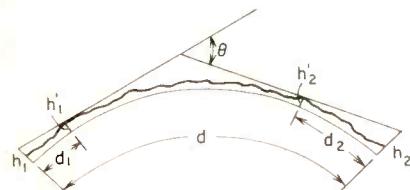


Fig. 3. Tropospheric layers form duct-like waveguides which carry signal well beyond the horizon.

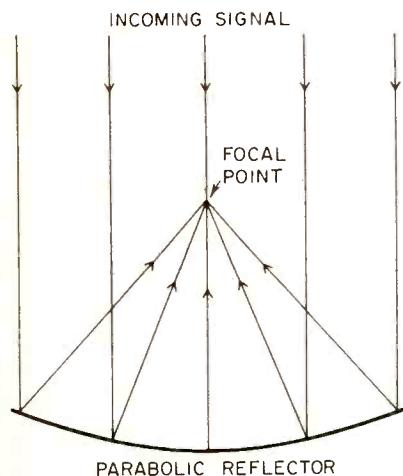
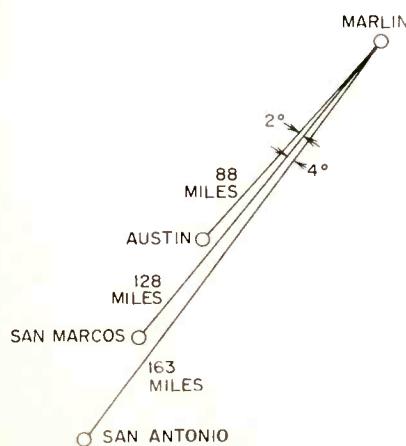


Fig. 4. A parabolic reflector concentrates the signal of a broad wavefront into a very small area.



reflector and approximately 10' above the ground. This point was marked when the foundation layout was staked off. Upon completion and during the initial check, the focal point was pinpointed by probing with an antenna, field strength meter, and portable TV set. The focal point was found to be within a few inches of the expected location, and was also found to be only a few feet wide. Extensive testing has been performed with focal point antennas. The best results have been obtained by using a 5-element yagi cut to frequency and vertically stacked. When several stations are coming from the same direction, it is feasible to use an all-band antenna. In this case an all-band preamplifier should be used and channels sep-

A-frames with the aid of a crane. This operation may be seen in Fig. 9. Each A-frame is guyed every 20' on the front and back, and X-guying is employed between the A-frames. The ends were guyed to tower anchors located 60' off the ends of the last A-frames.

The vertical aluminum runners on each A-frame were then adjusted to produce a true parabolic curve. The installation of the reflector was completed with the stringing of the aluminum wire to form the face of the parabolic reflector.

Test Results

Comparative tests were made at the Marlin site using a 400-foot tower equipped with TACO antennas and the parabolic screen.

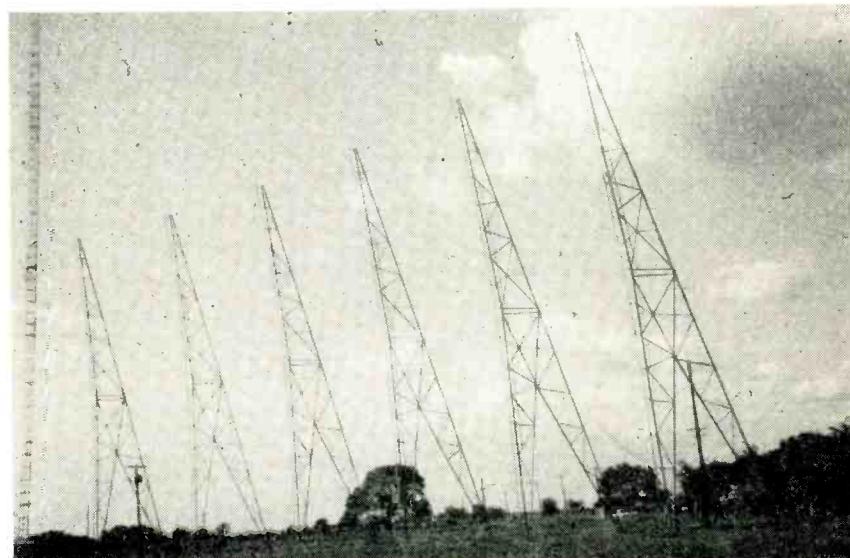


Fig. 5. Completed 150-ft. long by 80-ft. high parabolic reflector.

arated at the head end.

To begin the installation, holes for the footings were drilled with an earth auger and then belled at the bottom; hole depth and size depend on the type of earth. Reinforcing steel was installed in the holes and then they were filled with concrete. (Foundations normally require 15 to 20 yards of concrete.) Anchor bolts imbedded in the concrete secure each A-frame leg (Fig. 7).

Once the foundations were located and poured the first 40' of each A-frame was erected (Fig. 8). When this was completed, the top sections were placed on the

The following signal levels were measured:

- Austin—Channel 7 (88 miles)
100 to 600 uv from the 150' x 80' parabolic
- 50 to 200 uv from a quad array of TACO screens
- Austin—Channel 42 (88 miles)
140 to 500 uv from the 90' x 80' parabolic
0 to 75 uv from a quad array of bowtie antennas at 40'
- San Marcos—Channel 9 (128 miles)
40 to 200 uv from the 150' x 80' parabolic
10 to 50 uv from a quad array of TACO screens
- San Antonio—Channel 4 (163 miles)
20 to 200 uv on the 150' x 80' parabolic

Fig. 6. Signal paths of stations used in Marlin, Tex. tests.

San Antonio—Channel 12 (163 miles)

20 to 200 uv on the 150' x 80' parabolic

It is very difficult to provide signal level readings such as these with extreme accuracy and reliability, due to the instability of the signal being received over great distances.

To sum up the test at Marlin, the comparison made between the

150' x 80' parabolic screen and the tower-mounted antennas shows that the parabolic antenna produced much better results from every standpoint.

Reliability

Variations in the path loss create fades in the signal strength and can be divided into two categories—short term fades and long term fades. Short term fades are

Tropospheric Propagation

Several basic factors appear to contribute to this type of propagation. In the first place, the waves may diffract or bend around the curved surface of the earth in the same way that sound waves bend around a corner. The strength of the diffracted field depends on the roughness of the earth's surface. Over most land paths, the roughness is sufficient. Second, turbulence in the troposphere gives rise to small irregularities in the refractive index. This causes TV signals passing through the troposphere to be scattered beyond the horizon. Finally, a gradual but continuous change in the refractive index in a nonturbulent troposphere will produce small reflections that will scatter energy beyond the horizon. Therefore, when the station's transmitted power is very large and the receiving antenna is able to abstract energy from a large section of wave front, tropospheric propagation is possible. Large parabolic screens make it possible to obtain usable signals from greater distances than with yagi or log periodic antennas.

Description of Comparative Tests

Station	Tower Antennas	Parabolic Antenna
Austin—Ch. 7 88 miles	Satisfactory signal. Good pictures with frequent co-channel interference.	Good signal. No co-channel interference
Austin—Ch. 42 88 miles	Very weak signal. Frequent fades.	Good signal. Received with great reliability and rare fades.
San Marcos—Ch. 9 128 miles	Very weak signal. Snowy fading pictures with considerable co- channel interference.	Good signal. Clean, snow-free pictures with occasional short fades. When using space diversity, approx. 90% of the fades were eliminated. No co- channel interference.

Typical Costs

Size	Kit Price*	Installed Price**
150' wide X 80' tall	\$ 7,000	\$10,000
210' wide X 80' tall	\$ 9,800	\$14,000
270' wide X 80' tall	\$12,600	\$18,000

*Kit includes foundation layout data and installation procedures.

**Depending on weather conditions, normally one to two days are required for surveying the site and pouring the foundations. Two to four days are required to complete the installation.

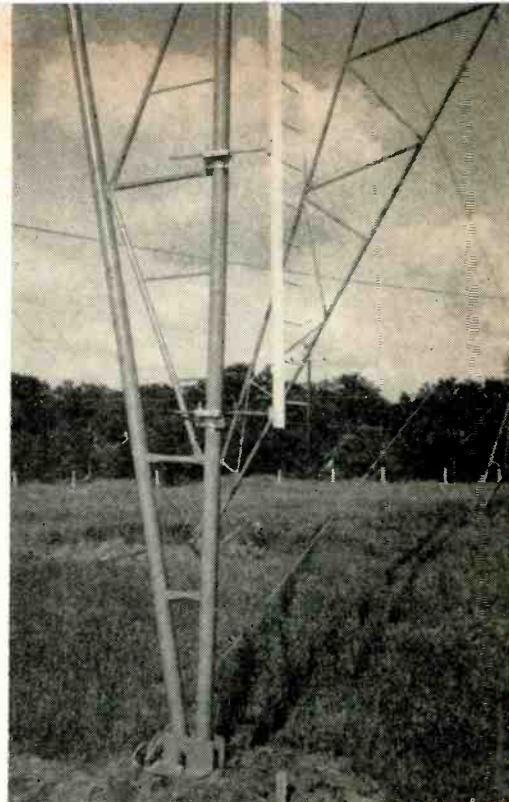


Fig. 7. Closeup of A-frame structure showing leg anchored to concrete base.

attributed primarily to multipath interference which causes trapping. Trapping is the effect produced when a signal is trapped between two layers of the troposphere, or between one layer and the ground. This is usually caused by temperature inversions at different altitudes. The signal is guided along this duct formation in the same manner as radio signals are guided along a standard metal waveguide. Duct transmission by trapping exhibits little or no attenuation of the signal strength. When the signal is trapped in the upper troposphere, it is possible for the signal to pass over the receiving antenna and a fade occurs. In the other case, it is possible for the signal to be trapped near the ground and an extremely strong signal may be received.

Short term fades generally last from a few seconds to a few minutes. Long term fades are variations in average signal level over a period of a few hours or days. This type of fading is almost independent of frequency and seems to be associated with changes in the refractive index of the atmosphere. The long term fade is not as severe as the short term fade.

The presence of fades has been the greatest problem in tropospheric propagation. When using a

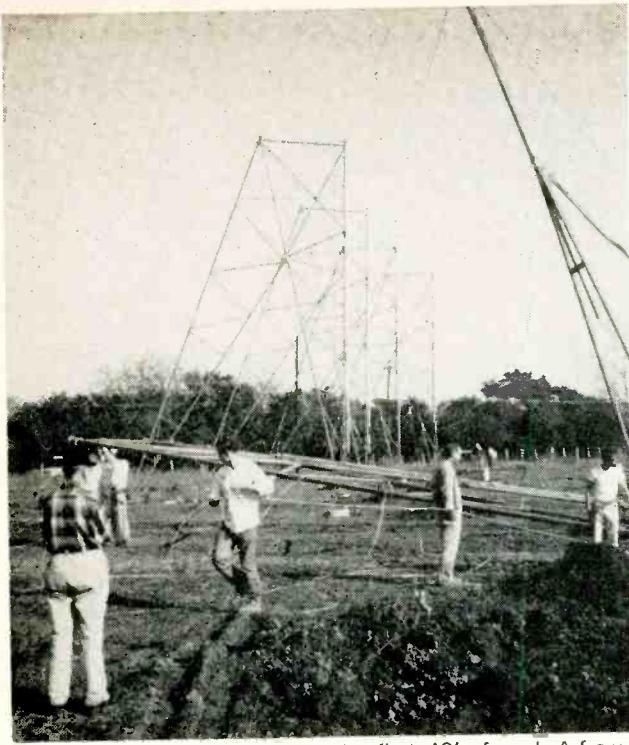


Fig. 8. During construction, the first 40' of each A-frame is erected, then the top section is placed, usually with the aid of a crane.

single parabolic screen for TV reception, fades have limited the usefulness of the receiving system. This problem has been greatly reduced at the Marlin system by employing space diversity. It has been discovered that if two antennas are separated by 100 to 200 wavelengths, the signal received by one antenna will be completely independent of that received by the other. This means that when one antenna experiences a fade, the other will not necessarily experience a fade. This procedure is known as space diversity (Fig. 10) and is used to greatly reduce the effect of short term fading. SPADECO has developed a switching unit to be used with an antenna system

employing space diversity. The unit samples the received signal on each of the antennas and when the antenna being used experiences a fade, the unit automatically switches to the other antenna. The switching unit will operate only when the other antenna is receiving a stronger signal; therefore, the best possible signal will be available at all times.

At the present time, a 270' x 80' parabolic reflector is being installed in Hearne, Tex. for the Hearne Cable Company at a cost of \$18,000 including installation. The antenna is being erected on a 1 3/4-acre plot of land compared to the 5 acres required for a 400-ft. tower. In Hearne, the parabolic antenna will be used to pick up

the four Houston stations at a distance of 115 miles.

Recent Improvements

New A-frames are now being constructed with the parabolic curve built into the front. This eliminates time-consuming curve adjustments after the antenna has been installed. The foundation layout must be very accurate; however, any individual with a working knowledge of a transit can easily lay out the foundation. Other advancements have been made in the A-frame structure itself. They are constructed in three separate pieces which are easily transported, then assembled at the site. The three sections are made out of steel pipe and are completely welded together.

Conclusion

A tropo scatter parabolic reflector is not a cure-all for long distance TV signal pickup, but it can solve many problems. It will not eliminate the need for microwave, but it can surely shorten the required microwave paths by moving the first pickup antennas one or two hops further away from TV stations. Thus, parabolic reflectors definitely have a place in the industry and the industry has a need for this type antenna.

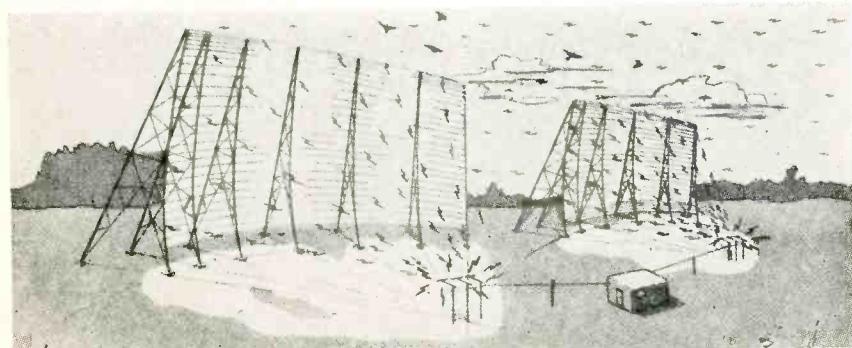
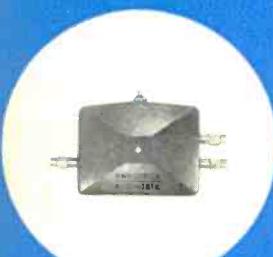


Fig. 10. Tropo scatter antenna system employing dual diversity.

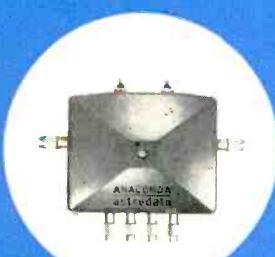
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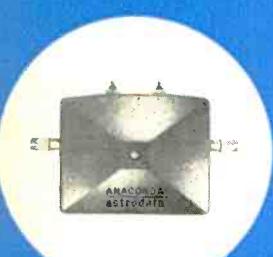
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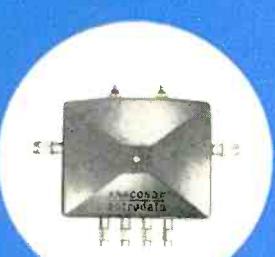
Trunk Line Amplifiers



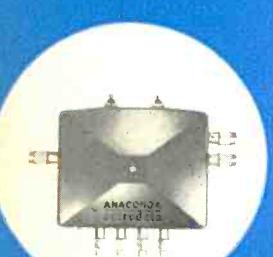
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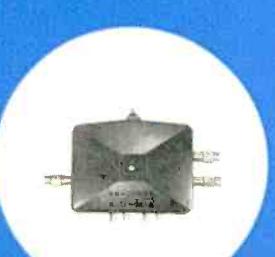
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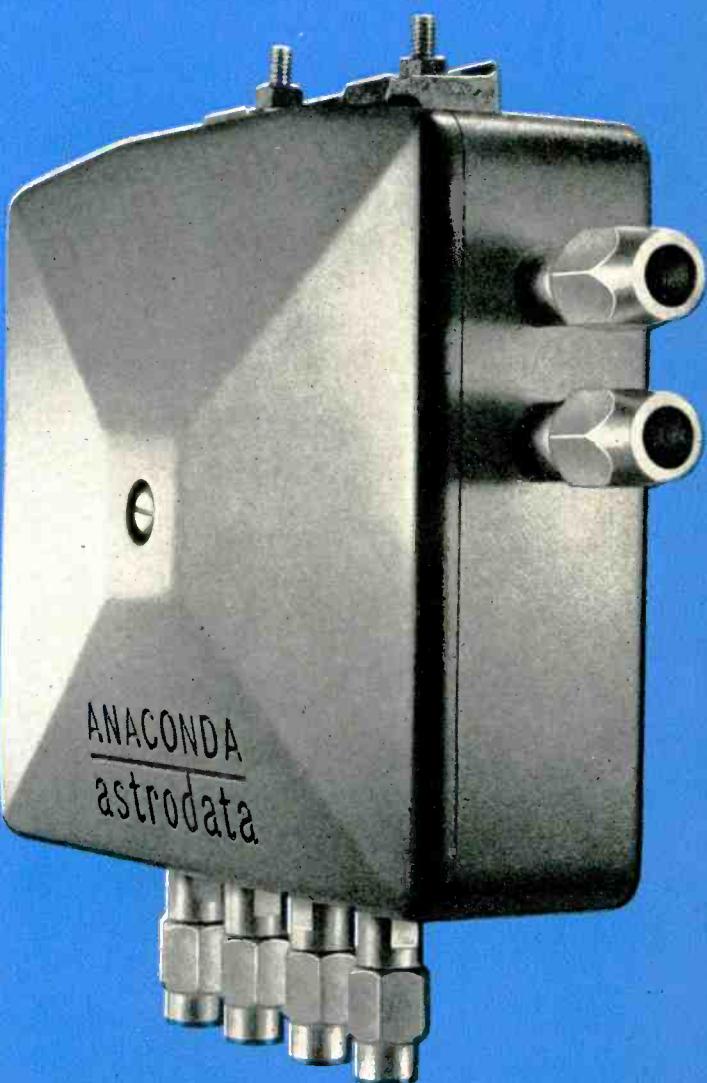
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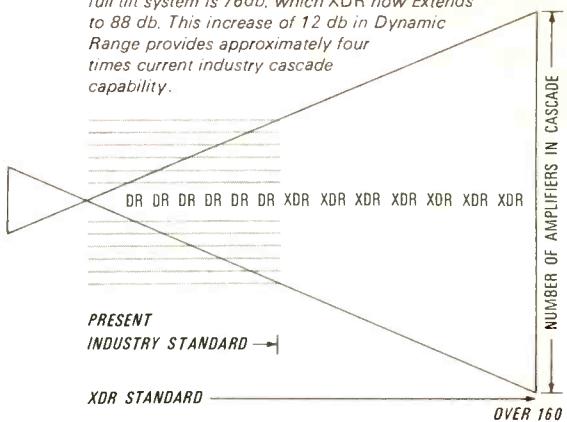


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NCTA CONVENTION REPORT

THIS YEAR'S 15th Annual NCTA Convention may be termed successful in many ways. Yet the excitement, the exuberance, the bold confidence ever-present in Denver last year contrasts strongly with the cool, calm, but concerned Miami Beach delegation. Maybe it was a reflection of the new FCC rules and impending copyright problems—but the usual vibrant, eager, "we're going to wire the country from coast to coast" attitude just wasn't in evidence. Perhaps it was the location—but this year's attendance figures weren't significantly greater than last year, and were a long way from the predicted 2200.

Legal Problems

Delegates came in earnest, seeking solutions to the problems created by FCC rules against importation of distant signals and non-duplication of local programming. They weren't disappointed. The Legal Panel session, which lasted more than two hours, drew a near-capacity crowd. The panel, moderated by one of the best in the business, NCTA's General Counsel Robert D. L'Heureux, consisted of three members of the FCC staff and three attorneys from prominent Washington law firms.

The FCC boys, perhaps feeling a bit uneasy "in the enemy camp," used their time to make new friends. General Counsel Henry Geller explained that the Commission's views on importation of distant signals is based on concern for present and future UHF stations in small communities, where "audience fragmentation" by big city signals would hamper success of programming geared for local public interest. Arthur Stambler, Special Assistant to the Chairman, stated that "the Commission recognizes CATV as a valuable service for the American public," and reported that "the CATV Bureau has already been formed." He also announced that the CATV reporting form is ready, although he would like to see it short-

ened and made easier to use. Bernard Strassburg, Chief of the Common Carrier Bureau, quipped "I know as little about the 2nd Report & Order as you do!" and went on to discuss a subject more in line with his responsibilities. He reported on FCC actions leading toward federal control, as opposed to state regulation, of phone company tariffs.

The three Washington attorneys, obviously on the side of CATV, vociferously called for changes in the 2nd Report & Order. Harry M. Plotkin (Arent, Fox, Kintner, Plotkin & Kahn) stressed that the rules governing non-duplication and importation of signals interfere "with the rights and privileges of the viewer," who should have the right to receive all the signals that can be supplied. "The audience fragmentation idea is wrong," said Plotkin, emphasizing that channel communications should be expanded. There is "no conflict of interest in (a CATV system) putting on a live program," he said, pointing out that a multiple-channel cable system is in a good position to do so since it is not concerned with audience fragmentation.

John Matthews (Dow, Lohnes & Albertson) also took exception to the distant signal rules, citing figures which indicated that stations in the top 50 markets provided service



No "gang-up" for registration, but steady flow brought attendance to slightly over last year.

NCTA Pres. Fred Ford summarized the Association's view on program origination as follows: "I urge each of you, if it is at all technically and economically feasible, to immediately institute on one channel of your systems programs designed to serve the needs, desires and interests of the community of which you are a part. Some of your franchises, in fact, require you to originate programming. Why? Because the local communities, the grass roots of the United States, want to see and hear their local talent and other matters of purely local interest. This is a public service. This will be costly. This will not be immediately profitable, but it is essential in carrying out the public service responsibility of the community antenna television industry. When this has been done, you will gain a place in the good will of your subscribers that ALL of the adverse propaganda of the detractors of CATV cannot dislodge."

to 90% of the TV receivers in the U.S. He expressed the need for realistic re-evaluation of the top 100 market ruling, stating that an evidentiary hearing is needed "only where a local UHF may be hurt," and claimed "the rule is needed only in the top 50 markets." Further, Matthews charged that the Grade A contour limitation should be "cut back to City Grade," and that rules prohibiting importation prevent "bringing in a UHF to a predominantly VHF market," which is an arbitrary restriction of what the viewers may want to watch.

E. Stratford Smith (Smith & Pepper) expressed the view that we would very soon need a 3rd Report & Order, particularly since "Congress is to decide the CATV and copyright problems as separate packages." Smith also charged that the Commission's CATV rules "are based on alleged economic impact and views on fair competition . . .



Attendance at Legal Panel session was near capacity.



With emphasis on program origination, FCC staff accepted opportunity to attend private showing of Tele-Mation gear.

the FCC should be required to ignore economic impact" insofar as broadcast and CATV rules are concerned.

Outgrowth of Program Origination

"If you can't beat 'em, join 'em"—the theme adopted by many broadcasters during the past year—is a concept many CATV operators may adopt as a result of this year's Convention. Concerned with channels left empty as a result of non-duplication and distant signal limitations, cable TV operators left Miami Beach with dozens of ideas for carrying their own program material to subscribers. Moved by the strong suggestion of NCTA president Fred

FCC Staff members were kept busy answering questions from Convention delegates who visited the hotel suite set aside for the purpose to discuss rules defined in the 2nd Report & Order. During the busiest periods, CATV operators waited in line for an opportunity to obtain answers to their questions. During the 3 days Mon. thru Wed. it is estimated that some 100 interviews were held.



Commissioner Wadsworth: "... we have often done better, but seldom worse, than our equivocal approach to CATV development and regulation."

Ford, many entrepreneurs are developing plans to provide local "public interest" programming. Mr. Ford, during his luncheon address, urged "cable-casters" to do everything they could to provide subscribers with coverage of local activities such as city and county political meetings, school programs, sporting events, etc.

Following on the heels of Mr. Ford's speech came the panel session, "Origination of Community Service Programming by CATV," featuring several operators who have already instituted such service and supported the idea with sound reasoning and ideas for carrying out the program origination concept. Interest in this idea was high. As reported in our BM/E Convention Daily, one operator said he is planning combination live and videotape service for his two systems. Another is thinking of using microwave for

live program distribution to his multiple system complex. A group owner reported he has just completed his third local-live studio (one for each of three systems).

Also reported was the filing of an application with the FCC, requesting three microwave channels for the purpose of relaying "closed circuit" programming to dozens of Texas and Oklahoma systems. Known as the "Dal-Worth Project," the present concept is to carry one 24-hour a day movie channel, a continuous news, sports, public service channel, and a third channel for educational program distribution.

If one phrase were used to describe the thrust of this year's NCTA Convention program, it might well be, "If we are to be regulated like broadcasters, we may as well operate like broadcasters."

Next year's Convention: Chicago, Palmer House, June 25-28.

Board Elections

Chairman: Alfred R. Stern, Pres., TeleVision Communications

Vice Chairman: Jack R. Crosby, Pres., GenCoE, Austin, Tex.

Secretary: Ralph L. Weir, Pres., Junction City (Kas.) Cable TV, Inc.

Treasurer: Harry Butcher, Pres., Cable TV of Santa Barbara

Board Members (3 years):

M. William Adler, Adler Assoc., Washington, D.C.

Yolanda Barco, Meadville Master Antenna, Inc. (Pa.)

Marcus Bartlett, Cox Cable-vision Corp., Atlanta, Ga.

Robert Beisswenger, Pres., Jerrold Corp., Phila.

Byron D. Jarvis, National Trans-Video, Inc., Dallas

Robert F. Jernigan, Pres., Mississippi CATV Systems

Robert Magness, Pres., Community Television, Inc., Bozeman, Mont.

Board Members (2 years):

Richard A. Moore, Southwestern Cable Co., San Diego

John J. Morrissey, Jr., Durango TV Network, Inc. (Colo.)

Board Member (1 year):

Monroe M. Rifkin, Daniels & Assoc., Denver

Associate Member Representative:

John G. Campbell, Pres., CAS Mfg. Co., Dallas

TOURING THE EXHIBITS

Most exhibitors seemed satisfied with the action, although there were a few comments about "tight money," attributed to FCC actions and the recent copyright ruling. One manufacturer felt he had a slowdown in business due to the increase in equipment suppliers. On the bright side, Jerrold reported "record-breaking sales for equipment and cable" to the tune of \$6 million. And this figure does not include "turnkey" construction contracts, which can't be determined as yet.

Weather and news equipment sales were exceptional, undoubtedly the result of the push toward increased program origination. Six manufacturers exhibited such equipment, as compared with only two last year. Despite the increased competition, sales were brisk. Tele-Mation, first in CATV with their "Weather-Channel" and "News channel" units, did a land-office business. They also sold several "origination packages," consisting of a vidicon camera and \$1500 Ampex 1" video recorder/reproducer. Jack Kent Cooke's American Cable

Electronics Div. sold nearly two dozen digital-readout time-weather units, plus a like number of its alarm-alert-emergency machines, a slide presentation unit with provision for accompanying audio. R. H. Tyler's "Weather-Scan" equipment also drew constant attention, and furthering the origination concept were Tape-Athon's background music systems.

A variety of new non-duplication switchers were also in evidence. In addition to a completely new version shown by Tele-Mation, sophisticated designs were introduced for the first time by Jerrold, Viking, International Good Music, and Electronic Systems Development.

Head-end and trunkline equipment design has undergone a number of improvements since last year. Solid-state head-end gear was exhibited by CAS and Dynair. The modular concept of plug-in amplifier components has been adopted by several manufacturers, with accent on serviceability and flexibility. Cascadability has taken on increased importance. As one example, Anaconda Astrodata, one of the

newcomers this year, bases its entire concept of cable plant design on increased cascadeability. Two other new exhibitors of cable plant equipment were American Electronic Labs with its "Colorvue" line, and Cascade Electronics, who introduced an etched-circuit plug-in board design.

Not to be outdone by the newcomers, Jerrold showed new additions to its "Starline" series, plus new head-end units, VHF and UHF antennas, and CARS band micro-

wave units. Spencer-Kennedy exhibited a new "Colorburst" line, utilizing a common housing to accommodate a number of trunk and feeder line elements. Viking featured a "Futura" series, also using a modular concept. Blonder-Tongue introduced new solid-state trunkline amplifiers, as did Entron, and Ameco showed its Pacesetter line, another design using plug-in circuit board concept.

Without question, CATV equipment has reached a high degree of

sophistication—from antennas and head-ends to cable and feeder-line components. And with the know-how offered by experts in every phase of the business today, about the only thing a prospective operator need do for himself is pick a community. In fact, even this service may be offered in certain instances—and if this isn't enough you can step right up and buy a going system, to a great extent, on borrowed money or credit from one of the equipment suppliers.

EXHIBIT ROUNDUP

Equipment offered by manufacturers. For data on products mentioned, circle the appropriate number on this month's Reader Service Card.

Aberdeen Co.: Stainless steel lashing wire for trunk cable strand-mounting; RG-59/U cable clamps and underground cable pedestals.

Circle 101 on Reader Service Card

Advance Industries: Pre-assembled aluminum head-end buildings. Can be shipped with wiring, insulation, ventilation, and head-end equipment installed. Field construction crews operating nationwide. Guyed and self-supporting towers, microwave passive reflectors.

Circle 102 on Reader Service Card

Ameco: Pacesetter solid-state-series, including mainliner, bridging, and line extender with plug-in circuit boards. Heterodyne signal processor with plug-in tuner and transmitter units, crystal-controlled single-channel or 12-channel. Improved 70A Series, 65 Series, and LC-39 data link.

Circle 103 on Reader Service Card

American Cable Electronics (Jack Kent Cooke): Emerg-Alert warning system designed to originate video and audio messages. Digital readout weather-time unit, Model 106C.

Circle 104 on Reader Service Card

American Electronic Labs: "Colorvue" amplifier series featuring modular interchangeability—permits, individual trunk, AGC, bridge amplifier, off-trunk splitter, and DC modules to be plugged into standard housing.

Circle 105 on Reader Service Card

American Pamcor: Waterproof, air-

tight splice covers, designed to withstand temperature extremes; universal connectors, including air-disc dielectric, amplit crimped-type pneumatic, and a variety of coax connectors and terminals.

Circle 106 on Reader Service Card

Amphenol Cable Div., Amphenol-Borg Corp.: Series 621 75-ohm connectors designed for .412, .500, and .750" cables, requiring no tools for installation. Trunkline, feeder, housedrop, and messenger cables.

Circle 107 on Reader Service Card

Anaconda Astrodata Co.: Extended dynamic range (XDR) equipment featuring cascadeability and bridgeability, higher dynamic range and 60 dbmv output. Bridger is said to serve 6 distribution amplifiers (53 dbmv output each of 4 legs) per output or 276 subscribers per output and 1104 subscribers per bridger.

Circle 108 on Reader Service Card

Benco Television Associates: "Benvac" automatic video-/audio head-end control unit providing individual video and audio carrier level control of 12 VHF channels. Model FSP-3 field strength meter with RF wattmeter.

Circle 109 on Reader Service Card

Blonder-Tongue: Transporter all-band trunkline amplifier; Courier pilot carrier AGC-controlled trunkline amplifier; Powerdrive AGC single-channel VHF amplifier; TBV Series multitaps with 2 and 4 out-



Noise and cross-modulation eye-perceptibility tests were conducted in Blonder-Tongue booth.

puts; MTB Series cable blocks for Stinger pressure taps; Homer for housedrop installation; 4133 marker generator; 4132 low channel converter for field strength meter.

Circle 110 on Reader Service Card

Burnup & Sims: CATV construction services in any size area, including plant rearrangement.

Circle 111 on Reader Service Card

Cable Promotional Services: Copyrighted CATV marketing and promotional services designed to relieve subscriber sales problems, cut down on disconnects, and help collect past due accounts.

Circle 112 on Reader Service Card

Cal-Tel Construction Co.: Aerial and underground plant design and construction of new and existing systems. Nationwide service in CATV as well as allied communications fields.

Circle 113 on Reader Service Card

Canada Wire & Cable: Alucel aluminum-sheathed jacketed and unjacketed coax cables. .412" with nominal attenuation of 1.53 db per 100'; $\frac{1}{2}$ " with nominal attenuation of 1.2 db;

Continued on page 52



CPS offers experienced help in advertising, promotion and marketing.



AEL's "Colorvue" amplifiers feature flat response and extended bandwidth.



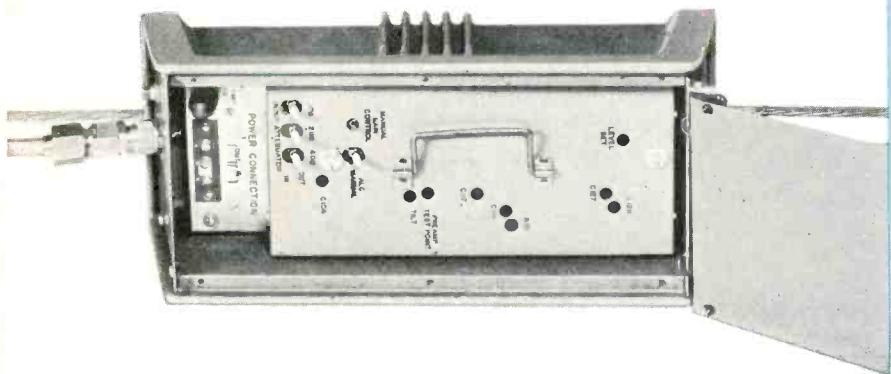
Extended dynamic range (XDR) Anaconda Astrodata design offers greater cascadeability and bridgeability.



entron solid-state and you'll



entron quality



Whether it's a complete turnkey job or a rebuilt, go Entron solid-state quality. Entron's R-3 solid state trunkline amplifier, its B-1 transistorized bridging amplifier, the E-3 solid state extended amplifier. All are in-a-line, and — most important—all are Entron quality.

For example, the R series modular remote powered solid-state trunkline equipment. With the R-3 you have 25 db spacing, absolute solid state reliability, and fittings to adapt to any system. It features continuous bandwidth (50 to 220 mc) with low noise, automatic gain and tilt control. It's strand mounted for simple installation and enclosed in a heavy cast aluminum housing to protect it from the elements. Yet, with all that Entron quality and Entron features, it costs far less than you'd expect.

B-1: Solid-state bridging amplifier...four outputs, your choice of connectors. Remote powered. Modular construction.

E-3: Solid-state extender amplifier . . . High gain. High output. Modern in-a-line construction. Low priced!

Whatever your CATV needs, from equipment (Entron makes over 250 items) to financing to engineering to installation, you need only contact:

B-1



E-3



entron

INCORPORATED
SILVER SPRING, MD. 20904
(301) 622-2000

Circle 19 on Reader Service Card

BROADCAST EQUIPMENT

Portable VTR

The 3M Co., St. Paul, Minn., has introduced a 50-lb. portable video tape recorder designed to use $\frac{1}{2}$ " tape to record and replay up to an hour on a 7-inch reel at $7\frac{1}{2}$



ips. The Wollensak VTR-150 uses a 1-inch diameter ferrite helical scan recording head; runup time is 8 sec. with two-motor drive. Specifications include: 2-mc bandwidth; signal-to-noise ratios: video, 35 db; audio, 40 db; wow and flutter 0.3%; audio frequency response from 50 to 100,000 cps ± 3 db. Tentative price is \$1495. Also will be available in mobile console package at less than \$3000, including camera, tape, monitor receiver, mic headset and accessory cords.

Circle 94 on Reader Service Card

PA Amplifier

McMartin Industries, Inc., Omaha, Nebr., is marketing three "economy" priced music and PA amplifiers.



fiers. The CM Series, CM-10 (10w), CM-20 (20w), and CM-35 (35w), feature one or two mic inputs, a program/ phono input, and tone control. Frequency response is 50-15,000 cps.

Circle 81 on Reader Service Card

Acoustic Doors

Sound and fire-retardant doors and framing systems, suitable for broadcasting and other facilities, are available from Overly Mfg. Co., Greensburg, Pa. The door carries the UL $1\frac{1}{2}$ -hour fire safe-

ty label and has a sound transmission class rating of 51 db for a single unit and 62 db in tandem. Doors are constructed of steel with internal sound-retardant material. UL labeled swinging units are $1\frac{3}{4}$ " thick; heavy duty units are fabricated in thicknesses up to $4\frac{1}{2}$ ". Astragals, automatic door bottoms, adjustable sound seals and thresholds with built-in seal retainers are available for special requirements.

Circle 69 on Reader Service Card

ETV "SchoolMaster"

Equipment for production, storage and playback of program material from TV stations or live events has been introduced by the North American Philips Co., Inc., N.Y.C. Housed in a plastic-finish



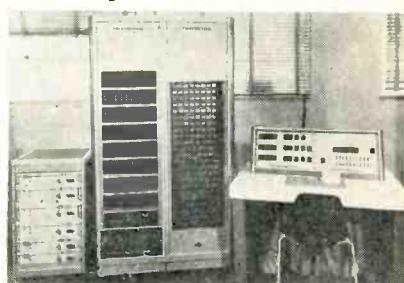
wood console equipped with casters, the SchoolMaster includes a Norelco VTR and 23" UHF/VHF receiver / monitor. The Norelco 6 1/2" viewfinder camera supplied with unit is equipped with zoom lens and pan and tilt head mount on a tripod. Additional equipment includes a dynamic mic, 8" reel of video tape with 45-minute capacity (optional 1-hour reels are available), take-up reel, and 50-ft camera cable. Price is \$6500; other models are priced up to \$12,595.

Circle 83 on Reader Service Card

Automatic TV Program Controller

A series of special purpose, stored program, digital control systems said to be capable of automatically controlling all steps and effects required in TV programming, has been developed by Hancock Telecontrol Corp., Old Greenwich, Conn. The 30-event magnetic core memory UNICON system is de-

signed to control up to 100 video sources and coordinate video with audio. Control functions, including fading and event mixing, can be automatically handled, and pre-rolls generated without manual intervention or additional programming. Input can be in the form of



machine voltages, punched cards, digital clock, machine cues, and operator intervention. Said to be compatible with existing control equipment, the UNICON consists of two main frames, containing solid-state logic circuitry, power supplies and blowers, plus 5 display panels and a control and entry panel; panel units may be incorporated into master control console.

Circle 84 on Reader Service Card

Tape Head Cleaner

An aerosol tape head cleaner is said to be more effective than cotton swabs wetted with ordinary cleaning agents, and may be applied while the tape is running. S-200 Cleaner is a formulation of Du Pont's Freon TF with other fluorocarbons. The com-



bination of solvent and pressure is said to clean tape heads in seconds, and does not interfere with pickup if applied to a running tape. Helical scan recorders are particularly vulnerable to dust on either the recording head or the slip-ring assembly; the S-200 cleaner offers a quick and convenient way to restore picture

MODEL FM-1 FIELD STRENGTH METER

Input 75 ohm F type connector
Accuracy ± 1.5 db All TV channels
Voltage Range 10 microvolts to 1 volt
Db Range -30 to + 60 dbmv
Frequency Coverage Ch 2 to Ch 13 One Range
Batteries (2) 9 volt 2mn6 (meter)
 (2) "C" cells (pilot lamps)
Voltage Scale one
Db Scales four
Measurement Method True peak value of sync pulse
Weight including carrying case 5½ lbs.
Size without case 4¼" x 5" x 5¾"
Size with carrying case 4¾" x 6½" x 7"
Carrying case Genuine Leather

\$29500

Complete with carrying case and batteries.



Video nstrument Corp.

The Model FM-1 is completely transistorized and has many advantages over meters now being used for CATV. The circuit is extremely stable through use of silicon transistors of an industrial grade. Shielding is thorough and complete, certain areas are double and triple shielded. Microammeter is one of the finest types available. Illuminated meter and dial are powered by a separate "C" cell batteries. Video detector output is provided for oscilloscope monitoring of video. Bandwidth is limited only by the .5mc I.F. carrier. (Earphones not supplied.) Image rejection is quite good, and error due to side channel overload is minimal due to the use of a double tuned bandpass filter that tracks with the oscillator across the dial. The carrying case is constructed of genuine leather, the same thickness as the ¾" shoulder strap and is lined with velvet covered board for added strength and rigidity. A snap holds the cover completely open in either horizontal or vertical position.

AVAILABLE FROM:



TV CABLE SUPPLY CO.

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Circle 20 on Reader Service Card

quality while in operation. The Miller-Stephenson Chemical Co., Danbury, Conn., offers a free sample can to inquiries on station and recording studio letterheads.

Circle 72 on Reader Service Card

Field Meter

Wilkinson Electronics, Inc., Woodlyn, Pa., has announced the perfection of a solid-state portable field meter with four functions in one 12-lb unit (including batteries). It

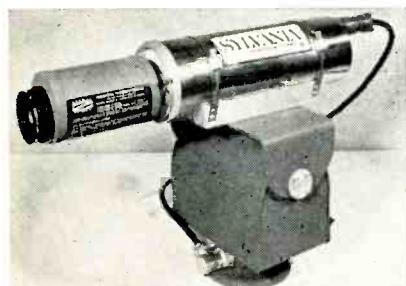


operates as field intensity meter, null detector, standard signal generator, and monitor receiver. A measured loop antenna provides RF input to a receiver and the audio output drives a speaker for identification. The 4N1 reads field strength from $10\mu\text{v}$ to 10v with 1% accuracy in the 535-1605 kc band. Calibrated signal generator output ranges from $10\mu\text{v}$ to 1v with 1% accuracy. The unit may also be used with an RF bridge for impedance measurements. Visual null indication eliminates earphones. Price is \$950.

Circle 85 on Reader Service Card

CCTV TV Camera

A ruggedized, 2-part TV camera said to be capable of withstanding shock, vibration, and acoustic noise has been introduced by the Commercial Electronics Div. of Sylvania. The SC10A camera head



contains 10% of the circuitry; all controls and adjustment parts and 90% of the circuitry are contained in a detachable control unit and connected by waterproof cable. In-

corporated into the system are a transmitter and sync unit designed to EIA standards, but the unit may be driven from an external source. Price is \$5900.

Circle 92 on Reader Service Card

FM Transmitter

Bauer Electronics Corp., San Carlos, Cal., has announced a new FM transmitter designed for stereo and multiplex operation. The Model 605 has a nominal power output of 7.5/5 kw. AF distortion is said to be less than 0.5%; FM noise level is -65 db below 100% modulation; AM noise level is -50 db below 100% modulation; and, frequency response is $\pm \frac{1}{2}\text{ db}$ 40 to 15,000 cps (monaural). The transmitter is 75" high, 48" wide, and 30" deep.

Circle 88 on Reader Service Card

Portable TV Recorder

Precision Instrument Co., of Palo Alto, Calif. is offering a portable TV recorder with variable playback speed control to display a TV picture at normal speed, any



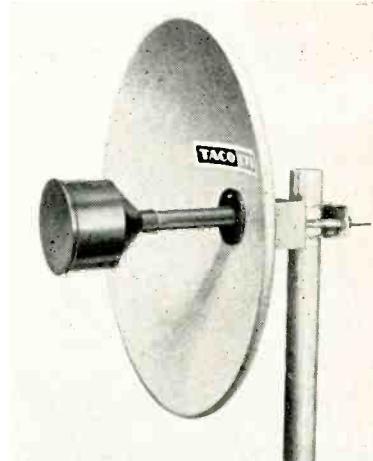
degree of slow motion, or with motion stopped completely. The equipment, designated PI-4V, incorporates Variscan playback speed control, continuously variable from stop to normal speed. Using 1" tape and two audio tracks which may be individually erased and re-recorded, the completely transistorized PI-4V is said to be as simple to operate as home audio tape recorders.

Circle 86 on Reader Service Card

ETV Receiving Antennas

The Government and Industrial Div. of Jerrold Electronics Corp., Philadelphia, has announced a series TACO directive parabolic receiving antennas designed to cover the 2500-2690 mc ETV range. The EPA Series antennas are available in 1-, 2-, 4-, and 6-ft. di-

ameters and are constructed of "Tacoform" aluminum, said to meet EIA windload specifications, and painted with Vinyl Alkyd sun

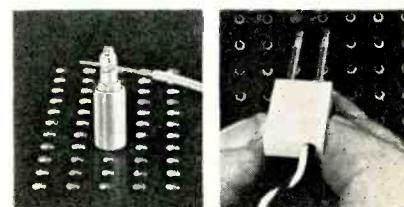


bronze to complement all architectural types. Antennas can be mounted on 2" to 4 1/2" diameter masts and rotated through 360° azimuth with 0 to 7° tilt. Installed from the rear of the reflector, the slot-dipole feed is "Cyclocac" radome protected and may be positioned for horizontally or vertically polarized color and b & w signals.

Circle 87 on Reader Service Card

Program Board Accessories

Sealectro Corp., Mamaroneck, N.Y., is offering Sealectroboards with any combination of program holes and supporting component devices. A rear platform, attached to the matrix and complete with terminal blocks, provides support for large size components. Smaller size units are soldered directly to the rear terminals of the board. For temporary test hookup of wire harness leads, a clip-on



shorting pin is available, featuring an internal spring-loaded clamp which grips an inserted wire. Also, a double jumper plug, JP-2403, provides a pair of external leads for test purposes and a diode holder in one double-plug assembly.

Circle 57 on Reader Service Card

Larynx Mic

An electromagnetic larynx contact mic with a frequency re-



Who says you're too small for automated broadcasting?

Maybe you've said it yourself.
But you might be wrong.

You see, some folks have a
mistaken idea about automating
a radio station. They think it
means throwing a switch, locking
the front door, and going home.

The real purpose of station
automation is to help you attain
greater operating efficiency and
save money on operating costs.

Now, how much would you be
willing to pay to attain
both goals?

\$65.00 a week?

Well, you might be interested to
know that for the price of a

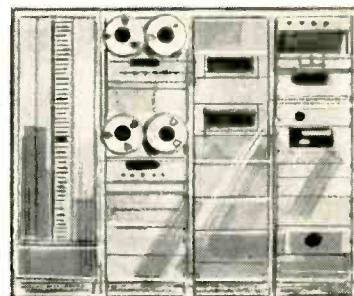
few extra spots per week you
can fully automate your station.
It might be less. It might be
more. It depends entirely on what
you want to accomplish.

You may want to automate only
certain segments of the day.
Or an entire weekend.
Or FM totally.

Whatever the goal, ATC has the
answer. And that answer will
relieve valuable, creative air
personnel from purely
mechanical control room
operations and make them
available for more productive
pursuits. Better programs, better
newscasts, sharper
commercials, more sales.

You can buy ATC equipment
outright. Or finance it. Or lease it.

So, maybe it's time to find out
once and for all whether you're
big enough for automation.
We're willing to bet you are.



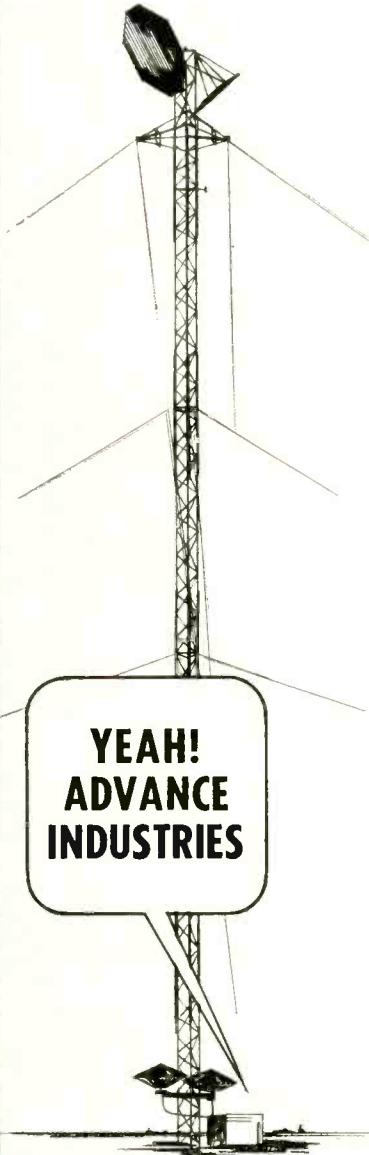
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broadcasters. Their intimate
knowledge of your business
makes communications easy
and satisfying. They speak
your language.

To hear them speak it, call
309-829-7006 today.

**AUTOMATIC
TAPE CONTROL INC.**

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Bloomington, Illinois

BOY!
The Guy who built
this TOWER knew
what he was DOING



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 PRE-ASSEMBLED
 ALUMINUM BUILDINGS**

IMMEDIATE DELIVERY

Write for Free Illustrated Brochures
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705 Douglas St.—Sioux City, Iowa 51101
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Circle 45 on Reader Service Card

46

sponse of 200-3,000 cps, is available from Telephone Dynamics Corp., N. Bellmore L.I., N.Y.



Ideal for remotes where noisy or windy conditions exist, the Model AC-77 is energized by vocal chord vibration. The unit is equipped with a light-weight plug-in cord and is said to be small enough to be concealed under a collar. Price is \$24.95.

Circle 89 on Reader Service Card

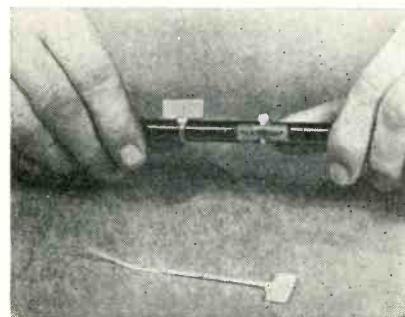
Radiation-Proof CATV Cable

A 59U-type coaxial cable said to be 100% radiation-proof has been introduced by Viking Industries, Inc., Hoboken, N.J. Radi-foil is double shielded, foil wrapped, but has the same O.D. as standard 59U. Available in white, beige, and black.

Circle 96 on Reader Service Card

Wire Marker Plates

Marker plates designed for small wire bundles, single coax, and small diameter conduit identification are available from Thomas & Betts Co., Elizabeth, N.J. Fabrica-



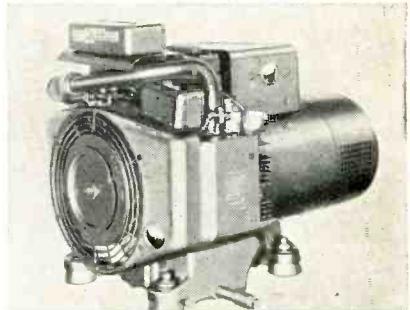
ted of nylon, the marker plates come in 9 colors in either twist-locking or self-locking types and designed to conform to the wire bundle (flag type) or protrude above the bundle (spade type). Flag type will accommodate conduit or bundle sizes from 3/16" to 5/8" diameter, the spade type 1/16" to 5/8" diameter. A reusable plastic wire bundle and harness tying device is also available. TYR-8 style accommodates a bundle diameter up to 4", and

TYR-5 a diameter of 1 3/4".

Circle 90 on Reader Service Card

Standby Generator

Onan Div. of the Studebaker Corp., Minneapolis, Minn., has introduced a 10-kw standby power unit utilizing a 2-pole revolving armature, self-excited and inherently regulated generator. The RFI shielded unit is driven

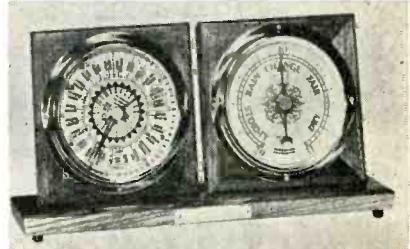


by the CCKB engine, offering a choice of gasoline or gaseous fuel carburetion. Rating of the horizontally-opposed 2-cylinder engine is 19.5 h.p. Generator offers optional reconnectible feature for delivering rated output in either 120- or 240-volt 2-wire service. Two models are available: remote starting and portable. Automatic load transfer is optional.

Circle 53 on Reader Service Card

World Clock

The Farmerie Corp., Glenshaw, Pa., has introduced a world time zone clock. The face is divided



into 24 zones, listing two principle cities in each along with the international code symbol. The battery powered jeweled movement clock is available in many models; Model B-2000 (shown) is priced at \$98.50, including barometer. Clock alone, Model D-250, is \$68.50.

Circle 54 on Reader Service Card

TV News Filming

Anyone interested in TV news production, in fact anyone interested in news, will find *Filming TV News and Documentaries*, published by Amphoto, a valuable volume of information on the many aspects of news gathering

August, 1966 — BM/E

Circle No. 23 for Sony Corp. Ad →

Not designed for broadcasting but it's great to have around the station.

It's the Sony Videocorder®—a video tape recorder with its own built-in monitor. It can do everything the big expensive video tape recorders can do. The only differences are: it's easy to operate; it's small and portable enough to put in your office, even on your desk, and it costs under \$1000.

Here are just a few places where the Videocorder can pay its way at the station. Executives can use it to keep an eye on programs and commercials—without staying up late at night. They can exchange tapes with other stations to review commercials or programs—because a program recorded on one Sony Videocorder can be played back on any other Videocorder.

Add \$350 to the cost of the Videocorder and you have a complete TV studio at your disposal (camera, microphone, tripod). Now you're ready to tape "live" action—preview ideas for commercials and programs.

The Videocorder travels easily from office to studio to home, or wherever you might need it. In its own portable case, it weighs 66 lbs. Model TCV-2010 costs \$995. 2020 costs \$1150, comes in a handsome oil-finish walnut case with built-in timer.

for recording programs in your absence. The 2020 is available as a deck Model CV-2000D with a wood base for \$695. It's great to have around the station. How about a free demonstration? Use the coupon.

SONY Corporation of America, Dept. H
47-37 Van Dam St., Long Island City, N.Y. 11101

Gentlemen:

I'm interested in the Sony Videocorder. Please:

- Call to arrange a free demonstration.
 Send me further details and the name of my nearest dealer.

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

BME

Sony Videocorder is not to be used to record copyrighted material.



and presentation. Written by active TV filmmakers Jim Atkins and Leo Willette, the book discusses in detail news sources and values, equipment and shooting, the use of sound, trick shots, editing, feature and documentary preparation, humor, the newsroom, and even how to get a job in TV. The authors have obviously drawn heavily on their own experiences and included, in addition, contributions from some 200 working news people. It tells how to find news when no assignments

are given; how to create, produce, and film feature stories, and how to enliven otherwise dull news film with trick shots and unusual approaches. Going behind the scenes, the authors present inside information on how a story is processed in the newsroom, how assignments are given, how schedules are coordinated, and how documentaries are pieced together. The experienced professional, as well as the novice, should find this book worthwhile.

Circle 67 on Reader Service Card

2500-mc Antenna

An omnidirectional antenna for use in the 2500 mc ETV band has been developed by the Jampro Antenna Co., Sacramento, Cal. The Type JZZ3-0-AED, with a power gain ratio of 20 and a horizontal pattern circularity of better than 2 db, is said to have a safe power handling capacity of 100w. The antenna is normally enclosed in a plastic radome and requires no de-icing. Beam tilt and null fill-in can be put into the antenna in any quadrant.

Circle 82 on Reader Service Card

CATV Converter

Ampli-vision Corp., subsidiary of International Telemeter Corp., Los Angeles, Cal., is offering a converter which increases capacity of existing CATV systems to 12

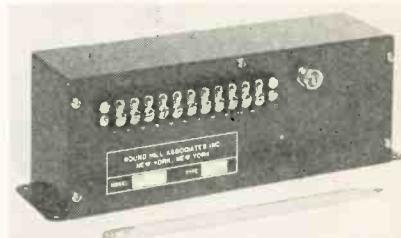


channels by eliminating "pickup" problem where systems are located in strong field intensities of local stations. It is said to eliminate left-hand ghosts.

Circle 95 on Reader Service Card

Audio Amplifier

A solid-state audio amplifier, suitable for monitor, line, or preamp applications, is available from Round Hill Associates, N.Y.C. The Model AA-200 delivers



100mw (over 80 db gain) into 8- or 500-ohm outputs with a frequency response of 20-20,000 cps ($\pm 1\text{db}$); harmonic distortion is said to be less than 1%. Shielded input transformer may be used with 50 to 150 ohm mics. Model AA-200 requires 9v DC power source, accessory power supply Model PS-220 will operate two Model AA-220 amplifiers. A Locking type volume control is mounted on the case and all connections terminate on a barrier strip. Price is \$34.50.

Circle 70 on Reader Service Card

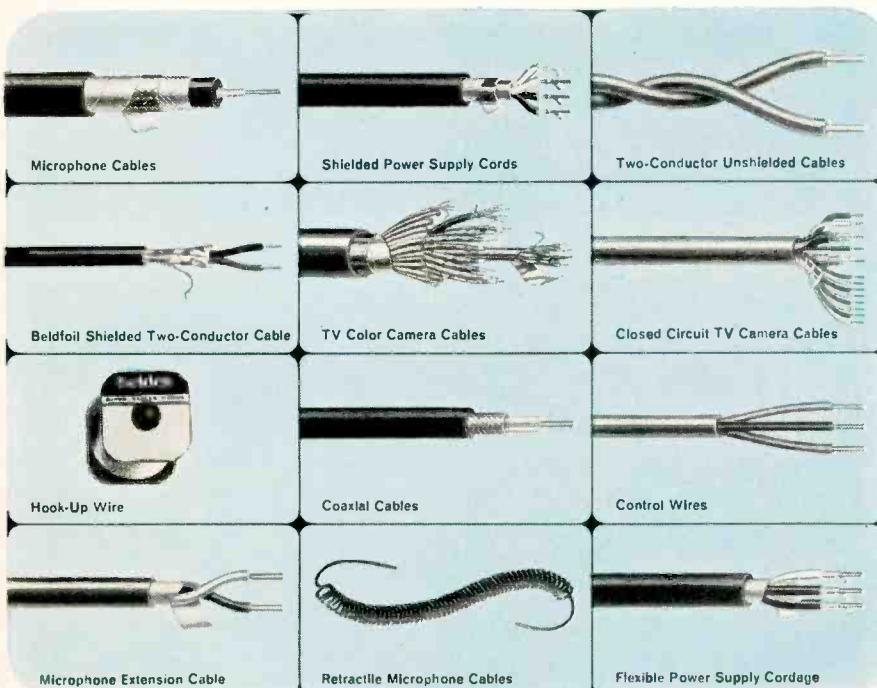
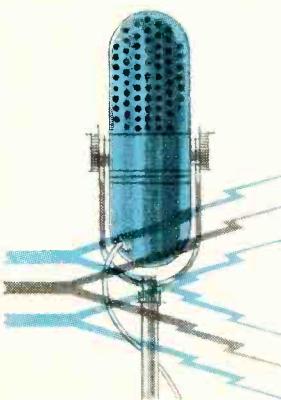
Why is Belden specified by most broadcast engineers?

Belden designs and manufactures a complete line of audio, camera, and control cables to meet every TV and radio broadcasting, recording studio, and remote control need.

Many Belden Audio and Broadcast Cables feature Beldfoil* shielding. This superior cable shield provides 100% protection against crosstalk...increases electrical reliability...reduces cable diameter and weight...is easier to terminate...usually lower in cost.

Here is just a part of this complete line, available from stock. Ask your Belden Electronics Distributor for complete information. Request also a copy of the latest Belden Electronics Catalog.

*Belden Trademark—Reg. U.S. Pat. Off.



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Circle 24 on Reader Service Card

Our CATV amplifier tubes: 1,000,000 hours MTBF



We upgraded our 6CY5 sharp cutoff tetrode and our two medium-mu twin triodes—the 6BQ7A and the 6DJ8—to Sylvania's premium Gold Brand standards. These three tubes can now provide 1,000,000 hours MTBF.

These Sylvania Gold Brand tubes are remarkably *uniform*. Because they're stringently tested to extremely narrow parameters. This protects you against impedance mismatches that cause "ghosting" on viewing screens. Solves the problem of low gain—with accompanying picture instability and "snow." Gold Brand tubes give high gain bandwidth—for best signal transmission along the cable.

They also cut down the effects of interface impedance as tubes age. Far less worry about troublesome frequency, gain or bandwidth adjustments. Why? Powder metallurgy is a prime reason. By pressing parts from powdered met-

als, we can control properties exactly.

We use our gold intermetallic alloy skin for the grids of these tubes. This eliminates such problems as flaking and peeling.

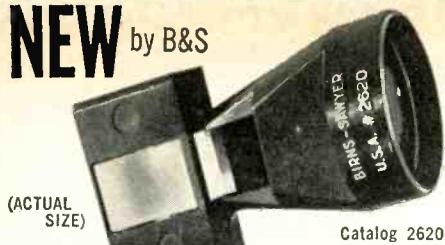
Designated the GB-6CY5, GB-6BQ7A and GB-6DJ8, these Sylvania CATV tubes retain their stability at extreme temperatures. They stand up at -40° to 435°F .

If you're concerned about maximum reliability and long life, go for Sylvania. And get a million-hour payoff. Sylvania Electronic Tube Division, Electronic Components Group, Seneca Falls, N.Y. 13148.

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GENERAL TELEPHONE & ELECTRONICS **GTE**

Circle 25 on Reader Service Card

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Birns & Sawyer

AuriBell FOCUSIGHT™



fast, exact lens

check for sharpness,
focus and parallax

Slip into film gate
...look into viewer



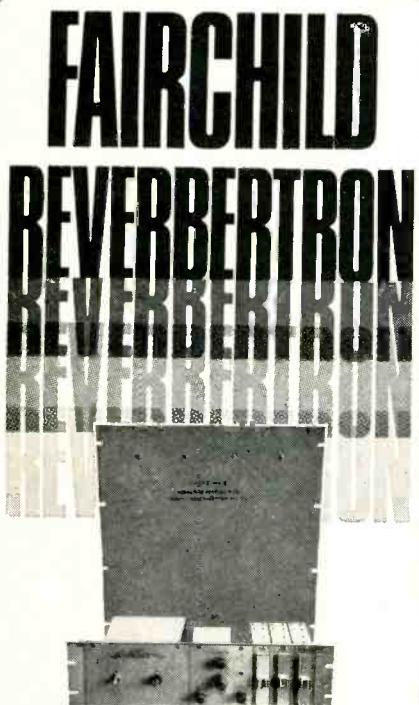
Designed for Auricon Cine-Voice, Bell & Howell 70 series and most other 16mm cameras with removable or retractable film gate, to save time, \$4950

SEND FOR 1966
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Cine Equipment

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Circle 27 on Reader Service Card



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RECORDING EQUIPMENT CORPORATION
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Circle 26 on Reader Service Card

BROADCASTERS SPEAK

We were delighted to see the photo of the G-E color camera system being operated by WPIX to televise the New York Yankees home games (page 8 of your June issue). However, some typographical gremlin changed the designation of the cameras from PE-25, which they are, to PE-250. The system was being installed with six PE-25's just about the time we were introducing the new PE-250 at the NAB Show.

George S. Tillman
G-E Visual Communications Products
Syracuse, N.Y.

The editor never heard of a PE-25 for color, and changed the designation because he thought the data was in error.

I am wondering how many letters Mr. Sawelson and Mr. Wood have received about the article on Color TV Tape Recording in the June issue. I think the article was interesting and instructive, but there are some points I believe to be in error.

On page 26, "The only high band production machines currently available are the Ampex VR 2000 and VR 1200 models." According to literature I have read and advertisements I have seen, RCA had delivered 23 high-band versions of the TR-22 prior to the NAB Show in 1964. Since then they have introduced the 22HL high-low band recorder in the spring of '65, and more recently the TR-70 and conversion kits for most of their smaller recorders. I am not a devout RCA fan, but I do believe in equal time.

On page 27, "RCA machines will not playback color if a discontinuity exists in vertical sync . . ." Following is a quote from RCA Broadcast News, May 1965: "Pixlock in the 22HL includes a Line Lock mode which is a valuable addition for color operation. In this mode the servo system locks on horizontal sync pulses as in normal Pixlock, but precise vertical framing is established only at initial start-up. Subsequent response to disturbances caused by splices or dropouts is rapid and reliable because re-locking is to the nearest horizontal sync pulse without reframing vertically. This minimizes the subjective disturbance to the reproduced color signal."

Other than these two points the article was a good one. Let's have more of that type.

Thomas O. Miller
WTPA-TV, Harrisburg, Pa.

We got a few letters, including one from RCA and another from SMPTE, but we expected more. The problem is too acute to "let it ride."

First of all, let me say that your treatment of individual items and services such as ours, in my opinion, is much needed. At the same time, while thanking you for the coverage, I'd like to call your attention to a small error in the May issue. You said that PMI had an automation system that started at less than \$1,000. As a matter of fact we did show a system which could deliver for less than \$5,000. And

by the way, there isn't an import in the entire system.

G. W. Sandefur, vp & gen. mgr.
South Charleston, W. Va.

It's fortunate you don't have to deliver at the price we quoted.

If you persist in your present editorial practices I may find it necessary to cancel my subscription. Your June issue arrived yesterday, and I missed a station break, and fouled up two commercials, trying to read it.

Name withheld by request
Dundee, Ill.

Your Reader Service Card system is the greatest thing since sliced cake. It's a terrific savings to us in time and postage. Keep it up—and thanks.

George N. Barnette, Radio Div.
Information Office, U.S. Army Center
Ft. Knox, Ky.

A sudden Indiana thunderstorm wiped out my copy of the July issue when I left it beside my chair in the back yard. Not only had I not finished reading it, but it means that my complete file of BM/E is going to have a glaring hole.

I will appreciate it if you can send me another copy. Obviously, I consider your magazine not only "must reading," but important enough to save for rereading and future reference.

Frank W. Norwood
National Center for School
and College Television
Bloomington, Ind.

Replacement copy sent. Suggest you store your file in a "cool, dry place," under lock and key.

Our Division is engaged in teaching and consulting activities for commercial and ETV broadcasting. While we sometimes see a copy of BM/E other places, it would be helpful to have our own subscription.

Both the articles and the ads are informative.

Daniel C. Smith
Dept. of Communication
Div. of Broadcasting and Film
Stanford University
Stanford, Calif.

The undersigned is in the process of purchasing Radio Station WAJM-FM. We would very much like to be placed on the mailing list to receive BM/E each month.

Boyd E. Quate, Pres.
Montgomery, Ala.

I would appreciate receiving a free copy of the survey conducted by Tvb on Color Facilities of TV Stations, as mentioned on page 6 of the June issue of BM/E.

Barton C. Conant, Gen. Mgr.
Professional Products Dept.
CBS Laboratories
Stamford, Conn.

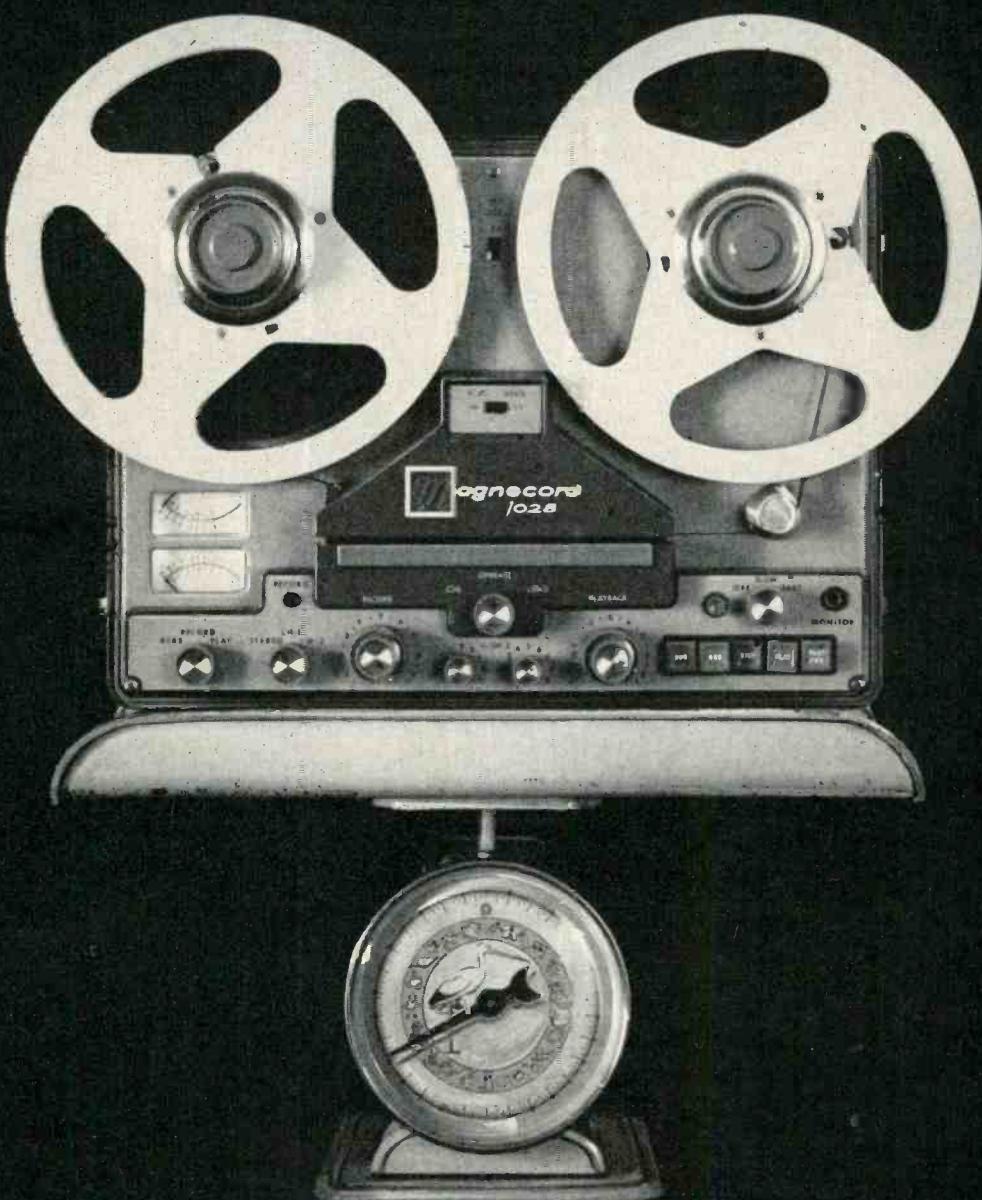
In response to all the letters and phone calls, copies of the Tvb booklet are not available from BM/E. Get them from your local TV station, the nearest Tvb office (New York, Chicago, and Los Angeles), or contact Television Bureau of Advertising, One Rockefeller Plaza, New York, N.Y. Phone No. is 212/PLaza 7-9420.

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Out of the case a Magnecord 1028 weighs less than 50 pounds and measures only 17 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ " x 12." But its performance is bigger than instruments twice its size. Wrapped up in a single compact unit are big features like 3-motor tape drive, precision lapped Micro-Optic heads, a die-cast mainplate and solenoid operated shoe brakes. A 1028 can handle king-sized jobs too, with excellent fidelity for cutting master tapes and a reel capacity up to 10 $\frac{1}{2}$ ".

You can buy another brand tape recorder/reproducer with about the same capabilities. But it costs about \$1,700.00 more; it comes without pre-amps; you get less quality in high and lows; and you would have to put up with a cumbersome, completely unportable machine requiring three separate enclosures. Now, doesn't that prove the best tape instruments come in small packages marked Magnecord? See your nearest franchised Magnecord dealer or write us for a free brochure.

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 Technique of Film & TV Make-Up—Most authentic, best illus. book of kind. 256 p. Order No. 71; \$10.00
 Principles of Cinematography—The famous technology handbook. 425 p. Order No. 149; \$13.95
 Video Tape Recording—Makes VTR completely understandable. 280 p. Order No. 116; \$8.95
 Animation Tech. & Comm. Film Prod.—Describes how animated films are made. 500 illus. No. 110; \$12.50
 Special Effects Cinematography—Demonstrates hundreds of techniques. 456 p. Order No. 63; \$15.00
 Technique of Film Editing—The standard. An absolute must; 288 p. Order No. 69; \$9.95
 Technique of Film Animation—Every stage of the animation process described in detail. 352 p. No. 68; \$10.00
 Video Tape Recording—The latest data on VTR technology & recording equipment. Order No. 189; \$12.00

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Announcer's Handbook—Covers all types for both radio & TV. 296 p. Order No. 122; \$7.25
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 TV Production—Step-by-step reference for the pros. 232 p. Order No. 75; \$7.50
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NCTA Exhibit Roundup

Continued from page 40

and $\frac{3}{4}$ " with nominal attenuation of .842 db.

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CAS Manufacturing: Modular circuit board, solid-state head end featuring full channel video and sound conversion, AGC and sound limiting, and provision for standby modulation. TRA-230D solid-state combination trunk, AGC, and distribution amplifier; "milkcow" multi-outlet backmatched transformer.

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Cascade Electronics: Modular amplifier line with universal housing and interchangeable plug-in circuit modules. Housing connector board will accept any combination of circuit boards; two extra connectors for power inserter and temperature-actuated thermistor gain control.

Circle 116 on Reader Service Card

Channel Splicing Machine Co.: 12" O.D. pedestals for housing mainline amplifiers and other components of underground plants.

Circle 117 on Reader Service Card

Collins Radio Co.: Updated 5w MW-109(E) heterodyne microwave system, employing solid-state frequency generation and new TWT system capable of 20w saturated output, for long haul color video transmission. Also 1w remodulating system with short haul color video capability: transmitter uses a klystron; receiver has a solid-state local oscillator and single-state step recovery diode.

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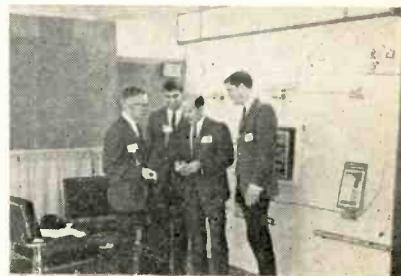
Com-Tel Construction: System construction services, including tower, head end, distribution system.

Circle 119 on Reader Service Card

Copperweld Steel Co.: "Alumoweld" messenger cables with aluminum coating said to be at least 10% of overall radius. Anchor rods with aluminum alloy guy eye, and complete line of ground and anchor rods.

Circle 120 on Reader Service Card

Craftsman Electronic Products: Modular power tap providing 18 db gain (Ch 13); Panther 20 featuring 20 db minimum gain, —50 db cross-modulation, 10 db maximum noise; Model 2000 high level amplifier offering maximum output of 54 db mv for 12 channels; DC back-matched taps with low insertion



Key Craftsman personnel include Matt Lysek, Dan Mezzalingua, and Vince Borelli.

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Cummins-Chicago Corp., Allison Coupon Co.: Coupon subscriber payment systems, coupon perforators, tally printers.

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Daniels & Associates: Consultation on feasibility studies and franchise procurements. Services include engineering, financing, public relations, promotion, management, system appraisal, and brokerage.

Circle 123 on Reader Service Card

Delta Electronics: Solid-state amplifiers designed for drop-in replacement of existing tube-type units. FST-3 field strength meter, FSM-C field strength meter calibrator, and inductance-capacitance meter.

Circle 124 on Reader Service Card

Dynair Electronics: TS-100A TV sideband analyzer which inserts a video sweep signal into the unit under test and analyzes the output. Also Dyna-Mod audio/video modulator which can be used with either separate video and audio inputs, combined video and multiplexed 4.5 mc audio input, or separate video and 4.5 mc audio inputs. Video carrier is crystal-controlled to 0.005%, aural carrier is locked 4.5 mc above video carrier.

Circle 125 on Reader Service Card

Electroline Television Equipment: 40 db isolation tap-offs for cable

up to .57 diameter; tube-type UHF preamps with 20-40 db gain; solid-state trunkline amplifier; and weatherproof 2-way splitter, including F plugs.

Circle 126 on Reader Service Card

Electronic Systems Development: Model MKW-2C "Teleweather" using stationary camera which fades from one time/weather function to the other. Up to 6 slides may be presented at the conclusion of the time/weather sequence. Also non-duplication switcher which does not require the use of pins or diodes for programming.

Circle 127 on Reader Service Card

Entron: R-3T cable-powered strand-mounted repeater amplifier; Model E-4 line extender with 30 db gain; single-channel VHF preamp, Model P-1; solid-state FM converter, Model F-1; Model RPT-310 remote power transformer; Model G-1 pilot carrier generator, Model D-1 distribution amplifier. Also, underground units for pedestal mounting in buried plant applications.

Circle 128 on Reader Service Card

Federal Electric: Design, engineering, construction, and financing; technical and management instruction may be included in turnkey package. Also assistance to legal counsel, marketing support, public relations and advertising, and add-on and operations financing.

Circle 129 on Reader Service Card



If smiles are any indication, Tommy Moore's tower business must have been very good.

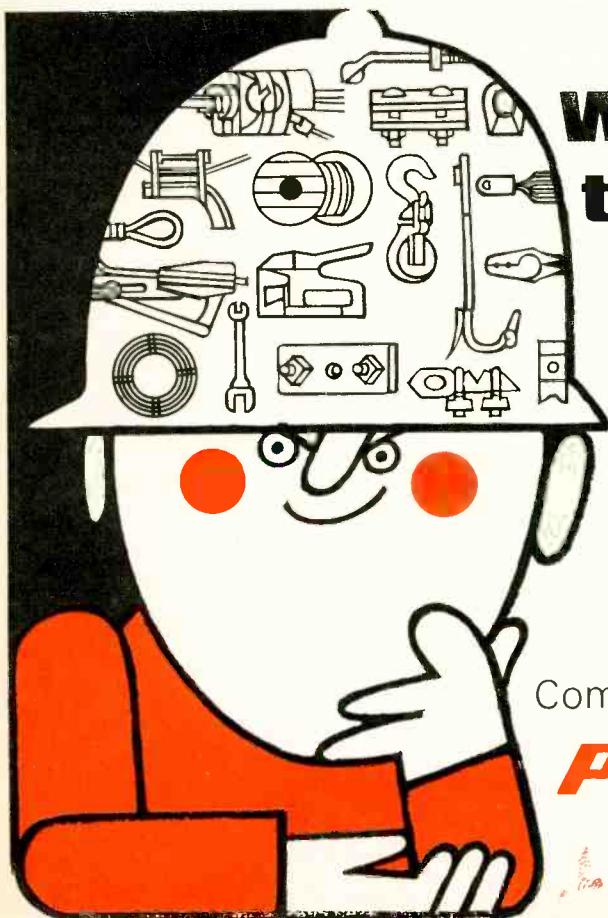
Ft. Worth Tower Co.: Spadeco tropo-scatter parabolic receiving antenna designed to provide long range TV reception. Motor driven power winch built for installation, repair and maintenance of antennas, booms, and lights; prefabricated fiberglass buildings with wiring, ventilation, and insulation; complete line of towers and reflectors.

Circle 130 on Reader Service Card

Gabriel Electronics: 4-port rear-fed dual-frequency parabolic microwave antenna for dual polarized operation in the 6 and 11 gc bands. Also passive reflectors, rigid wave guides, and stub-mount pylons.

Circle 131 on Reader Service Card

Gilbert Engineering: N Series coax connectors, plus complete line of 75-ohm video and DC line terminators.



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Circle 31 on Reader Service Card



Looking for a good video stabilizing amplifier?

International Nuclear's TVA1 is certainly one of the best on the market today. The TVA1 with its associated series of plug-in units offers high level performance and versatility for studio or transmitter use. It removes all low frequency disturbances such as hum, bounce and tilt by sync-tip clamping. This back porch level is precisely stabilized without affecting color signals in any way. Sync is stretched after back porch stabilization and then clipped accurately to desired level. This level may be set by means of a front panel control which can be extended to a remote location. Stripped sync is provided at one 75 ohm internally terminated output connector, at a 4 volt level. The TVA1 chassis contains a plug-in compartment which accepts up to 4 plug-in units. Among these plug-in units is the TVA1-E, providing a stripped color video channel, and the TVA1-D which provides the means of adjusting peak-white clipping, white stretch and differential phase. Other plug-in units are listed below.

PRICES F.O.B. NASHVILLE, TENNESSEE

Model TVA1 Stabilizing Amplifier (less plug-ins) . . . \$1,380.00
Model TVA1-A, Manually Operated Input Amplifier Unit . . . \$310.00
Model TVA1-B, Input Amplifier Unit, with
Remote Master Gain and Chroma Panel . . . \$425.00
Model TVA1-C Monitor Amplifier Unit . . . \$265.00
Model TVA1-D White Stretch and Clip Unit . . . \$240.00
Model TVA1-E Stripped Video Unit . . . \$450.00
Model TVA1-S Remote Sync Level Control Panel . . . \$25.00

For more complete information write or phone:



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Features include solderless connections, intermatability with comparable connector series, weatherproof construction, and low insertion disturbance and VSWR.

Circle 132 on Reader Service Card

Henkels & McCoy: System planning and construction—aerial and underground plant engineering, make-ready and installation, pole line construction and system balancing.

Circle 133 on Reader Service Card

Hewlett-Packard: Model 1415A time domain reflectometer, with Model 140A scope, functions as a cable testing unit; Model 8405A vector voltmeter which permits simultaneous voltage and phase measurements. Also Model 197A scope camera with electronic shutter, available with Polaroid pack-back or 4 x 5" Graflok back.

Circle 134 on Reader Service Card

Holan Div., Ohio Brass: Bronco 83 aerial elbow bucket lift truck capable of carrying 300-lb payloads to 37-ft. working height; bucket heights of 27 and 32 feet also are available.

Circle 135 on Reader Service Card

International Good Music: Telmas non-duplication switcher designed to handle up to 12 channels. Switching is determined by inserting diode pins in the programmer, up to a week in advance. Also solid-state switchable filter to reduce carrier level by more than 80 db, high or low band; will



Jerry Hastings, Jerrold's CATV Div. manager, and a satisfied customer.

operate with either Telmas model and most existing switchers.

Circle 136 on Reader Service Card

ITT Wire & Cable: Line of 75-ohm aluminum-sheathed coax cable; cable diameters of .412", $\frac{1}{2}$ ", or $\frac{3}{4}$ " are available with polyethylene jacket or steel messenger. Structural return loss guaranteed to be a minimum of 26 db channels 2-13.

Circle 137 on Reader Service Card

Jerrold Electronics: Program Commander non-duplication switcher offering preset programming of 6 output events for half-hour or hour intervals during a 1-week period. Starline satellite line extender featuring seized center conductor connector. Starline stations for long haul transportation of low and sub-channel 5 to 95 mc signals to replace combination solid-state/tube amplifiers. Crystal-controlled VHF single channel converter for the

Channel Commander. Pedestal or surface mounting directional couplers; pressure tap for jacketed aluminum cable. Parabeam UHF and Color Captain VHF antennas.

Circle 138 on Reader Service Card

Kaiser-Cox CATV: Phoenician Series, including 21-channel KCLE distribution amplifier; 25 and 22 db spacing trunkline amplifiers with 40 db S/N; 4-way taps available with losses of 14, 17, 21, 25, and 29 db; KCPG pilot carrier generator with 166.5 mc direct and low-level signal outputs.

Circle 139 on Reader Service Card

Lenkurt Electric: 75A and 76TV microwave systems. Type 75A heterodyne repeater system for long haul color video relays; Type 76TV systems for either demodulating or heterodyne color or monochrome video relays. Optional 7.5-mc channel will carry program audio.

Circle 140 on Reader Service Card

Phelps Dodge Copper Products Co.: Polyethylene dielectric Foamflex cable in .412, $\frac{1}{2}$, $\frac{3}{4}$, and $1\frac{1}{8}$ " diameters; air dielectric helical membrane cable with polyethylene helix. Both available with Habirlene jacket for buried plant use.

Circle 141 on Reader Service Card

Plastoid Corp.: Complete line of cable — aluminum-sheathed, corrugated copper, and flat shield types in standard sizes and lengths.

Circle 142 on Reader Service Card

Preformed Line Products: Teletap cable connector support with neoprene coating to protect drop cable, suitable for multitap installations; "telesplice" splice support for RG-59/U cable. All types of dead ends, plus lashing rod, spiral vibration damper, and plastic spacer unit.

Circle 143 on Reader Service Card

Pruzan Co.: Cascade Electronics amplifiers and Preformed products including Teletap. TV "S" wire grips and cross-arm mount cable stringing block. Pole line material, lineman's equipment and tools, and outside plant supplies.

Circle 144 on Reader Service Card

Raytheon Co.: KTR-III A heterodyne repeater microwave system designed for medium and long haul applications; equipment is solid-



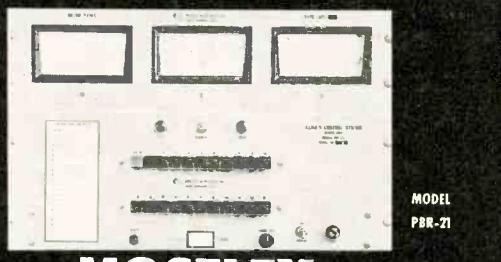
Same-day shipment is motto of Jack Pruzan, who now handles Cascade line in U.S.

Solid State REMOTE CONTROL SYSTEM

—RADIO AND WIRE



- 1 AC wire pair or STL
- 21 channels
- Write for Bulletin 214
(for radio: Bulletin 213)



MOSELEY
ASSOCIATES, INC.
135 NOGAL DR. SANTA BARBARA, CALIF.
(805) 967-0424

Circle 33 on Reader Service Card

THE PALMER TELEVISION FILM RECORDER

... is a simplified system for producing high quality picture and sound on 16mm film from any video source.

Intended for broadcast, industrial, educational and defense applications — wherever it is desirable to obtain images approaching the quality secured through conventional motion picture production.

Available in portable or console models.

Write for details.

W. A. PALMER FILMS, INC.
611 Howard Street
San Francisco, California

Circle 34 on Reader Service Card



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; 3 $\frac{3}{4}$ -7 $\frac{1}{2}$, or 7 $\frac{1}{2}$ -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.

© AMPEX CORP., 1965

Please send me information on:

- new AG-350 Series recorders
 other Ampex equipment

(please specify) _____

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Write today to:
 Ampex Corp., 401 Broadway
 Redwood City, California

AMPEX

Circle 35 on Reader Service Card

No noise after 500,000 operations with Altec rotary attenuators.

Here's proof.

No need to get involved in the old-fashioned daily cleaning of contacts when you use Altec rotary attenuators. That's because Altec attenuators stay clean, as proved in recent tests. We applied a 15,000-Hz tone at -90-db to the attenuator input and 90-db gain to the output. This test firmly establishes stability, both physically and relative to noise, after repeated long-term operations.

Running the units for 500,000 operations showed no increase over the insignificant residual noise. In a second test, we ran units for 4000 operations, let them idle for four weeks, then repeated the operations to a total of 50,000. Still no noise.

If you think about it, 500,000 operations come out to more than 125 operations every day of the year without an increase in noise! But Altec rotary attenuators

are even better than that, because they were still going strong and noise-free after 500,000 operations!

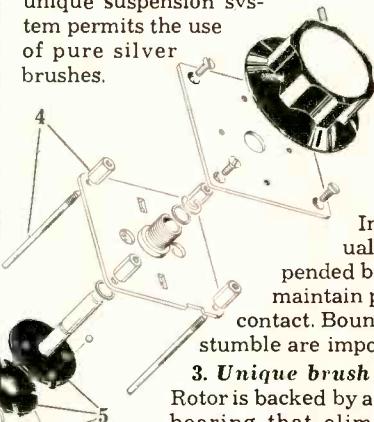
So, just for old times' sake, go ahead and clean your Altec attenuators once a year—even if they don't need it!

Here's why Altec rotary attenuators are best:

1. Pure silver precision-lapped brushes & contacts. By using fine (pure) silver instead of copper alloy (coin silver), we eliminate the major cause of noise-causing contaminants. Coin silver oxidizes, reducing conductivity and increasing noise level. Altec's pure silver sulphides, actually forming a wear-reducing lubricant. Pure silver is one reason for Altec's lowest contact resistance, less than 1.0 milliohm! Altec's solid silver contacts are cold-forged, giving them as much density

as silver can have. Compare this to ordinary silver plating of competitive units, which is spongy and easily wears off.

2. Unique double-nested brushes. Altec's unique suspension system permits the use of pure silver brushes.



Individually suspended brushes maintain perfect contact. Bounce and stumble are impossible.

3. Unique brush rotor. Rotor is backed by a thrust bearing that eliminates wobble-plate action. Turn the knob of an Altec attenuator—you'll feel the difference!

4. Cadmium iridite finish protects steel parts from corrosion.

5. Black dulite prevents corrosion on cold rolled steel parts.

6. Thrust bearing is made of spring brass.

7. Brush tension springs are of beryllium copper.

The most commonly needed Altec rotary attenuators are available off the shelf for prompt delivery. Custom configurations made to your requirements. Write for our new precision attenuator literature.

New gain set now available



The new Altec gain set is a precision test instrument for measuring the gain, loss,

frequency response, and signal level of audio devices. Simultaneous input and output and two VU meters permit simultaneous readings, and the unit can be used for balanced or unbalanced circuits. Write for complete data.



A Division of **LTV** Ling Altec, Inc., Anaheim, California



Scientific-Atlanta exhibited new parabolic and yagi antenna designs.

state, except TWT, and operates in both 6 and 12 ge bands, has a 5-year warranty.

Circle 145 on Reader Service Card

R. F. Systems: All-channel 30-ft. parabolic antenna which receives all signals from a single direction on a single feed; using multiple feed system, channels from various directions can be picked up or nulled out. Also anti-vibration device for multiple-element antennas.

Circle 146 on Reader Service Card

Rohn Systems: Passive microwave reflector with aluminum face; CATV-microwave towers, lighting equipment, and accessories.

Circle 147 on Reader Service Card

Scientific-Atlanta: Ultra Channeler UHF and Super Channeler VHF antennas. Parabolic UHF antenna produces 24 db gain with a horizontal beamwidth of 10° at Channel 50. VHF antennas provide reception up to 130 miles or more. Also Quadrate Channeler master antenna system with 25 db front-to-back ratio.

Circle 148 on Reader Service Card

Sigma Industries: Heat shrinkable splice covers, including new 2" splice tubing and heating equipment. Also through-wall aperture seals for aerial or buried plant applications and burial system entry enclosures.

Circle 149 on Reader Service Card

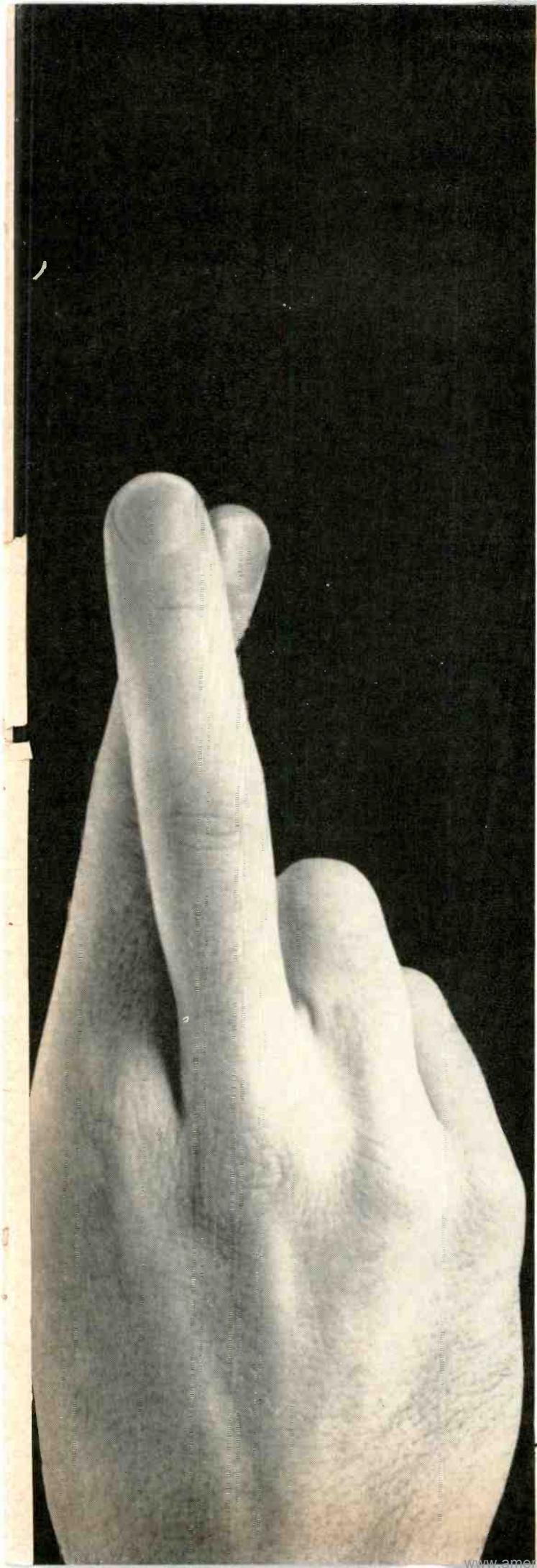
Spencer-Kennedy Labs: Colorburst 7000 line—one common housing accepts 5 different amplifiers and 4 line splitters using connectorless cable fittings. Trunk and bridging amplifiers are modular plug-in units suitable for new systems or updating existing systems for color. Color-taps allow connectorless fittings to be used on line and drop cables. Co-channel filter which allows an interfering channel to be carried.

Circle 150 on Reader Service Card

Stan Socia Corp: consultation service to franchise holders and applicants. Management and operation.

Circle 151 on Reader Service Card

Superior Cable: Amplifier housing for underground cable systems. Alumigard corrugated copper cable for aerial or burial use and series of matching connectors. Balloon air dielectric coax cables featuring natural solid polyethylene insulation arranged as a series of small balloons. .412" 75-ohm cable has a #10 center conductor, outer conductor of



Why push your luck with a tired tube-type STL...

**(Raytheon's Dual-Link II
guarantees superior
color performance)**

Worried about the demands increased color programming and picture quality will place on your tired-out studio-transmitter-link? Then it's time you investigated Raytheon's new solid-state Dual-Link II — the 1-watt hot-standby STL microwave equipment that eliminates program interruptions and exceeds all applicable NTSC color standards.

Backed by a 5-year warranty, the Dual-Link II combines continuous transmitter monitoring, automatic high-speed switchover (with no loss of programming) and duplicated receiver protection. Its unique design enables you to remove one complete STL system for routine servicing *during programming hours*. Exclusive pull-out drawers permit easy access to all functional modules . . . no extender cards or complicated test cables necessary. Dual-Link II can be supplied with up to four 15kc program audio channels and is expandable to a completely automated STL system at nominal cost.

If you've decided that it's easier to modernize than to apologize for STL failures . . . mail this coupon today.

RAYTHEON

Sales Manager
Raytheon Company
Communications & Data
Processing Operation
1415 Providence Turnpike
Norwood, Mass. 02062

Please mail me more information about
Raytheon's Dual-Link II.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip Code _____

seamless aluminum, available in 2,000-ft. reels.

Circle 152 on Reader Service Card

Systems Engineering: Turnkey system construction services; Log Log Z line antennas; Bulldog line of splice covers and connectors.

Circle 153 on Reader Service Card

Tape-Athon: Model 900 dual-capstan tape transport system with starting time of less than 10 milliseconds; speeds of 15-7½ or 7½-3¾ ips. Also Librarian tape player which provides audio playback on a preset sequence, capable of continuous automatic programming from two tapes.

Circle 154 on Reader Service Card

TCA Tower: Towers, obstruction lights, accessories, and booms.

Circle 155 on Reader Service Card

TeleMation: New "Weather Channel" units. Chroma-Channel for providing weather data in the form of color-coded stripes; Sav-A-Channel for automatic interspersing Weather Channel and News Channel programs. Also 12-channel 7-day non-duplication switcher and Ampex VR-6200 VTR with built-in tuner.

Circle 156 on Reader Service Card

Telemet: Line of pulse and video distribution amplifiers; Model 3508-B1 video transmission test signal generator; Model 1004B differential phase and gain receiver; Model 320-3B1 feedback clapper; and Model



R. H. Tyler introduced new "Weather Scan" and "Roto Scan" units.

3205B2 cable equalizer amplifier.

Circle 157 on Reader Service Card

Texas Electronics: Series 600 and Series 300 weather instruments with individual power supply, cable, outside remote sensing transmitter, available in any combination.

Circle 158 on Reader Service Card

Times Wire & Cable: Supertrunk and Superdrop coax cables. Type JT-11250 seamless aluminum sheath trunk with attenuation of 0.68 db per 100'. Type JT-207DT offers maximum attenuation per 100' of 3 db. Also "Timatch" connector with "Coilgrap" clamp which grips the outer conductor; center conductor is connected to a screw-type terminal.

Circle 159 on Reader Service Card

R. H. Tyler Co.: Roto-Scan and Weather-Scan units. Roto-Scan features rotating camera providing 8 stop positions. Weather-Scan offers

5 weather functions, time, and three card holders. Camera may be used for live studio work. Optional equipment includes humidity indicator and automatic slide projector.

Circle 160 on Reader Service Card

Viking Industries: 6-channel 7-day non-duplication switcher; Goldline Series modular in-line solid-state amplifiers with "Supermatch" fit-



Viking exhibit included new "Futura" line and non-dup switcher.

tings; Futura Series amplifiers with modular components; 24-hour Newsarama with provision for locally produced news; 10-station Weatherama with fixed-position camera and 80-slide projector. Test equipment, including Model 5907 signal strength meter, Model 5902 variable return-loss bridge, Model 5905 bridging type RF detector; back-matched hybrid couplers.

Circle 161 on Reader Service Card



Long time no trouble!

"We've been using QRK Turntables for 14 years and it just occurred to us — we've forgotten what turntable trouble is. It's like our engineer says, 'the only reason to change a QRK is if you get tired of its color.'* Of course our DJ's wouldn't trade, because QRK spins any disk with no need for pop-up gadgets — starts fast for accurate cueing — runs true and quiet."

*And, we can do that for you, too!
Ask about our custom color service.

See your dealer today or call or
write us for complete information.

QRK ELECTRONIC PRODUCTS

2125 N. Barton — Fresno, California

Circle 38 on Reader Service Card

Delta News

Vol. V

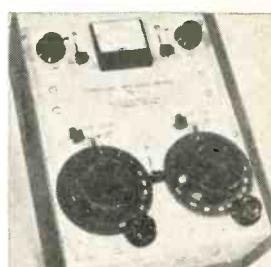
1966

DELTA'S OPERATING IMPEDANCE BRIDGE

MODEL OIB-1

We quote our designer: "Operating Impedance" is the complex ratio of the voltage applied to a load as compared to the current flowing in the load when it is operating under normal power in normal environment. In many cases, this impedance differs substantially from the 'self impedance' or 'cold impedance' of the load . . . many loads have operating impedances which vary with applied power levels. Meaningful impedance measurements must therefore be made at normal power level.

amounts of power, and measure only the 'cold impedance' of the load."



Delta's OIB-1 will handle 5 kw through power at VSWR ≤ 3, from 500 kc to 5 mc, or 10 kw intermittently below 1.7 mc.

For more information, write

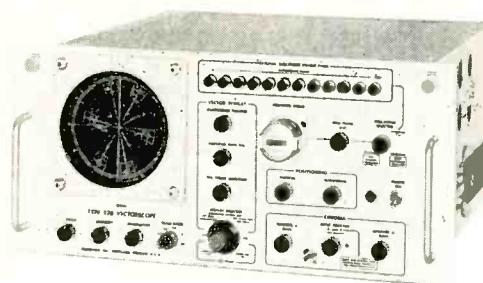
DELTA ELECTRONICS, INC. 4206 Wheeler Ave., Alexandria, Va. 22304

Circle 39 on Reader Service Card

Tektronix Television Instruments

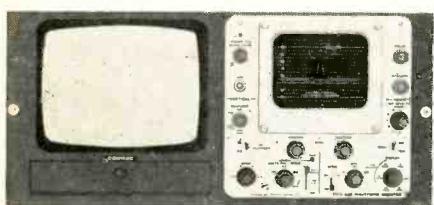
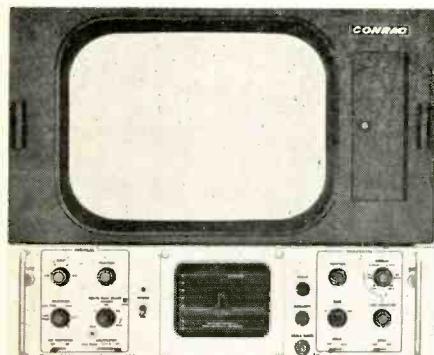
Type 526 Vectorscope for Chroma-Signal Displays

color encoder adjustments
differential phase measurements
differential gain measurements
vertical-interval-test-signal (VITS)
displays
video tape-recorder setup



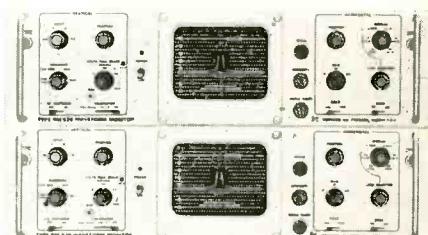
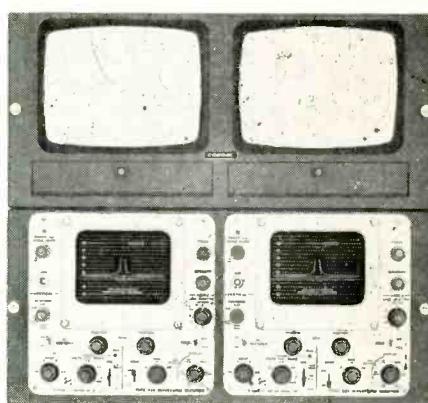
Measuring amplitude changes and phase shifts can be done accurately, conveniently, and independently with the Vectorscope. The Vectorscope presents relative phase and amplitude displays (of chrominance information in the N.T.S.C. color signal). Dual-trace capability permits simultaneous display of two color signals for precise matching of phase and amplitude. In addition to the vector display, the Vectorscope can present the chroma signal demodulated along any phase-angle with respect to time.

Type 526 Vectorscope \$1665
Size is 8 $\frac{3}{4}$ " high, 19" wide, and 18" deep.
Weight is \sim 45 pounds. Designed for rack mounting.



Type 529/RM529 for Waveform Monitoring

vertical-interval-test-signal (VITS)
displays
sine-squared pulse and bar testing
transmitter modulation monitoring
YRGB or RBG displays (with color-
processing amplifiers)
video signal-level monitoring
bandwidth measurements
differential-gain measurements



In waveform-monitoring applications, the Type 529 and RM529 offer 2 LINE and 2 FIELD displays plus calibrated sweep rates of 0.25 H/cm, 0.125 H/cm, 0.025 H/cm with X5 Magnifier, and 0.005 H/cm with X25 Magnifier. They provide 4 response characteristics necessary to monitor VITS—FLAT to 8 MHz (which assures excellent waveform fidelity for sine-squared testing with 2T, T, and 1/2T pulses), HIGH PASS 3.58 MHz, center frequency, LOW PASS—18 dB at 500 kHz, and IEEE 1958 STD 23-S-1. Other characteristics include a backporch type DC restorer, a positive-going field selector, and a full-field line-selector *including digital VIT line selection*.

Type 529 Waveform Monitor \$1050
(8 $\frac{1}{4}$ " high, 8 $\frac{1}{2}$ " wide, 19" deep, weighs 24 pounds.)

Rack Mount Type RM529 \$1100
(5 $\frac{1}{4}$ " high, 19" wide, 20" deep, weighs 27 pounds.)

Power consumption of each model is \sim 80 watts — no fan used.

U.S. Sales Prices, f.o.b. Beaverton, Oregon

Tektronix, Inc.



For complete information, contact your
nearby Tektronix field engineer or write:

Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97005

SEE THE LATEST TEKTRONIX INSTRUMENTS AT WESCON—BOOTH 428-433

Circle 41 on Reader Service Card

INDUSTRY NEWS

Continued from page 11

perform CATV management and consulting services, assist in new franchise acquisitions, system design and construction, and in financial and technical problems of system operation. Offices will be located in Los Angeles and N.Y.C.

New Wire Plant

Belden Manufacturing Co., Chicago, has begun construction of a 50,000 sq. ft. plant on a 40-acre plot a mile south of Pontotoc, Miss. When completed in September, the facility will be used for insulated copper magnet wire production.

Telex Buys Viking of Minneapolis

The Telex Corp., Tulsa, Okla., has agreed to acquire the assets and assume certain liabilities of Viking of Minneapolis, Inc. and an associated firm, Viking Tool & Die Co., from Peter A. Rasmussen, according to a joint announcement by Mr. Rasmussen and Roger M. Wheeler, board chairman of Telex. Telex is also purchasing additional real estate leased by one of the companies.

NAMES IN THE NEWS

Hugh W. Granberry, former district manager of G-E's broadcast and CCTV equipment sales in the northwestern states, has been appointed manager, RF Product planning and systems engineering of the Visual Communications Products Div.



H. W. Granberry



R. L. Manahan

Syracuse, N.Y. Mr. Granberry will be succeeded by Robert L. Manahan, who will continue to operate from the Palo Alto, Cal., headquarters.

Glenn I. Baxter has been named manager, broadcast products div. of Northern Electric, Ltd., with headquarters in Belleville, Ont.

John F. Dille, Jr. was reelected Board Chairman of NAB; Robert Ferguson moved up from vice chairman to chairman, TV Code Board. John Murphy was elected vice chairman. Grover C. Cobb, vp and gen. mgr., KVGB Great Bend, Kansas, was elected chairman of NAB's Radio Board of Directors. George W. Armstrong, exec. vp and gen. mgr., WHB Kansas City, Mo., was elected vice-chairman. Mr. Cobb succeeds

Jack W. Lee, vp, Capital Cities Broadcasting Co. and gen. mgr., WSAZ Huntington, W. Va. Mr. Armstrong succeeds Mr. Cobb.

William J. McGuckin has been appointed western regional manager for Spencer-Kennedy Labs., with responsibility for the firm's national advertising and public relations. Mr. McGuckin is headquartered at 5800 N. 19th Ave., Phoenix, Ariz.

Daniel T. Green was recently appointed New England sales rep by Visual Electronics Corp., according to George H. Wagner, v.p. and sales manager. Mr. Green was formerly v.p. of Comrex Corp.

E. S. Shortess has been appointed national sales manager of the meter div. of Hickok Electrical Instrument Co. Sales headquarters has been moved to Grand Junction, Colo.



E. S. Shortess



Wm. G. Laird

William G. Laird was appointed v.p., engineering by the board of directors of TeleMation, Inc.

James J. Clerkin, Jr., pres of GT&E Communications, Inc. has announced the appointment of Wenton F. Stewart as v.p. and general manager.



W. F. Stewart



James C. Bell

James C. Bell has been named assistant treasurer and comptroller of Stainless, Inc., according to Henry J. Guzewicz, pres.

William W. Wilcox has been appointed Memorex Corp. sales engineer, according to Vernon Kuellmer, midwest regional office manager.

Alfred L. Ginty has been elected v.p.-marketing and sales, Anaconda Astrodata Co. Robert A. Brooks has been appointed marketing manager, CATV.

Donald Spencer has resigned as board chairman of Spencer-Kennedy Labs. and will continue as a director and consultant. George W. Brewster, who served as board chairman until September 1965, has been re-elected chairman. Charles H. Wright, pres. and chief executive officer, is directing the company's CATV installations.

FULL SHIELDING

• PLASTIC CLIP
• MALE CONNECTOR
• & FERRULE SUPPLIED

THE NEW T-15 TRANSFORMER

WON'T PULL OFF

EPOXY FILLED
T-15 CUTAWAY

TRANSFORMER T-15
when ordering
SPECIFY ORDER No. 102

**STRONG . . . 300 OHM TWIN LEAD, COM-
PLETLY ENCAPSULATED TO PREVENT PULL-OFF**

CEP's Model T-15 Matching Transformer is the only one on the market that is completely potted and EPOXY FILLED for durability! Full-shielding metal can with plastic covering to prevent shock.

CRAFTSMAN
ELECTRONIC PRODUCTS, INC.
133 WEST SENeca ST.
Area Code 315

MANHATTAN, N.Y. 10104
Phone Overbrook 2-9105

CRAFTSMAN
MANHATTAN, N.Y.

Circle 42 on Reader Service Card

ROUNDTABLE

Continued from page 68

tion, just as they will be in pay TV and/or CATV.

Problems

- There will be many as the mad scramble goes on between those who "view with alarm," and those who "point with pride." The "have-nots" will welcome change; the "have" will resist it. But, just as the networks and major corporate groups will continue to diversify *out* of broadcasting and into other fields (ala George Storer), there will be other equally large companies diversifying *into* broadcasting.
- The day of the independent is going to get lonelier than it has been in the past, despite the Commission's well-intentioned efforts to thwart bigness.

CATV

- CATV, or Cable TV For Pay, as I call it now, will get bigger and bigger. And if the program rights issue isn't solved soon it will create a ground swell of support for over-the-air, scramble-signal pay TV as being the *only way* a station, or network, or corporate group, or regional, can protect its property rights.
- I predict that the copyright issue *will* be solved, within the next two years. And, of course, it will be solved *in favor* of copyright owners.

Management

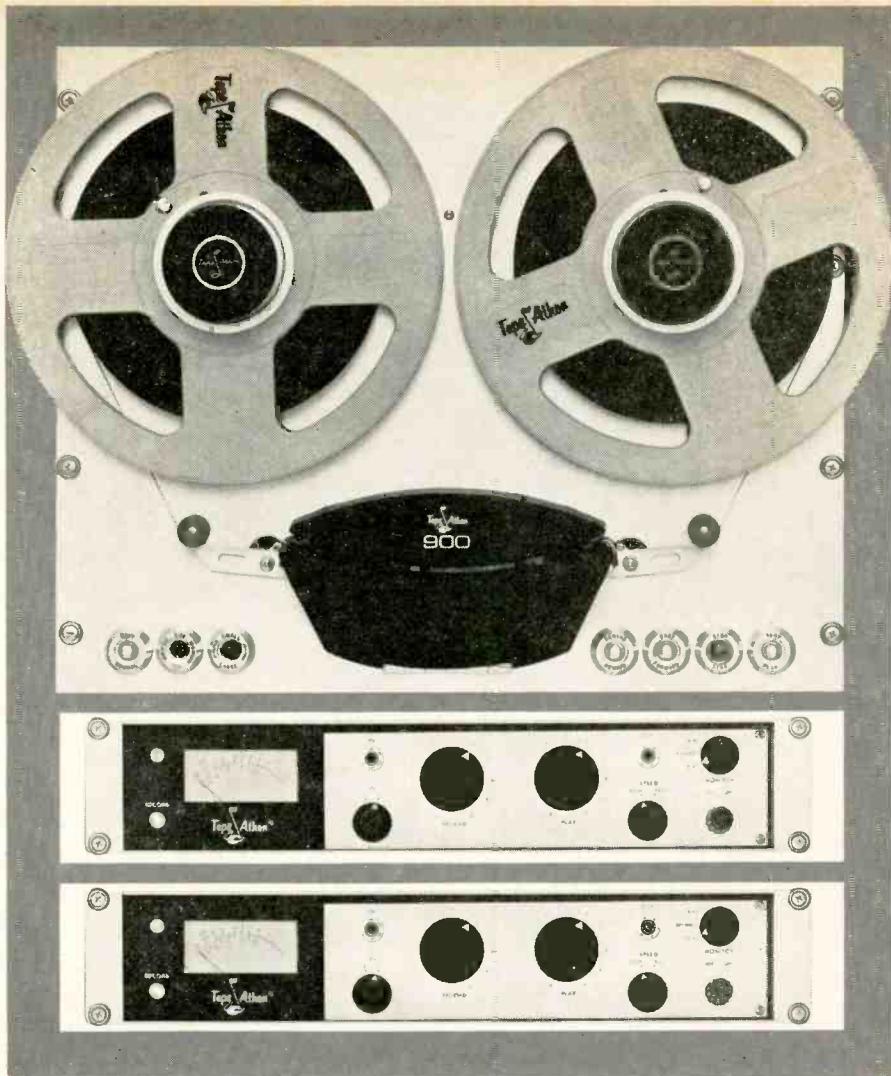
- Lack of creative management at the station level will plague the entire industry over the next 10 years, and this will be the most perplexing problem of capital as it attempts to expand into independent UHF.

FCC

- General posture of the FCC will remain much as it is today—hounded, hampered, locked-in and made ineffectual by a Congress knee-deep in broadcasting investments. This may become one of the major issues in a Presidential election, possibly within the next 10 years.

Satellite Transmission

- I go along with those who predict satellite-to-station transmission within 5 years. I do not go along with those who speculate on satellite-to-home transmission in 5 years, or 25 years. There are copyright issues and property rights involved, just as there are in CATV.
- With all this, TV will remain, by far, the most dynamic advertising medium ever.



A New Name Hits the Recording-Broadcasting Industry

900

PROFESSIONAL TAPE RECORDER/REPRODUCER

- ◆ WITH A DUAL-CAPSTAN TAPE TRANSPORT for split-second timing, measured tape speed, long term accuracy, and precise programming.
- ◆ ALL SPECS MEETING OR EXCEEDING NAB for unexcelled performance in broadcasting, logging, monitoring, studio or educational applications.
- ◆ SOLID STATE ELECTRONICS for highest reliability, compact packaging, modular construction, easy servicing.
- ◆ TOTAL VERSATILITY featuring 10½" or 7" reel sizes, all tape speeds, automatic reversing, 2 or 4 track, editing mode.
- ◆ "AUTOMATIC" THREADING saves both time and tape—unique curved tape slot automatically places tape correctly.
- ◆ Priced well-below comparable professional tape recorders.

AND IT'S AVAILABLE FOR IMMEDIATE DELIVERY

Tape-Athon.Corp.

523 S. HINDRY
INGLEWOOD, CALIFORNIA 90307
TEL: (213) 678-5445

900 BROCHURE
AVAILABLE ON REQUEST



Circle 43 on Reader Service Card



Presenting Metrotech's Two-Direction Slow Speed Logger

12-16 Operating Days of Continuous, Unattended Logging Time for any Broadcast or Communications Requirement.

Tape cost less than 4¢ per hour—or \$1.00 for a 24-hour day.

Heavy duty Transport with latest solid state electronics is fully automatic and provides exceptional fidelity—3 db from 200-2700 cps with adjustable equalization.



A complete line of Professional Recorders/Reproducers, operating at standard speeds, is also available and surpasses all N.A.B. specifications.

Write today for six-page illustrated brochure and price information.

SERIES 500

METROTECH INC. 670 NATIONAL AVENUE ■ MOUNTAIN VIEW, CALIF.

Circle 40 on Reader Service Card

Non-Network Programming

Continued from page 27

local, a much greater variety of program sources will become necessary, including coverage of vital community issues which provide opportunities to develop shows based on exploiting conflicts and ideas. Local news and public affairs programming, long a vital element in radio, should offer many valuable low-budget programs.

In some cases a local station will find it profitable to feed live programming to stations in nearby cities. Coverage of special news or sporting events is one example of programming which might interest audiences in cities up to 500 miles away. Other live programs with no particular time value may be taped for later use by other stations.

Cost-Per-Hour

Obviously, rates to advertisers have to be held within reach of local merchants, and within a realistic cost-per-thousand for national and regional advertisers. Since basic overhead costs (equipment, maintenance, manpower, etc.) are pretty well fixed, program costs have to be held within strict budgetary limits. Operating costs for each commercially available hour must, of course, include overhead expenses for time devoted to public service, thereby pushing commercial hourly overhead a bit higher.

Since total hourly operating costs obviously cannot exceed the amount charged advertisers, the amount of money available for programs must fall between overhead costs and potential hourly income.

Ratings are non-existent for a new station, so they have little choice but to base their rates on potential audience ratings (and hope!). An experienced operator will, by intuition, have a pretty accurate feeling for the market and, apprised of operating costs, be able to set a fairly equitable rate, hopefully eliminating rate juggling during the early months of operation. Rates based solely on operating costs have also been established in new stations by simply adding the commercial hour overhead and program cost to a percentage figure designed to include a reasonable profit and cover unsold time.

When WFLD began operation in January '66 they set a goal of \$100 per hour for program costs, including remotes (an average of four a week), line costs, sports rights, etc. Currently, they are programming at a cost of \$173 an hour, which they do not consider too bad for a city like Chicago.

Conclusion

Obviously, management philosophy will play a major hand in programming direction, guided by prevailing audience factors such as ethnic makeup, age, education, income, family size, etc. Tempering the decisions is achievement of a desired image and building an audience which will induce advertisers to buy time.

With a projected format and a capable staff, it is a matter of blending available, carefully-selected elements into a finished product. In most cases it is a formidable task, the kind "go-getters" can sink their teeth into.

LITERATURE of INTEREST

For additional data, circle No. shown on Reader Service Card.

Video-pulse distribution amplifier described in flyer from Ball Bros. Research Corp. Mark IX is designed for color operation. 170

Monitor amplifier/speaker described in brochure from Lang Electronics. Includes solid-state amplifier with switch to monitor several lines. 171

Color stabilizing amplifier provides automatic video level control, clamping, sync level. Specifications in brochure from Vital Industries. 172

Color camera pulse group amplifier offers 6 channels or double-4 units. Operates with one amplifier per camera. Details from Applied Electro Mechanics, Inc. 174

Transmitter remote control described in brochure from Bionic Instruments. Model 615-C offers 16 functions with no dials or steppers. 175

Tower building and maintenance services described in brochure from C. L. Gardner Communication Construction Co. Yearly contracts for beacon and lighting service. 176

Taped message repeater designed for sales presentation or public station promotion. GP-360 described in brochure from Goodway Printing. 177

Tape program logger described in 6-page brochure from Metrotech. Series 500 operates both directions offering 12-16 days logging. 178

Microwave and related equipment catalog from Lenkurt lists standard products and services. 36-page catalog includes specifications and photos. 179

Remote amplifier offers 4 mic channels, weighs 11½ lbs with batteries. RA-4C described in flyer from Broadcast Electronics. 180

Alarm panel for remote control unit provides alarm output when either of 2 parameters deviate from limit. AP-12, described in data sheet from Rust, is designed to operate with Autolog. 181

Video switcher designed for broadcast operation described in brochure from Northern Electric. Preset automatic mixing system, 13 event memory, and special effects generator may be customized. 182

Audio loudness control described in data sheets from Fairchild Recording Equipment Corp. Balance/Gard

acts on continued sound intensity, not on every peak. 184

Program control unit designed to control as many as 9 tape sources. Simplex Programmer Model STC-9, described in catalog sheet from Automatic Tape Control, provides sequential control of 24 events. 185

Broadband antennas covering a frequency range from 8 to 70 mc listed in 20-page brochure from American Electronic Labs., Inc. Includes design, characteristics, terminology data. 186

Video transmitter test assembly described in brochure from Rohde & Schwarz. Caster-mounted unit includes video sweep generator, selective receiver, scope, video generator with signal mixer, sync generator. 187

50-kw AM transmitter with vapor phase cooling described in brochure from Gates Radio. VP-50 uses 4 tubes cooled by liquid vapor system. 188

Color camera for CCTV described in data sheets from Cohu Electronics. Series 1000 offers auto light level compensation, remote control to 1000', optional lenses and 9" viewfinder. 189

Videodisc recorder described in catalog sheet from MVR Corp. Provides instant replay of 20-sec. segments with individual freeze of any part of 20-sec. segment. 190

Displacement recorder automatically repositions sound track of processed 16mm film to editor sync. Brochure from Magnasync Corp. gives details and specifications. 191

Tape head replacement and conversion guide for cartridge machines available from Nortronics. Includes Quik-Kits for rear-mount heads. 192

Video switching matrices listed in catalog from Trompeter Electronics. Units may be remote controlled by toggle or push-button switches or by automatic card or punched-tape devices. 193

VHF-UHF Translator described in catalog sheet from EMCEE. Model SSV-1 1w uses double conversion, operates from 24v DC or 110v AC @ 25w. 194

TV field strength meter listed on catalog sheet from Entron. Model M-1 covers VHF and UHF radiated or conducted signals. Portable unit weighs 4 lbs. 195

Sync generator described in brochure from Dage-Bell Corp. Type 585 features digital logic switching techniques in modular plug-in units with auto changeover option. 196

CATV distribution amplifier described in data sheet from Spencer-Kennedy Labs. Model 262 offers 50 db gain with fixed and variable tilt. 12-channel bandwidth. 197

Video switcher offers vertical interval switching with custom designed control panel. Brochure from Riker Industries lists specifications, including color capabilities. 183

Books on all phases of radio-TV-CATV, many unavailable from other sources, fully described and illus-

trated in 18-page literature package from TAB Books. 173

Zoom scale for 12-120 zoom lenses described in catalog sheet from Birns & Sawyer. Includes specifications, prices. 198

Audio distribution amplifier described in technical information from Ward Electronic Industries. Each module provides 6 outputs; 10 units fit in 5¼" frame. 169

TV AGC amplifier, solid-state construction, with self-contained power supply described in fact sheets from Dynair. 168

Magnetic mat recording/reproducing system discussed in illustrated "Cue-Matic" brochure from Ampex. 167

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2 experienced announcers for 5 kw AM, 50 kw FM, combined operation. Send audition and complete resume with references & photo to: Donald E. Knowles, Pres., Coastal Broadcasting Co., Inc., 68 State St., Ellsworth, Maine.

HELP WANTED (continued)

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Experienced engineer for 1000 watt AM station in midwest—Require good maintenance background—Contact Bob Olson, WJMS Ironwood, Michigan. Send all information and salary expected.

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Chief Engineer needed for metro station to handle studio, mtr and pattern, and eventually supervise several stations of chain. Contact Chuck Mefford, WITL, Lansing, Michigan.

Opportunity combination news, production and announcing. Send details: KFRO, Longview, Texas.

Man for production and copy, etc. Salary open. No collect calls. Jim Hairgrove, KBRZ, Freeport, Texas.

Immediate opening, chief engineer; some announcing; 1000 watt daytimer, also FM. Box 389, Williamsport, Pennsylvania.

Engineer needed immediately with some announcing ability. Contact KEVL, P.O. Box 309, White Castle, La. Phone 3160.

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For Sale: Three slightly used Model 702 Tape-Athon portable tape players. Two 7 inch reel machines and one 10 inch reel machine, complete with pre-amps. Each machine completely checked and in like new condition. 7 inch machines \$150.00 each. 10 inch machine \$195.00, machines are for either 1 1/2 IPS or 3 3/4 IPS. Contact Priv-O-Line T.V. Cable Co., Safford, Arizona, Phone 428-1313.

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15% off list price of Ampex and Viking tape decks. 22% off Fisher, Pilot, and J. B. Singer Electric, 222 Lenox Road, Brooklyn, N.Y.

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ADVERTISERS INDEX

Advance Industries	46
Altec Lansing Corp.	58
Ampex Corp.	57
Anacoda Astrodata Co.	36-37
Automatic Tape Control	45
Ball Brothers Research Corp.	17
Belden Mfg. Co.	48
Birns and Sawyer Cine Equipment	50
CBS Laboratories	5
Craftsmen Electronic Prods., Inc.	62
Delta Electronics, Inc.	60
Electro-Voice, Inc.	Cover 4
Entron, Inc.	41
Fairchild Recording Eqpt., Co.	50
Fairchild Space and Defense Systems	20
Ft. Worth Tower Co.	65
International Nuclear Corp.	55
Jerrold Electronics Corp.	Cover 2
Kaiser-Cox Corp.	15
Magnecord Sales Dept., Midwestern Instruments, Inc.	51
McMartin Industries	10, 11
Melcor Electronics Corp.	18
Metrotech, Inc.	64
Moseley Associates, Inc.	56
3M Co., Magnetic Products Div.	19
Revere-Mincom Div.	12-13
W. A. Palmer Films, Inc.	56
Pruzan Co.	54
QRK Electronic Products	60
Raytheon Co. CADPO Div.	59
Riker Industries, Inc.	Cover 3
Sony Corp. of America	47
Spadeco, Inc.	31
Sylvania Electronic Tube Div.	49
Syntron Co.	53
Tape-Athon Corp.	63
Tektronix, Inc.	61
Townsend Associates, Inc.	7
TV Cable Supply Co.	43
Viking Industries	3
Ward Electronic Industries	9
Wilkinson Electronics, Inc.	8

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MANAGEMENT ROUNDTABLE

UHF—A Look Into the Future

WHAT WILL life be like for independent UHF TV during the next 10 years? What about the 4th network, programming, audience, commercial patterns? Sterling C. Quinlan made some predictions recently in an address before the Ohio Broadcasters Association. Here are the highlights of that speech.

THE TEMPTATION to speak on a subject like "The Next 10 years in TV As An Independent UHF" is too much for any broadcaster to resist. But let me establish at the outset that yours truly has, basically, no more credentials for predicting the future than many of you have. However, I may have one slight edge on you, and that edge may be the fact that I am now in UHF broadcasting as in *independent*. I had damn well better be thinking about the next ten years, because it's the next ten years that I must face—very critical years in which UHF independents must make it or break it.

Let me begin by saying that the next decade will be both good and bad. After this past decade of steady, even phenomenal growth, broadcasting generally, I predict, is going to come in for some *startling* and *sensational* changes. The reasons for these changes? Color it UHF largely. UHF will be the villain, or the hero, depending on how you look at it.

Networks

- I think there will be at least one more network... probably specializing in prime time sports. There may be two more networks, as we know network patterns today.
- I predict an expansion of true *regional* networks among UHF stations, linked together, many by microwave relay, as is done in Germany. The FCC will look with favor on this kind of UHF expansion and will waive, or change, a number of its present rules which would tend to restrict independent UHF growth.

Programming

- I believe it is entirely possible

Mr. Quinlan is president, Field Communications Corp. (WFLD) Chicago.

that a large central program pool will be created from the output of UHF stations and exchanged at little or no cost between stations. More format testing than ever before will go on among VHF stations. Every conceivable stylized program format will be attempted: teenage, all news, all sports, all talk, ethnic, country and western, etc. Many will fail in one place, but succeed in another, making it difficult to judge why a format will click in one city and fail in another. Market differences will emerge more clearly than ever before. The greatest successes will be in regional network operations.

Audience

- Will there be audience fragmentation? Yes, of course, but not as much as you might think. If I were a VHF network affiliate, I wouldn't worry about fragmentation. The result of UHF expansion will be merely that the total audience will have MORE to choose from. Therefore, the total audience will be titillated more, respond more, and therefore grow larger. If we are playing now to an average of 40-50% of the homes in prime time, I predict that we will be playing to a much larger average 10 years from now; perhaps 65-75%, because the TOTAL POTENTIAL audience will be offered more program choice by independent UHF stations. Among the more spectacular *failures* will be those that attempt to imitate network affiliates by running all network rejects.

Commercial Patterns

- I predict that they will change radically. Networks will be running 10 and 12 spots per hour, and individual stations will run an almost continuous parade of commercials. This isn't a prediction I am pleased to make, but I'm stuck with it by conviction. Many agencies will continue to buy foolishly by numbers

only, thereby hoodwinking clients with the phony numbers-only mystique. There will NOT be much more improvement in rating methodology, primarily because networks and stations will not want to pay for it.

The Code

- It will still be with us, but we'll hardly recognize it. The code will be more flexible than any of us can dream.
- I think we will have liquor advertising within the next 5 years. Good taste will make it as acceptable as that for foundation garments. Moralists will point out that liquor ads can scarcely be refused when the industry accepts vast volumes of cigarette advertising.
- Superpower UHF stations will pop up increasingly, causing some networks to switch affiliations because UHF will be able to radiate unlimited power. The silly canard that UHF is in any way inferior will disappear rapidly.
- There will be a scramble for height about 1973, as Uncle Sam reclaims the VHF spectrum and puts all stations in the UHF spectrum. The powerful land mobile services, backed by the military, will have a fairly easy time making this switch.

Set Penetration

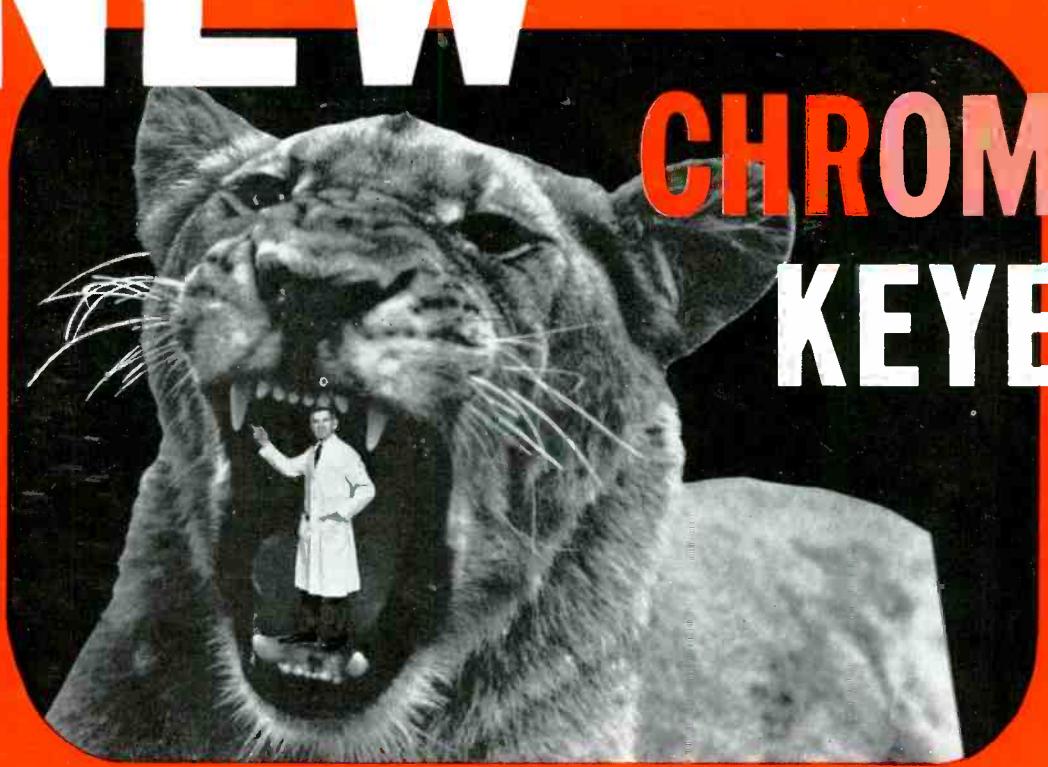
- UHF will catch up with VHF in set penetration between mid-69 and mid-70. I think the multi-set home count will reach over 100% by 1976, and color set penetration will be about 75% by 1976.
- Once attained by the majority, color will begin to lose some of its effectiveness; like anything else, color can be overdone. (Hollywood learned this long ago.) Some critics and viewers will discover that mystery thrillers and grim dramas, as well as many other program types, are best presented in realistic black and white.

Ownership

- The 7-station limit for corporate groups will be increased at least to 10, and perhaps to 15—very likely to 15 for those who concentrate solely on UHF.
- Networks will be in UHF opera-

Continued on page 63

NEW RIKER CHROMA KEYER



THE MODERN WAY TO ACHIEVE
CLEAN INSERT KEYING IN
COLOR OR MONOCHROME



MODEL 5641—CHROMA KEYER

Chroma Keying provides the most accurate and reliable inserts and effects in color or monochrome programming where color cameras are available. The requirements for shadowless lighting and careful control of grey scale, essential in monochrome keying, are relatively unimportant in Chroma Keying, since any color can be chosen to determine the keying signal by hue (phase) only, without regard to luminance.

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In the new RIKER MODEL 5641 CHROMA KEYER, all transistor circuitry has been used for highest performance and to eliminate instability and drift found in older tube-type design. Utilizing the standard RIKER module packaging the all-transistor design will operate with the RIKER MODEL 540-A or any other Insert Keyer.

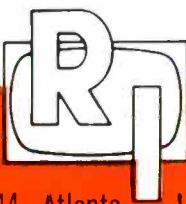


MODEL — 5640 DECODER

For color studios, Riker adds to its line of color modules a new useful all-transistor decoder. Its function is to derive RGB information from encoded color signals.

The DECODER allows distribution of encoded signals to studio equipment requiring RGB, such as Special Effects or Chroma Keyer. Color video tape may be decoded for reprocessing and correction of faults in the original recording. The RIKER module packaging allows easy installation of the Model 5640 DECODER wherever decoding is required.

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