A MACTIER PUBLICATION / MARCH 1967

BM/E

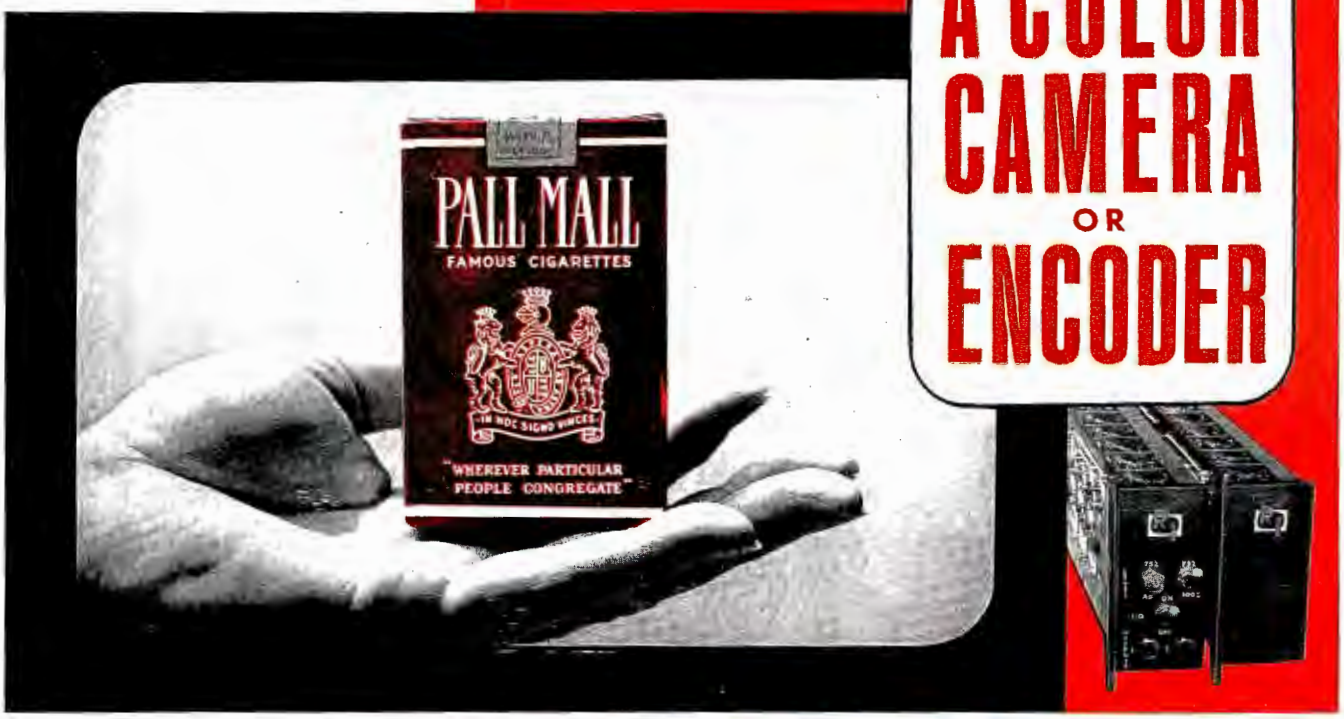
THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING

Analyzing Video Systems

NAB Preview

COLOR COLOR COLOR COLOR COLOR

NOW COLOR WITHOUT A COLOR CAMERA OR ENCODER



INTRODUCING THE RIKER COLORIZER

The RIKER COLORIZER allows even the smallest station to swing to color. Now for the first time, broadcasters can produce color station breaks, color commercials and network color inserts using existing monochrome cameras.

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. . . Any 3 pre-selected colors
. . . Manual selection of color
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This unique production tool is designed for economy, speed and simplicity of operation. For example: black and white film may be developed normally to generate color. Color inserts may be varied without changing luminance.

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. . . Color ID's and titles

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- Encoded Color Bar Generator
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- 3.58 MC Phase Shifter
- Plus Many Others

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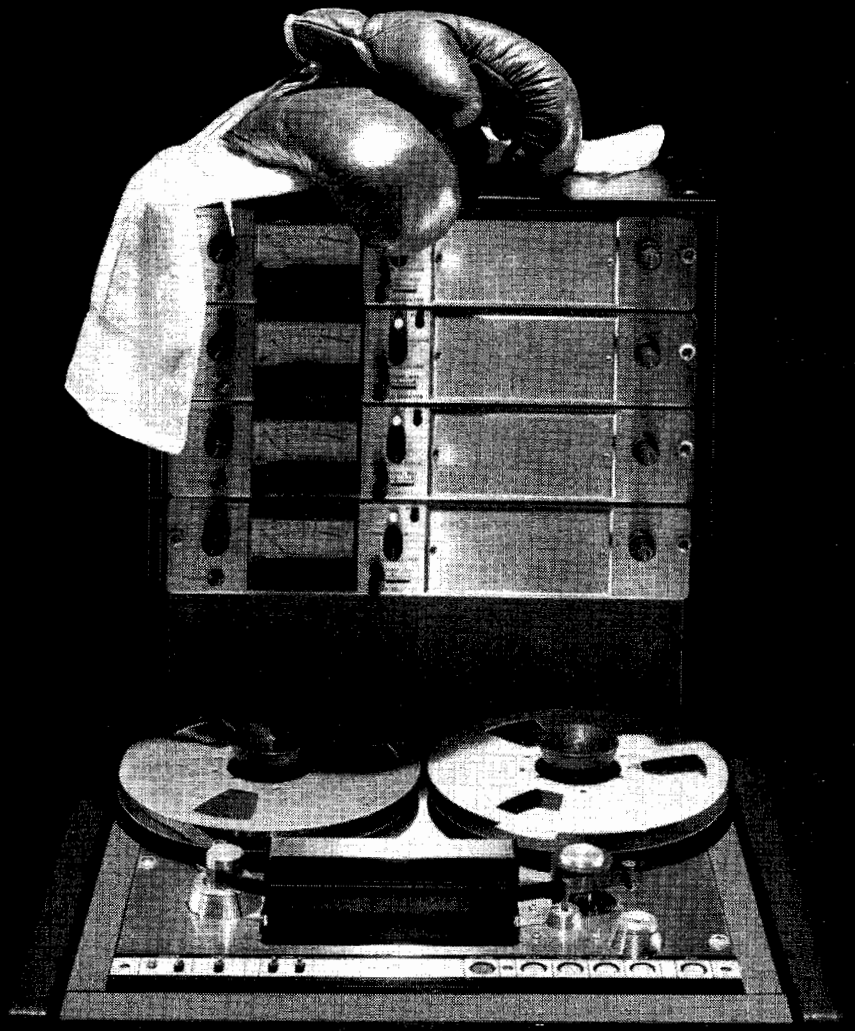
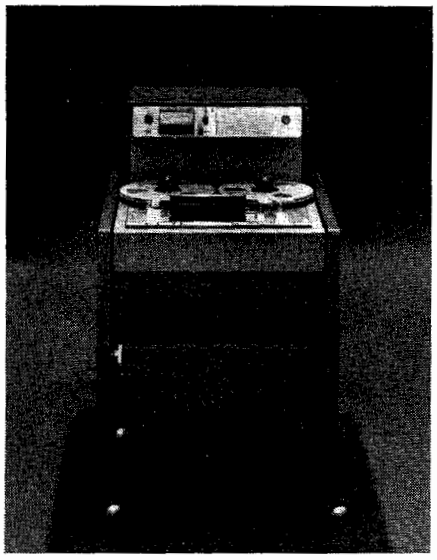
Circle 1 on Reader Service Card

A rugged new professional from Ampex is ready for all assignments





Start with a 1, 2, 3 or 4 track Record/Reproduce; or Reproduce-only. Plug-ins make changes fast.

Introducing: The AG-440

It's ready. Rugged. With new solid maintainability for the broadcaster. New lightning-fast convertibility for the master recording studio. Our new Ampex AG-440 professional audio recorder has everything—no other recorder can match all of these features:

Precision-milled transport surfaces assure automatic alignment of heads, motors and assemblies. Exclusive ribbed, heavy-duty die-cast top plate maintains precision alignment.

Plug-in head assembly and plug-in heads permit rapid interchange . . . 4, 3, 2 and 1 channels.

Instant tape-guide convertible–from ¼" to ½" tape.

Exclusive front mounted plug-in boards for bias amp, record and reproduce electronics. Instant replacement.

Master bias oscillator and regulated power supply, in transport. Feeds up to four channels.

New three-way push-button editing: 1.) brake release for manual cueing, 2.) play-edit, and 3.) fast-cue-finding.

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Exclusive precision-lapped triple-shielding on play head minimizes magnetic interference.

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Individual switches adjust tensions for different reel size on each side.

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Push-button solenoids permit either local or remote control with smooth tape handling.

Newest Ampex advanced engineering, all solid state.

Your choice of interchangeable versions for rack mounting, console or portable case—all expandable and *ready for all assignments!* *TM Ampex Corp

For an illustrated brochure showing many other features of our rugged new AG-440 professional recorders, write to: Ampex, Room 7-14A, Redwood City, Calif. 94063.

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MARCH 1967/VOLUME 3/NUMBER 3

BM/E

THE MAGAZINE OF BROADCAST MANAGEMENT/ ENGINEERING

Cover this month, in not quite full chroma, salutes the feature article, page 34, Analyzing Video System Performance. Any resemblance of the instrument scope is purely "artistical."

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Just send this page to CBS Laboratories, or call us collect at (203) 327-2000. We will send Audimax and Volumax to your station. If you want to send them home after 30 days, we'll even pay the freight. But if you want to make your station their permanent home, all you do is pay $665 for the Audimax and the same for the Volumax. Add $30 more if you need an FM Volumax.

At the end of that period, chances are you'll be so sold on Audimax and Volumax you will want to buy them.

And you should. After all, they can increase your program power 8 times.

Solid state Audimax is an automatic level control years ahead of the ordinary AGC. By automatically controlling audio levels, it frees engineers, cuts costs, boosts your signal.

Volumax, also solid state, outmodes conventional peak limiters by controlling peaks automatically without side effects. By expanding effective coverage and improving reception, it brings in extra advertising revenue.

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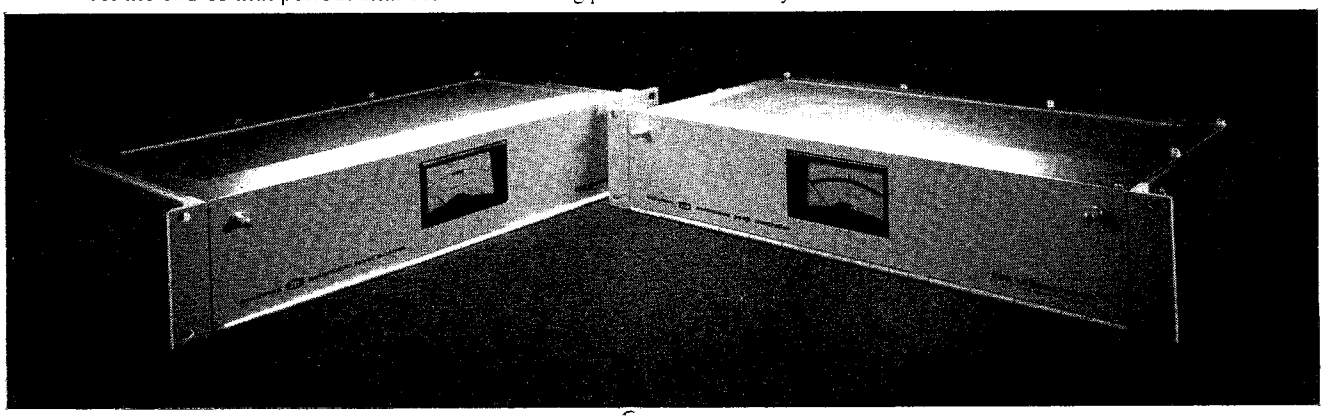


Circle 5 on Reader Service Card

BROADCAST INDUSTRY NEWS

Guideline for Public Television

The long awaited Carnegie Commission report on educational television for the general community has been made to the public. Initial and continuing reaction has been favorable. Among the commission's recommendations are these:

- Increase the number of ETV stations — 150 by '69, 240 by '72, 380 by '80.
- Provide heavy support of programming — Local station program production of 20 hours per week each, and 10 hours weekly from two national production centers.
- Create a public corporation to dispense funds — nongovernmental (six directors appointed by the President, confirmed by the Senate; remaining six appointed by the first six.)
- Raise funds by excise tax to supplement local, state, federal, and private funds — Excise tax of 2 percent on TV sets increasing to 5 percent ($56 million to $104 eventually), appropriation from HEW ($68 million rising to $91 million), local, state and gift ($54 million to $75 million) for an initial budget of $178 million per annum rising to $270 million by 1980.

The amount recommended for capital construction would average $66 million annually for four years, the greater part of the budget going into programming. The $178 million budget is about three times higher than the '65-'66 fiscal year expenditures for ETV of $58.3 million. Some of the funds would be spent on distribution or interconnection of ETV stations. The commission asked for preferrential rates from carriers (which AT&T has said is not possible).

A salient feature of the proposal for the corporation for public TV is that it be free from government control. The commission placed great emphasis on supporting local programming as contrasted with developing a strong national network.

The report called for research to find ways of improving instructional or classroom TV as well as public TV, but the commission concentrated most of its recommendations of the public sector. Full details on the commission's report are available in a $1 paperback from Bantam Books, Public Television — A Program for Action.

Noise Report Available

A technical committee working group under the direction of FCC engineer Jules Deitz, has completed a study and report on man-made noise in the Land Mobile Services. The report is available from the Office of the Chief Engineer, FCC, Washington, D.C. 20554.

Anxious color casters arrive at General Electric's Visual Communications Products Division in Syracuse, N.Y. for pickup and tender loving care of GE PE-250 color camera. Pilot and copilot (second and third from left) of plane owned by KATV, Griffin Leake TV, Little Rock, Ark. plan to make color-camera airlifts of five more cameras for two other Griffin Leake stations—KTUL-TV, Tulsa and KWTV, Oklahoma City. Others in photo are members of GE's Visual Communications Products Department.

NAB Publishes "Cook Book" on Broadcast Research

The National Association of Broadcasters recently introduced a primer for radio and television executives which gives a practical, "cook book" approach to station research.

Howard Mandel, NAB vice president for research, told delegates to the NAB's opening Fall Conference that the Association's new booklet, "A Broadcast Research Primer," emphasizes the "nuts and bolts and how-to-it" in a way that keeps theory to a minimum. But, he added, the booklet presents technically valid and widely accepted procedures.

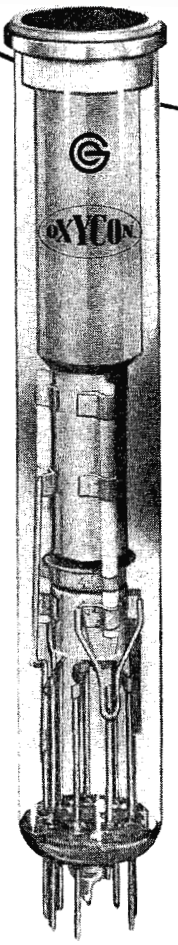
Though the booklet primarily is intended to show operators of small broadcast stations how to do research, information also is included on how to tell when it's worthwhile to call in professional help.

NCTA Sets Cablecast Code

National Community Television Association directors meeting in Florida last month adopted an ethical code for those doing local origination. Code is patterned after that of the NAB. Covered are community responsibility, selection of programs, responsibility to youth, how to handle news and public events, handling political and controversial issues, and contests.

The directors also reviewed NCTA's position on copyright legislation which may be adopted this session. (NCTA's position: 1. No copyright liability within the normal reception range of a station. 2. When the system is in an inadequately serviced area (no grade A signal), a compulsory license should be given with a statutory formula for copyright fees. 3. In an adequately serviced area, license from

OXYCON™



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distant stations must be obtained. 4. If a CATV does its own origination, it should secure a license like any other user and copyright legislation should not inhibit such origination. The NCTA is also on record as favoring a grandfather clause exempting all CATV systems in use on January 1967 from copyright laws.

The association plans regional workshops on copyrights to keep all interested parties informed. Also planned for March is a demonstration and seminar cablecasting at Cox Cablevisions new facility at Shaker Heights, Ohio.

Other business: acceptance of a management report on NCTA's functions; establishment of a technical education committee, under chairmanship of James Palmer, president of the Pennsylvania Association.

NAB Asks FCC to Revise Monitoring Rules

The National Association of Broadcasters has asked the FCC to revise its regulation to allow broadcasters to monitor their remotely-controlled directional antenna systems by remote control.

In an 80-page filing by NAB Counsel Douglas A. Anello, the Association said 1957 criteria established for metering and inspection of remotely-controlled systems are outdated.

A broadcaster now must make a daily trip to the transmitter to read and log certain parameters. The revision NAB seeks would allow such metering to be made by remote control.

The Association said its suggested changes would provide broadcasters and the FCC with "Adequate safeguards" for the operation, metering and logging of the directional antenna performance.

ARB Changes Survey Plans

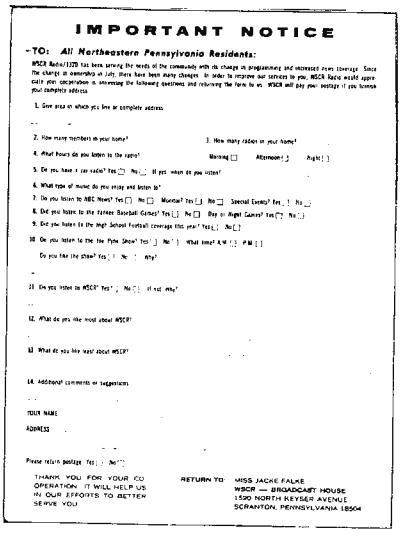
Dr. Peter Langhoff, American Research Bureau president, has announced that the firm's radio audience measurement service will be expanded to more than 50 markets from its current 30 market service effective with the April/May surveys. At the same time he also revealed plans for testing a system of radio-TV coupled data which could lead to a data bank for "vastly widening the opportunity for exploration of all manner of advertising combinations."

The move represents a change in ARB's previous plans to first conduct an intensive all-county radio coverage study and expand to additional markets from the data base which such a study would provide. Though acceptance was widespread, ARB felt that industry response was insufficient to warrent conducting the study at this time, and that the best course of action would be to broaden the base of the market report service.

WSCR Reports Success With Audience Poll

WSCR Radio in Scranton, Penn., recently concluded an audience participation poll in attempting to meet FCC requirements in determining the programming in Pennsylvania's third largest market.

The questionnaire was prepared in such a way that anyone could answer the questions with relative ease and in a short time. The



IMPORTANT NOTICE

TO: *All Northeastern Pennsylvania Residents:*

WSCR Radio/1229 has been serving the needs of the community with the change in programming and increased news coverage. Since the change in ownership on July, there have been many changes. In order to improve our services to you, WSCR Radio would appreciate your cooperation in answering the following questions and returning the form to us. WSCR will pay your postage if you forget your complete address.

1. Give area on which you live or complete address

2. How many members in your home?

3. How many radios in your home?

4. What hours do you listen to the radio?

5. Do you have a car radio? Yes ☐ No ☐ If yes, when do you listen?

6. What type of music do you enjoy and listen to?

7. Do you listen to ABC News? Yes ☐ No ☐ Monday? Yes ☐ No ☐ Special Events? Yes ☐ No ☐

8. Did you listen to the Yankee Baseball Games? Yes ☐ No ☐ Day or Night Games? Yes ☐ No ☐

9. Did you listen to the High School Football coverage this year? Yes ☐ No ☐

10. Do you listen to the Joe Pyne Show? Yes ☐ No ☐ What time? A.M. ☐ P.M. ☐

Do you like the show? Yes ☐ No ☐ Why?

11. Do you listen to WSCR? Yes ☐ No ☐ If not, why?

12. What do you like most about WSCR?

13. What do you like least about WSCR?

14. Additional comments or suggestions

YOUR NAME

ADDRESS

Please return postage Yes ☐ No ☐

THANK YOU FOR YOUR CO OPERATION. IT WILL HELP US IN OUR EFFORTS TO BETTER SERVE YOU

RETURN TO: MISS JACKE FALKE
WSCR — BROADCAST HOUSE
1590 NORTH KEYSER AVENUE
SCRANTON, PENNSYLVANIA 18504

questionnaire appeared on two occasions in the *Daily Scranton Tribune,* once in the Sunday edition. The questions dealt with the station's policy of broadcasting such programs as the *Joe Pyne Show,* sports events and news policies. Mr. Rice, President and General Manager, reports rewarding response and receipt of questionnaires that reflected support for the station's editorial policies.

NAB Membership Tops 4000 Mark

The National Association of Broadcasters announced recently that its membership has crossed the 4000 mark for the first time.

It said the total record membership of 4005 represents a net increase in all categories of 340 members during the past year.

NAB said the present total includes 3281 radio station members—2226 a-m and 1055 fm—and 499 television stations. It also includes all four radio and all three television networks as well as 218 associate members among equipment manufacturers, film distributors and other allied fields.

Largest growth during the year was among fm members with a net gain of 122 fm sta- membership showed a net gain of 59 while TV station membership was up by 39. The net gain for associate members was 20.

NAFMB Plans March Convention

The Board of Directors of the National Association of FM Broadcasters met in New York City on January 12th to plan the Association's convention to be held in Chicago March 31st through April 2nd, to kick-off an intensive membership drive and to consider a closer, working liaison with RAB and NAB in their future fm projects.

NAB Board Adopts Amendment for More Flexible Time Standards

The radio Board of Directors of the National Association of Broadcasters voted recently to retain the maximum limit of 18 min/hr on commercials under the NAB Radio Code's time standards, but to permit the NAB Code Authority to approve exceptions for special circumstances which may be in the public interest.

CATV Praised for Public Service

The CATV industry has been praised "for the public service it provides and the traditions for

THE BBRC MARK VIII AUTOMATIC GAIN CONTROL VIDEO AMPLIFIER

AGC VIII

The Mark VIII is available in two models: one for use in studios where local drives can be supplied, and the other where its drive pulses can be derived from composite video signals originating outside the studio, or from VTR's. Both models have full color capabilities, designed to compensate for both video and set-up levels over a ±6 db range. For price and delivery information contact Ball Brothers Research Corporation, Video Marketing, Boulder Industrial Park, Boulder, Colorado.

- Solid-state designed and built in the laboratories of Ball Brothers Research Corp.
- Provides continuous monitoring of video levels from a variety of signal origination equipment.
- Automatically adjusts video gain and setup.
- Ideally suited to follow film chains and live cameras, or network originations.
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ingenuity and free enterprise that it typifies" by Congressman Fred J. Rooney (D-Pa.)

Rep Rooney keynoted the industry's observance of National Cable TV Week (Jan. 30 to Feb. 4) by reading his comments into the Congressional Record of Jan. 17.

Riker and CPE Negotiating Merger

Mr. Erwin Lane, Chairman of Riker Video Industries, Inc. and Mr. Herman P. Taub, President of Continuous Progress Education, Inc., recently confirmed that negotiations have been taking place with respect to the merger of the two companies. An agreement has been signed in which Riker Video Industries has an option to acquire the outstanding shares of Continuous Progress Education, Inc. No price was announced.

CPE, Inc. of Wilton, Conn., designs and manufactures a line of audio-video communications systems for educational use.

The Young Sound Goes To Viet Nam

The Armed Forces Radio and Television Service will make weekly releases of transcriptions of *The Young Sound* to more than 300 overseas radio outlets, including 14 in the Viet Nam war zone, it was announced by William D. Greene, director, CBS fm.

The Young Sound is now available to over 100-million Americans through the seven CBS-owned radio stations and other leading stations which have been licensed to broadcast it. In addition, it is estimated that AFRTS outlets have a total available audience of over 200 million around the world.

NAB Will Poll Fm Members; Backs Census Count

The FM Committee of the National Association of Broadcasters recently endorsed research to determine what types of programming fm radio stations are offering under the FCC's a-m/fm separation rule.

Information of fm programming will be collected by means of a questionnaire to be sent to NAB fm member stations.

The committee also formally supported the action of NAB, the National Association of FM Broadcasters, the National Association of Educational Broadcasters, and Electronic Industries Association in asking the Census Bureau to include fm set penetration data in the 1970 U.S. Census.

CATV Manufacturer Files Federal Court Action Against Rules

On the last day of January, Jerrold Corporation of Philadelphia began action in Federal Court to challenge the FCC's jurisdiction over the CATV industry, according to Robert H. Beisswenger, President of Jerrold Corporation.

Charging that the FCC's Sec-

ond Report and Order of March 8, 1966 is "invalid and unlawful" in imposing strict regulations on cable television reception, Alice Cable Television Corporation, a Texas-based subsidiary of Jerrold, filed an appeal petition in the Fifth Circuit Court of Appeals to review and set aside the orders.

The action was Jerrold's first opportunity legally to challenge the Commission's authority through the Federal Courts, and came as an immediate result of the FCC's formal denial two weeks ago of the firm's Petition for Reconsideration. Jerrold told the court in its petition that the Commission acted without proper constitutional and statutory authority in establishing a de facto halt on CATV expansion into the country's top-100 television markets. These markets represent over 90 percent of the television receivers in the country.

The Jerrold appeal petition further charged that the Commission acted in violation of the U.S. Constitution in "asserting jurisdiction over the CATV industry without conducting a full evidentiary hearing."

BBC Expands Second Channel

Pye TVT Ltd. of Cambridge has received a further contract from the British Broadcasting Corporation valued at more than $1.4 million for the supply and installation of transmitters to equip eight more high-power uhf stations for the latest expansion of the BBC2 television service.

The transmitters, scheduled for delivery during 1968, will have peak sync outputs of 25 kW (3 stations) and 10 kW (5 stations). They are provisionally scheduled for installation at the BBC2 stations to serve Bristol and Somerset, Hampshire, Sussex, Staffordshire, Flintshire, Londonderry, Angus, and East Lothian and Fife.

The sound and vision power amplifiers will utilize vapor phase cooled klystrons and an automatic fall-back system will be employed where, in event of a failure of either klystron, the sound and vision input signals are automatically combined and fed to the remaining tube, thus providing a lower power emergency service without separate standby equipment.

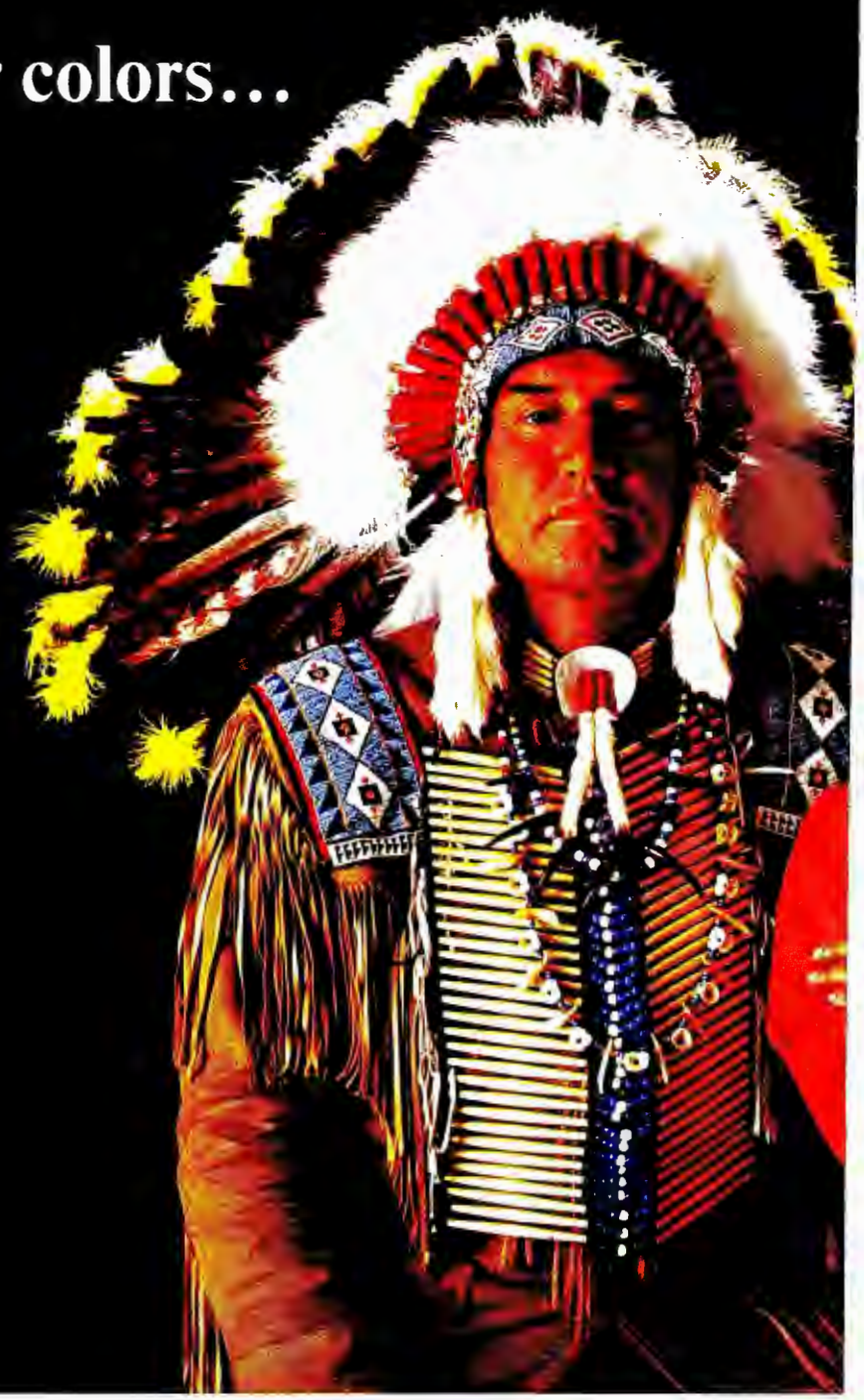
Expansion of Magnetic Tape Facilities at RCA

The Radio Corporation of America recently announced a major development and expansion program designed to strengthen its position as a world-wide supplier of magnetic tapes and other memory devices using magnetic coatings.

Mr. Charles M. Odorizzi, Group Executive Vice President, said RCA's magnetic products sales more than doubled in 1966 and are expected to double again in 1967. He noted that industry sales are expected to rise from $150 million in 1966 to more than $325 million by 1971.

The Magnetic Products Division produces a full range of magnetic tape for sound recording and playback, computer information storage and instrumentation purposes.

Livelier and truer colors...



Livelier, truer colors: Colors appear brighter, clearer, lifelike. Up to 5db better signal-to-noise ratio for multiple generation copies. New oxide, new binder, new coating technique make this possible.

Perfect copies: Create up to 4th generation duplicates that only the most experienced eye can distinguish from the master tape.

Stronger black and whites: Compatible high fidelity resolution with startling presence. Minimal background interference or blur. It's a picture that's truly alive!

Improved sound: Tape background noise is significantly reduced. New No. 399 gives you living sound to match the picture!

Total versatility: Can be used for both high-band and low-band recording. Recorders need no special adjustments or set-ups.

Cleaner running: Will not shed, block or rub-off. Leaves no oxide deposit on heads or guides. Assures better results—averages less than 15 dropouts per minute.

Longer life: Capable of three times the life of previous video tapes. No visible indication of head to tape contact. Almost impossible to wear out. Virtually unlimited shelf life.

Field proven: Thoroughly tested and proven in actual broadcasting use by networks, local television stations and production studios.

Find out how Color Tape Plus can add an exciting new dimension to your programming. Write: Magnetic Products Division, 3M Co., St. Paul, Minnesota 55119.

Magnetic Products Division 3M COMPANY

THE TERM "SCOTCH" IS A REGISTERED TRADEMARK OF THE 3M COMPANY

plus copies you can't tell from the original

color tape plus!

"Scotch" Brand Video Tape No.399

Business of CATV

CATV Operator Applies for Uhf. Burt Harris, owner of a Palm Springs CATV system and Morris H. Bergreen, owner of Palm Springs KCMJ-AM, have filed for channel 42 with a power of 243 kW.

CATV Operator Gives Channel to School: Amherst, Mass. eleven public schools plan to use channel 13 for educational purposes after being interconnected by Pioneer Valley cablevision. Program from Boston ETV station will be offered. The Board of Education and Pioneer hope to offer adult programs after 3 P.M.

City Council to Test FCC. Huntington (W. Va.) city council is considering offering a CATV franchise if it appears the franchise holder would have a 50-50 chance of getting permission from the FCC to operate a microwave system. Huntington and Charleston constitute the 45th market in the U.S.

Appleton Setting Tough CATV Rules. Prompted by radio station WAPG and the Post Corp. (which owns newspapers, radios and TV) the Appleton Wisc. City Council is considering very stringent CATV control such as full service, control over origination and high rates.

Big U Cablevision. General Electric Cablevision of Merced, Calif. will bring in uhf channels 19, 24, 30, 43, and 47—all approved by the FCC. The system uses underground cable and the installation charge is $19.50.

To Revoke Franchise. The Bucyrus City Council (Ohio) continued to take steps to revoke a 10-yr franchise granted to Crawford County Cablevision because the firm sold majority stock to outside interests (*BM/E* Feb. p 66).

Franchise Filed. In **Yonkers, N.Y.** by 3 CATV firms but TV service owners and JFD Electronics protested the action . . . **Pensacola, Fla.**, by CATV firms; opposition voiced by WALA-TV, **Mobile, Ala. . . . Elmwood Park, Ill.** by Leydon-Norwood and Multiview TV Systems, Inc. Elmwood is in nonfringe area of Chicago and would pipe **Milwaukee** and **Rockford. . . . Shelby, Ohio** by Continental Cablevision, Inc. . . . **Richmond, Indiana,** by Plains Television.

Franchise Granted. Mishawaka, Ind. to a combine of three TV stations. . . . **West Elizabeth, Pa.**, to Steel Valley Cablevision, Inc. for 3 percent of gross proceeds. connection to schools and public buildings. Connections for 90 days offered free. . . . **Wahpeton, N. D.** to Reidel Enterprises of Willmer, Minn. to bring in Minneapolis stations. City to get 2½ percent of gross profit . . . **Shelbourne Falls** Community Antenna Service (Mass.) has been granted permission to expand from 5 channels to 12. . . . **Pittsfield, Ill.** to Pittsfield Cable TV Co. in a tight vote. . . . **Anderson, Ind.**, to Cablevision Corp (GE).

Ordinance Adopted After 2 Yr. Charlotte, N.C. after 2-yr hassle adopted an ordinance, but the 10-percent fee for receipts over $1.25 million was labelled too

← Circle 12 on Reader Service Card for 3M Co. ad

high by Jefferson Hassland. Cox-Cosmos said it would file an application.

Taft Objects to CATV. Taft Broadcasting has objected to the FCC over three central Kentucky CATV firms plans to transport in channels from Chicago, St. Louis, Cincinnati and Charleston-Huntington, W. Va. as will the current channel from Lexington and Louisville. Taft says it's trying to protect uhf station, WKYT in Lexington.

Tucson Tussle Anew. The four firms who lost in Tucson to Jack Kent Cooke's Southwest Cablevision (*BM/E*, Feb. p. 17) are not taking the decision gently. Tucson Cable sued both the city and Southwest asking that Southwest be restrained from using the license. Southern Arizona Cable Co. filed a lawsuit against the city; Southwest, the telephone and electric utilities to keep them from permitting installation. Pima Cable (formed by Time-Life, Inc. and American Cable Television of Phoenix filed with a Superior Court, challenging the legality of city ordinances under which nonexclusive licenses are given.

Newberry Seeks Bids. Newberry, N.C. seeks additional bids after Jefferson Standard withdrew offer. Other bidders: Georgia Cable and TV Co., Midland Cablevision.

Selective Installation Raises Council's Ire. The Maryville, Michigan, council is upset over the cautiousness of Port Huron Cable Co. in making installations. Other communities, too, are critical when a cable company just picks prime area for installation and ignores other citizens.

Franchise Delays. In **Redwood City, Calif.** to assimilate the technical data offered by Peninsular Cable (V. A. Laughton and V. E. Sharar) and R. C. Cable, subsidiary of Chronicle Publishing Co. . . . In **Liberty, Kansas,** blocked by WDAF-TV, (Kansas City) and Westport Television which plans a uhf station. . . . **Ashland, Ohio** because of pressure from other CATV franchise seekers. . . . **Falls Church, Va.**

Continued on page 79

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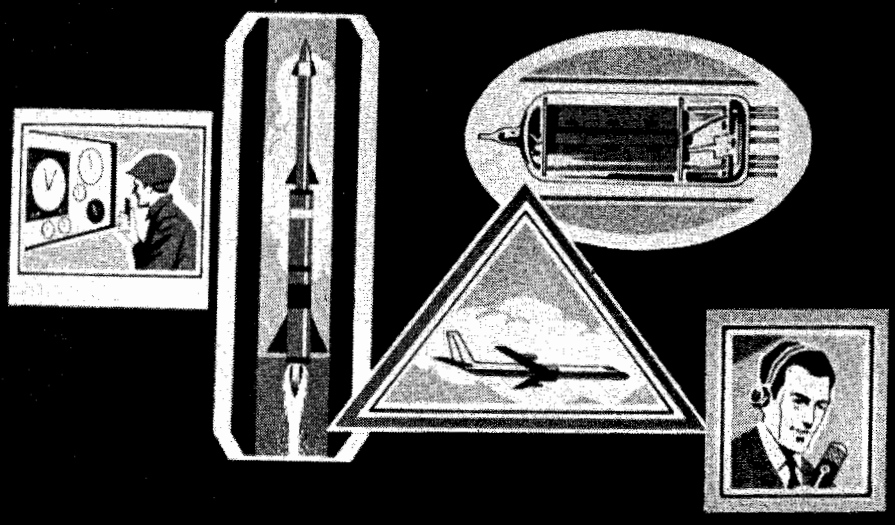

INTERPRETING THE FCC RULES & REGULATIONS

"OVERCOMMERCIALIZATION" REVIEWED

SOME MOST PREGNANT QUESTIONS HAVE ARISEN: (1) Does the Commission maintain commercial standards? If so, in what form? (2) *What are these standards*? (3) *Is the Commission, by virtue of its recent "Commercial Inquiry," changing these standards*?

These probative, curious and Delphic questions flow from the Commission's October 24, 1966, Public Notice (FCC 66-923). In this cryptic and unimposing Notice (above and hereinafter referred to as the "Commercial Inquiry"), the Commission required *all* broadcast licensees, without exception, to file "updated" information concerning their proposed commercial practices. This request was made, purportedly, to bring all licensees within the boundaries of the program forms adopted for radio (*BM/E* Feb. & Mar. 1966 issues) and TV (*BM/E* Dec. 1966 issue) and to afford each licensee an opportunity to state its commercial content in *minutes* rather than in terms of the number and length of commercial announcements. Its effects, and the trends reflected thereby, warrant the reader's avid attention. This unassuming Commercial Inquiry has caused considerable, warranted concern. The questions set forth in the above paragraph will be discussed in the order posed.

Does the Commission Maintain Commercial Standards? If so, in What Form?

Yes! And, no! The ambiguous answer is necessitated by the Commissions' ambiguous and volatile commercial "policy." This nebulous and oracular standard can be better understood by a cursory review of its inconsistent and surprise-filled background.

Over the years, the FCC has considered overcommercialization in a host of cases, too numerous to list, and has consistently taken the position that this was "an important element in judging the overall program performance of an applicant or a licensee." However, *in none of these cases did the Commission* (or its predecessor Agency) *establish definite standards or even broad guidelines as to the formula used to distinguish "overcommercialization" from acceptable commercialization.*

While the Commission has maintained a continuing interest in this problem, there have been few cases wherein the FCC actually concluded that there was overcommercialization. In those infrequent cases, the findings of so-called overcommercialization have resulted in nothing more than "short-term" renewals. In most cases, the licensee has seen the error of his ways before, or at least in the middle of, a hearing, adjusted downward his commercial proposal, and received a renewal. In most of the hearing cases, the amount of overcommercialization was so extreme as to be obvious. (See 1962 case, 24 RR 315, wherein the a-m licensee proposed 6 to 8 minutes commercial in every 14½ minute period —an average of 50% or more commercial.)

Throughout over 40 years of broadcasting and federal regulation thereof, a definite commercial standard or guideline (in written form) is conspicuously absent. These unwritten policies have not appeared in case digests, memoranda, opinions, and orders, or even in letters to licensees. Why, the reader may ask, has the Federal Governmnet judiciously avoided reducing these transitory, fugitive and ever-changing policies to writing? There are a wealth of *legal* reasons militating against rigid guidelines. A brief review thereof follows.

The First Amendment to the United States Constitution provides, in pertinent part, as follows:

> "Congress shall make no law . . . abridging the freedom of speech, or of the press. . . ."

Section 326 of the Communications Act of 1934, as amended, states:

> "Nothing in this chapter shall be understood or construed to give the Commission the power of censorship over the radio communications... and no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communications."

In an inexhaustible list of precedents, *the courts, the federal agencies, and the Commission have repeatedly disavowed any authority to "censor"* the right of free speech. In the case of the FCC, "censorship" would involve any rule which dictates what the licensee must offer (or not offer) in the way of program content. (Notable exceptions to this dearth of written specifics may be found in those cases wherein the Commission has properly forbade the broadcast of obscenities, criminal acts, libel, lotteries, and the like. Few, if any, would quarrel with the prohibition of amoral or *criminal* program content.) In a more general sense, "censorship" of program content — the amount of music, agricultural, religious, sports, news, and even *commercials* —

This section, providing broad interpretation 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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remains a somewhat unsettled issue!

In numerous *FCC* cases, *the courts have ruled that the choice of programs rests with the licensee* and that the Commission is forbidden to censor. (See, for example, *McIntire v. Wm. Penn Broadcasting*, 151 F. (2d) 597, C.C.A. 3d, 1945.) Also, see U.S. Supreme Court decision in *Farmers Educational and Cooperative Union*, 360 U.S. 525 (1959).)

Despite all of the above, the Commission, from time to time, has asserted (and seemed to assume) that it has authority to regulate the amount of commercial content broadcast.

In one of its more recent "Magna Carta's," entitled *Report and Statement of Policy Re: Commission En Banc Programming Inquiry*, 20 RR 1902 (1960), the Commission, in justifying its authority to control commercialization, stated:

> "Notwithstanding the foregoing authorities, the right to the use of the airwaves is conditioned upon the issuance of a license. . . ."

Thus, after thoughtful review of the clearly anti-regulatory legal premises, the Commission pointed out that it does not have to issue or renew a license to one—as contrasted with its (Commission's) view of proper programming. It implies that its basic obligation — to make broadcasters program in consonance with the public interest — may supersede the explicit and repeated "censorship" prohibitions.

In January 1964, the Commission adopted a *Report and Order* (FCC 64-22, 1 RR 2d 1606) regarding "Commercial Advertising Standards." In that proceeding, *the Commission had proposed to adopt fixed rules to restrict the amount of advertising broadcast* by its licensees. While the Commission continued to maintain that it has authority to promulgate commercial standards, it concluded:

> ". . . We will continue to take whatever steps are necessary and appropriate to prevent its occurrence [overcommercialization] . . . however, [*the*] *adoption of definite standards in the form of rules limiting commercial content, would not be appropriate at this time. . . .*" (Emphasis supplied).

> ". . . we will give closer attention to the subject of commercial activity . . . *on a case-by-case basis.* . . . Attention will be given to situations where performance varies substantially from standards [promises] previously set forth. . . ." (Emphasis supplied.)

To the chagrin of then Chairman Henry and Commissioner Cox, in July 1964, the Commission granted a series of renewal applications that embodied apparent overcommercialization. The dissenters offered an impassioned plea for *definite commercial standards*, because the licensees, guilty of commercial excesses, as pointed out by the staff, were granted renewals anyway. In some of these cases, the excesses of commercial content far exceeded (1) NAB Code limits and (2) the "promises" set forth in the last renewal. It is interesting to note that most of the punishment (short-term renewals or fines) administered for "overcommercialization" to date has been predicated upon the licensee's failure to program as proposed (promise vs. performance test) — *not* upon excessive commercialization *per se*.

The next significant action is the current (October 1966) Commercial Inquiry seeking commercial content in *minutes* — as distinguished from the number and length of commercial announcements — from *all* licensees.

Thus, in response to the question, "Does the Commission maintain commercial standards? *BM/E* must respond both "Yes, and no." *In summary, for 40 years, the Federal Government has espoused an acute interest in the amount of commercial "chatter"; but, the intensity of this interest has undergone a marked change every five years or so; moreover, the law is such that it is difficult for the Commission to establish firm and fixed advertising standards; additionally, no two broadcasting markets are alike; for these reasons and others, the Commission has never set in print, in any form, its "commercial standards"; however, by indirection (the refusal to issue a license or grant a renewal), the Commission controls commercial content!*

Today, the major problem is to ascertain or define these *unwritten, amorphous commercial ceilings! But, what are the Commercial Standards?*

As the Commission might say, "These standards must be predicated upon the needs of the public and can be determined only by the licensee." *There is no lucid answer!* There is only inference, supposition and speculation. The ever-present, unwritten implication was and is that the *commercial proposal must comply with current Commission standards.* This nebulous, and still undefined policy, has a long history of vacillation.

During the past 20 years, the Commission has repeatedly altered its commercial standards. For example, during much of the 1940's and early 1950's, the Commission would accept a statement to the effect that "The licensee proposes to adhere to the NAB Code limits." In the middle and late 1950's, it became necessary to be more specific; a recitation of Code compliance was unsatisfactory; the licensee was expected to assert that it would ". . . . not *generally* broadcast any commercial in excess of one minute in length and no more than three such commercials, aggregating no more than three minutes, in any given 14½ minute period." In the 1960's, this technique became unpalatable to the FCC. With the advent of the KORD case in 1961, the Commission augmented its use of the *"promise vs. performance"* test. In this era, high commercial ceilings were not nearly so dangerous as composite week statistics that demonstrated that the licensee was programming substantially more commercials than proposed.

However, by artful wording and the liberal use of such evasive terms as "generally," many licensees were able to justify their "performance" with their *inexact* "proposal." Several Commissioners became most disturbed. With the exception of a few, ancient and distinguishable cases, the Commission had no legal precedent or procedures upon which to base definite advertising standards. This situation resulted in the *proposal to adopt definite standards by amending the Rules.* Under pressure from Congress, as indicated previously, *this proposal was*

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defeated, by a 4-3 vote, in January 1964 — with Commissioners Henry, Cox and Lee dissenting. The latter two remain on the Commission today, and Commissioner Nicholas Johnson (Henry's replacement) may be logically expected to follow in the same general tradition of his predecessor.

As NAB Code requirements stiffened, its standards, once again, became more attractive guidelines. Within very recent years, the Commission has encouraged licensees to propose to adhere to the Code standards. With the adoption of the long-anticipated new program forms (Section IV's) and program logging requirements for a-m and fm (in 1965) and TV (in 1966), the Commission, at long last, had renewal, assignment, transfer, and new license forms (Section IV's programming proposals), with "teeth." Now, the licensee must set forth his commercial proposals in terms to which the Commission may bind him. Hence, the "promise vs. performance" test is more effective, and, more saliently, the Commission is better able to ascertain *exactly* what the licensee is proposing.

During much of the 1960's, the a-m/fm licensee could obtain renewal by proposing "20 minutes commercial during the average broadcast hour" with limited exceptions wherein the ceiling was raised to "22 minutes." By adhering to this *unwritten* rule, the licensee could obviate letter-inquiries and deferral of renewal. Those exceeding these limits were required to make out a strong case in support. Generally, the licensee yielded to the Commission's will, when questioned, and brought his commercial proposal in line with the "20- and 22-minute ceilings." That was the unwritten, commercial policy in effect prior to the issuance of the 1966 Commercial Inquiry.

Has the Commission, Via Its Recent Inquiry, Changed the Commercial Standards?

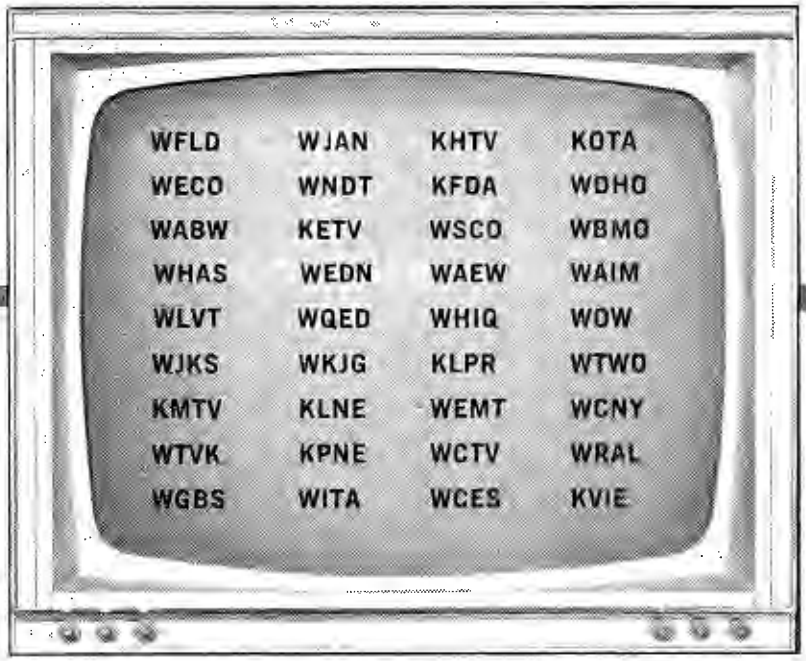
Much to the surprise of many — in view of the current composition of the Commission — the Commissioners, by virtue of strong staff influence, were prompted to issue the *October 1966 Commercial Inquiry*. In so doing, the Commission concluded its Notice with the following statement:

> "By this action *the Commission does not imply or seek to impose any particular requirement or limitation on the commercial practices of licensees*, but does seek full, specific and responsive statement as to licensee's commercial practices." (Emphasis supplied.)

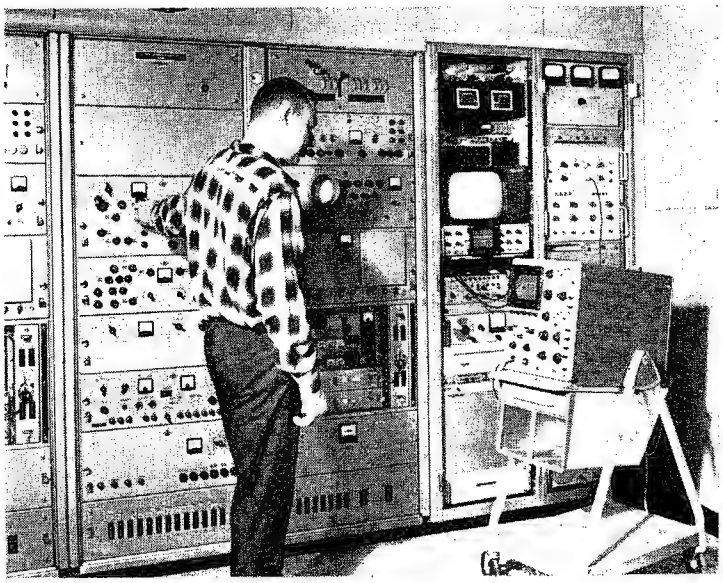
Once again, by artfully avoiding a classic opportunity to spell out its convictions in the matter, the Commission has left the broadcaster puzzled. However, *the general import of the message* was received "loud and clear" by the industry. That is, *the licensee had best propose to comply with the NAB Code commercial standards.*

The instant responses to the Inquiry were due to be filed prior to January 1, 1967. Many licensees filed well in advance of that date. One FCC staff member reports that ". . . *in excess of 95% of those replying indicated that they would comply with the NAB Code.*"

Interestingly, assuming the accuracy of the *Commission's 1963 staff-analysis (Report and*



check the stations that . . .



(Photo courtesy WFLD Chicago. Marconi 50KW UHF Tx)

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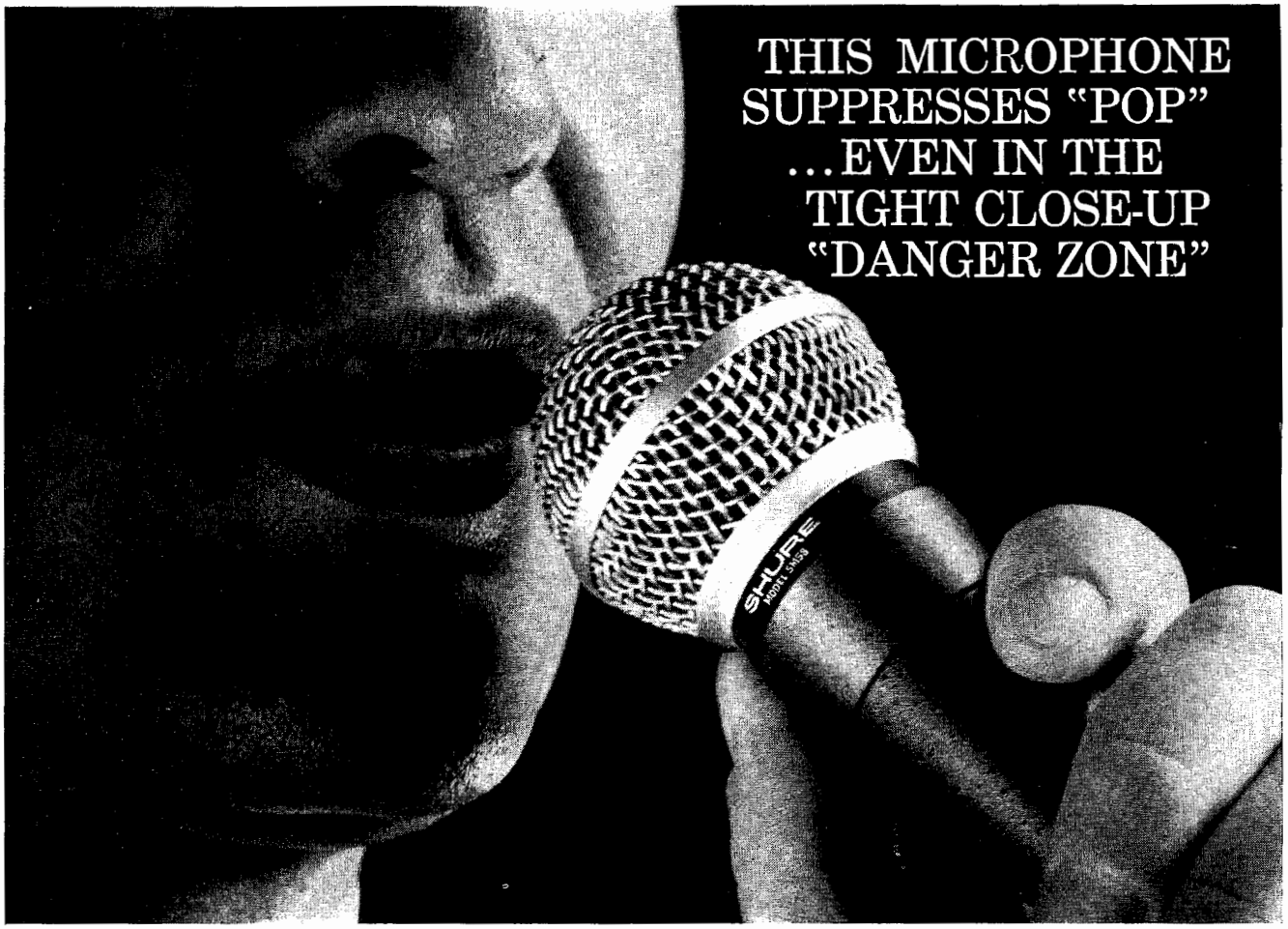

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On the other hand, the unusually effective unidirectional cardioid pickup pattern (uniform at *all* frequencies, in *all* planes) means that it is a real problem-solver where background noise is high or where the microphone must be operated at some distance from the performer. Incidentally, but very important, the SM58 tends to control the low frequency "boominess" that is usually accented by close-up microphones.

All in all, close up or at a distance, the Shure SM58 solves the kind of ever-present perplexing problems the audio engineer may have felt were necessary evils. The SM58 might well be the finest all-purpose hand-held microphone in manufacture today. And, all things considered, it is moderate in cost.

Other features: the complete pop-proof filter assembly is instantly replaceable in the field, without tools. Filters can be easily cleaned, too. Stand or hand operation. Detachable cable. Rubber-mounted cartridge minimizes handling noise. Special TV-tested non-glare finish.

For additional information, write directly to Mr. Robert Carr, Manager of Professional Products Division, Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois 60204.

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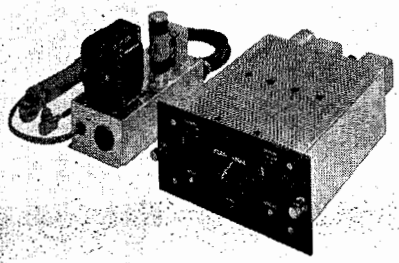

Shure stereo equalizer and preamplifiers are praised as MAJOR contributions to upgrading station quality by broadcasters.

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Provides precise RIAA equalization from magnetic phono reproducers at line levels. Separate high and low frequency response trimmers. Lowest distortion, noise level, susceptibility to stray RF fields.

M66 Broadcast Stereo Equalizer
Passive equalizer compensates recorded frequency to three playback characteristics: RIAA, flat, roll-off. Provides precise equalization from magnetic pickup at microphone input level.

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Order, re Commercial Advertising Standards, 1 RR 2d 1609, footnote 4), *"40% of the licensees analyzed proposed to exceed NAB Code commercial limits."*

Thus, the October 1966 Commercial Inquiry form appears to have resulted in a substantial decrease, in commercial proposal, by an estimated 35% of the broadcast industry! That is, where "40%" of the industry exceeded NAB limits in 1963, only 5% exceed it today. Such a marked departure is somewhat astounding when one considers that *the Commission has not set forth, to this day, either broad or specific commercial standards in written form.* Such pronouncements have been, and continue to be, judiciously avoided.

The Commission has appeared to have accomplished its long-sought goal by innuendo, indirection, or quasi-intimidation. The licensees, as a group, appear to believe that, the Commission's assertions to the contrary notwithstanding, a failure to meet and comply with NAB Code standards, may result in letter-inquiries, deferred renewal, possibly a hearing, and/or a loss or denial of license. Accordingly, they conclude that a few extra commercials are not worth the risk. Is it really necessary to yield so quickly? Have the prior, more liberal commercial standards really changed that much? Will the Commission really enforce its ephemeral commercial standards?

Reports in the industry press have indicated (1) the "rules" have not really changed, (2) the thrust of the Commercial Inquiry is to elicit exact and precise commercial proposals and not to reduce commercial content, and (3) exceptions, well stated and justified, will be permitted.

For several weeks, the Commission has chosen to postpone action upon a series of renewals which the staff has recommended for deferral. Within the last two weeks, the Commission has ruled that several of these stations should receive letters. The *feeling*—and "feeling" is what has determined acceptable and unacceptable commercial policies for 40 years—*is that most requests to exceed the NAB Code limits will meet with stern opposition—BUT probably not result in a hearing or loss of license!*

In the case of a-m and fm stations, some staff members speculate that the Commission will approve many requests wherein the licensee proposes to exceed Code limits from 10% to 15% of the time. In the case of TV stations, excesses of the Code commercial limitations, supposedly, will be confined to 5% to 10%. At least, this is the current thinking. As a practical matter, *percentages* of permissible commercial excesses (e.g., ". . . licensee will adhere to the NAB commercial limits 90% of the time. . . .") are apt to prove disappointing. To wit, *depending entirely upon the reasons advanced,* a request to exceed NAB Code limits 15% might be granted in one a-m case, and a 5% excess denied in another. At present, there are no meaningful guidelines or "rules of thumb"—except for the NAB code standards.

What reasons will the Commission accept as sound justification for commercial excesses? This is a question that can be answered *only* by the licensee and the specific and unique facts of his case. The chances are that most requests for exception will be denied *indirectly.* That is, after letter-inquiry and deferred renewal, most licensees will voluntarily reduce their commercial proposals.

Conclusion

BM/E is compelled to observe that *it is not necessarily prudent or appropriate to agree to or adhere to the NAB Code standards so quickly*—unless you feel it desirable from a public interest and financial standpoint! Why? *First,* the Commission is overloaded with hearing cases and can ill afford renewal hearings on borderline commercial-policy issues. *Second,* the Commission's *legal* footing to "censor" or indirectly dictate commercial content is shaky at best. The only court cases on point do not indicate a disposition to ignore the First Amendment of the Constitution or Section 326 of the Communication's Act. Congress might rally to your defense. In brief, the Commission might lose and would prefer undoubtedly to avoid taking the risk of losing its present *indirect* leverage. *Third,* if you have (in your opinion) legitimate, good faith reasons to propose commercial standards greater than those permitted under the NAB Code, you should present them; if you receive a letter-inquiry, you could reduce your commercial proposals; in fact, you could "stick to your guns" up to the unlikely day your case was designated for hearing; further, you could proceed through the issuance of an Initial Decision by the Hearing Examiner, and, if unsuccessful, adjust your commercial proposal at that time.

In any event, there are *many* opportunities, along the way, to reduce your commercial proposals to NAB levels and receive favorable action upon your application. *It seems tragic that the average licensee's first reaction is to yield rather than to defend his democratic rights.* Of course, it may cost money to resist, but, then, the matter can be settled in a day by agreeing; moreover, the loss of substantial advertising dollars, over a period of years, may well result in large cash loss. In brief, any licensee, who really needs to exceed the "new commercial standards" (the standards of the NAB Commercial Code), should be daring enough to make a tacit attempt at least. While bureaucracy is upon us, we should not lose our willingness to defend our freedoms. In our sacrificial zeal to avert controversy, let us not lose sight of the Supreme Court's 1959 admonition (in *Farmers Educational Cooperative Union*) as follows:

> ". . . expressly applying this country's tradition of free expression to the field of radio broadcasting, Congress has from the first emphatically forbidden the Commission to exercise any power of censorship over radio communication."

While the Commission is vested with the authority and obligation of requiring broadcasters to meet the needs of the public, *the licensee,* as the Commission has consistently held, *is the final judge.* Even a greater commercial content may be needed by (1) the public in some cases or (2) the broadcaster to provide funds for other forms of needed programming.

There are two basic methods of resolving the

Continued on page 75

CONVENTION LOG

Which Color Camera?

SMPTE Color Broadcasting Workshop and Conference, Jan. 27, 28.

A somewhat improvised *To Tell the Truth* panel of five color camera users was organized at the recent SMPTE Television Broadcasting Workshop. The verdict: Everybody is happy—even Tom Keller of WGHB who hasn't yet gotten delivery.

Panel was to consist of independent stations who had purchased different cameras but a midwest snow storm blocked out Norelco purchaser Robert Byloff, Reeves Broadcasting, New York. Substituting on the Norelco (Philips) camera were Adrian Ettlinger and Norman Baedler of the CBS network. Reporting on RCA's TK42, Warren Williamson, WKBN-TV, Youngstown, Ohio; on GE's PE250, K. L. Renaud, WWJ-TV, Detroit; on Marconi, Tom Keller, WGBH, Boston.

***How long have you been in operation?**

Williamson: Received delivery of our 2 TK-42's last July and have 2000 hr. We do 2½ hr live each day plus some commercial work. No remote.

Keller: We have not as yet received our Marconi camera.

Renaud: We've been on the air since October with four PE250 studio cameras logging 1200 hr.

Ettlinger-Baedler: We inaugurated our first Norelco camera in September of 1965 — on the *Ed Sullivan Show*. Altogether we have 44 Norelco cameras in the CBS network and 9 in station divisions. Sixteen of these are in mobile units. Two mobile units colorcast the NFL football games this fall. Incidentally we have ordered some Marconis—four are now operating in Chicago and two are expected for network use in March—the Chicago units are not part of the network and we have no direct knowledge of their performance.

***Why did you pick the camera you did?**

Renaud: An engineer picking a make of camera is something like an engineer buying a car. The decision isn't necessarily based entirely on engineering evaluations. My new car is a Chrysler product since my wife's uncle is a dealer. My cameras are GE. I once worked for GE and respect the company's technical competence. Our station is becoming nearly a total GE plant, therefore we got a good delivery priority.

Keller: We evaluated cameras for over a year. Unfortunately no camera has been in the field long enough to get good comparative performance data. We chose Marconi. We liked the optical system and found many of the lenses we already owned could be used. Since we intend to use the camera for a great deal of field use (WGBH is an educational station) we liked the fact that the gain could be increased 6 dB if we lost lighting. The spec of 42 dB S/N ratio for 120 ft candles at f8 appealed to us. Supposing lights were to fail, we could put all light into the luminescent tube because dichroics are not used. We also liked the location of controls, those in camera, those in the CCU for remote use. The heavy 110-conductor cable is a disadvantage but other factors outweighed this aspect.

(Ed. note: Williamson didn't respond directly to this question. His other equipment is RCA's 3TK-11's and a TK-27. And does anyone wonder why CBS picked the first non-RCA cameras available?)

***Are you satisfied with your choice of cameras?**

All: Yes. (*Renaud* volunteered that his down time for four cameras was less than 10 hr. Down time was caused by mechanical bugs that once cleared up did not recur.)

What lighting levels do you use and what contrast range do you set for?

Renaud: We generally have 300 ft candles. The other day I found three sets illuminated at 250 ft candles (and camera at f5.6) and one set at 470 ft candles. We try to set for a contrast of 40:1 using a gamma correction chart (log chart zero reference).

Ettlinger: CBS aims for 250 ft candles but this sometimes creeps up. Contrast ratio is 30:1. We use a log chart, however, the Plumbion log chart is not precise. We therefore switch to a power log chart for a more correct gray scale. We say we set for 30:1; obviously, if we're digging black we push up the pedestal.

Williamson: I suppose as a small U we are not as fussy as the bigger stations. We shoot for maximum contrast by establishing key lighting and backlighting and then add fill lighting until the outcome is pleasing.

Keller: I think in a discussion of lighting it's worth recalling that the IO is not the limiting factor. Sensitivity is dependent on the quality of the optical system, depth of field, and noise in the preamp. In the near future we may see color camera systems as sensitive as monochrome IO's.

Please comment on the color fidelity of the Plumbion and the IO.

Ettlinger: In theory the 3-tube Plumbicon camera and 3-tube RCA TK-41 are comparable although the former works on a static transfer curve and the latter at the knee of the curve. In the four-tube cameras the subject is much more controversial. The contest waged at the NAB convention each year is supposed to provide the best answer!

(Ed. note: Also on display at NAB for further comparison will be the Sarkes Tarzian polychrome studio camera model 88.)

Renaud: I think cameras are comparable but home viewers are likely to see wide differences of quality depending on just how good they are at adjusting their sets.

Williamson: Since we are the only station with color in our community, it's us versus the networks. We think we're comparable.

Keller: Image orthicon cameras should provide sharper picture detail than three-tube Plumbicons because of less aperture distortion.

Continued on page 75

*First three questions were preassigned by the panel moderator. Answers were extracted from the panelists' introductory comments and are not necessarily verbatim.

212T-1

212T-2

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Before ordering a custom installation for your control room, check your requirements against these features of Collins' standard 212T-1 and 212T-2 Audio Control Consoles:

REMOTE CAPABILITY. Rack-mounted assembly containing amplifier cards can be located in an equipment room and linked by cable to the audio control panel in the studio. Sensitive audio wiring is concentrated in a card cage away from interference. Noiseless switching and audio level control are accomplished by photoconductive cells which employ a light beam to isolate control voltages from the audio circuits.

COMPONENT ACCESSIBILITY. Plug-in etched circuit card construction ends time-wasting troubleshooting. Attenuator, input switches, amplifiers, and amplifier output switches are replaced by simply taking one card out of the rack-mounted assembly and plugging in another card.

The 212T Audio Control Consoles consist basically of three units:

CONTROL PANELS. The control panel constitutes the difference between the two systems.

The 212T-1 control panel provides 28 inputs to 14 faders, 2 program output channels, and 2 10-watt monitor speaker outputs. The overall dimensions are 15¾" high by 24" wide.

The 212T-2 control panel has 32 inputs to 16 faders. The panel is divided into two sections: The fader operating controls are mounted on a panel 10½" high by 19" wide; the VU meters and monitoring controls are mounted on a panel 5¼" high by 19" wide.

RACK-MOUNTED ASSEMBLY. The assembly contains 16 preamplifier cards. Quantity and types of cards depend upon individual requirements. The assembly includes three program amplifier cards—one for cue and two for program channels. Two amplifiers are for speaker monitors; two switching cards select monitor inputs. The rack-mounted assemblies for the 212T-1 and 212T-2 are identical.

POWER SUPPLIES. Two power supplies are housed with the rack-mounted assembly. One power supply provides variable illumination for meters and push-button controls. Another provides powering for cards, attenuators, amplifiers, switches, and photoconductive cells.

Most studio audio requirements can be met by adapting the standard 212T-1 or 212T-2 Console through strapping options and minor wiring changes. Expansion and adaptation can be accomplished easily with additional space which the units provide for two extra preamplifier cards, two additional program amplifiers, and two unwired spare card receptacles.

For a copy of a new descriptive brochure on the 212T series, contact Broadcast Marketing, Collins Radio Company, Dallas, Texas 75207, Ph. (214) AD 5-9511.

COMMUNICATION/COMPUTATION/CONTROL

Visit Collins' NAB Convention Booth (209). New products will include speech consoles, AM & FM transmitters, and measuring and monitoring equipment.

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Countdown to NAB Convention Begins

If you haven't registered yet it's already too late for preregistration prices. March 1st marked the date that general registration rose from $15 to $20. And you won't be staying at the Conrad Hilton, convention headquarters — that's full. There are other hotel accommodations in Chicago, though, and its not too late to attend the industry's most important event.

The 45th NAB convention is not cut and dried. Details on the program have not yet been set. Manufacturers aren't quite sure just what they're going to take for exhibit. Some gear now in the lab won't make the last countdown, and will be held back for unveiling later in the year. Nevertheless the best the industry has to offer will be on display. Right now it looks like a lot will be shown.

The '67 Product Line

Color cameras, and color film chains will apparently dominate the show as the multibooth exhibitors such as Ampex, RCA, GE, Visual, display their wares. Visual Electronics will devote 4000 square feet (Booth 301-3) to color studio equipment and will be adjacent to Norelco's Color Studio. Visual will show a new 16mm flying spot scanner film system for color. A new concept in color film processors (portable) for developing news footage (to 500 ft) will be shown by TV Zoomar, Both 105.

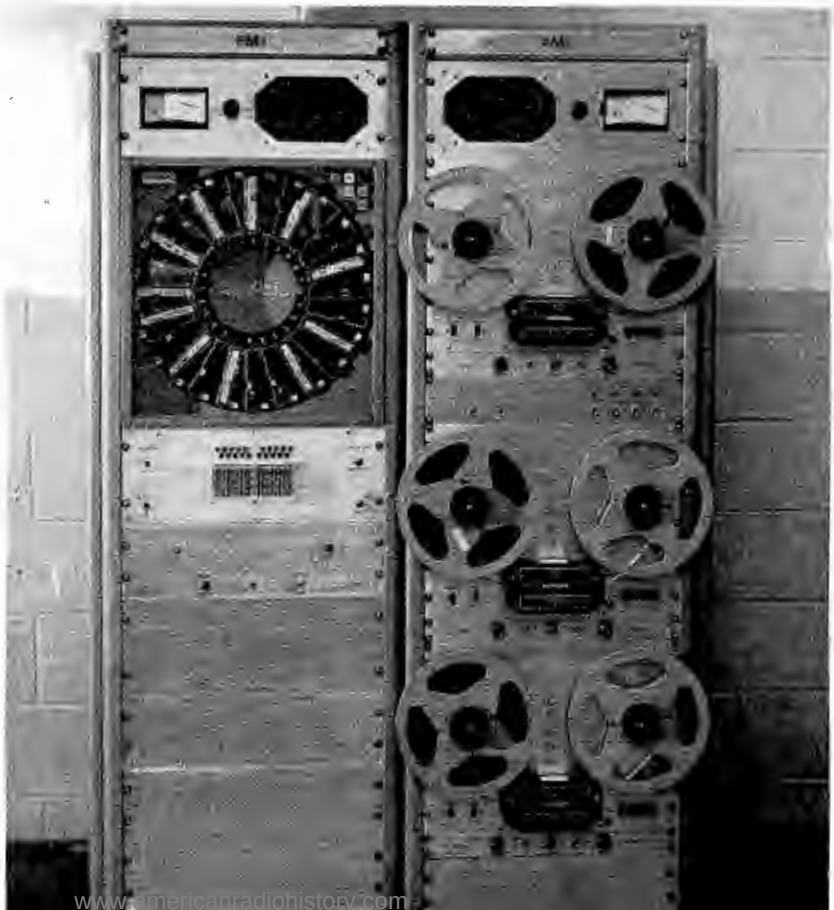
- Videotape and 16mm film exhibits will show color too—Memorex will show a new 78V tape. But if you peel away the color, automation in the form of pre-programmers, pre-switchers, automatic switching, and logging will be found everywhere. Remote control and new fm equipment will be prevalent. Here is a sampling available at press time:
- Automation of station break switching for TV: Chrono-log will show a new solid-state version of its STEP system. Ease of use will be demonstrated at the booth by operating a Riker video switcher.
- An automated programmed TV switcher will be unveiled by Ward Electronics (Booth 201-2). Although said to be sophisticated, price will be under $50,000.
- Complete automation of audio broadcasting will be shown by several exhibitors. Perfection Music, Inc. will introduce the PMI Budgeteer—automation for less than $4000. PMI will show three separate automation systems operated by "Whole Program" concept tapes. International Good Music, Inc. (Booth 224) will have a working demonstration of the IGM 600 audio control system, which does automatic logging, and the 500 system which incorporates stereo, network switches, time announcer and stereo transports and carousels. Sample automated program formats will be shown.
- A preset plate that sets and stores scene-lighting intensities will be shown by Kliegel Bros.
- An automatic transmitter log printer will be unveiled by Mosely Associates (Booth 223W). The ADP 101 prints out on an IBM executive typewriter and will log up to ten transmitter site measurements in columnar form.

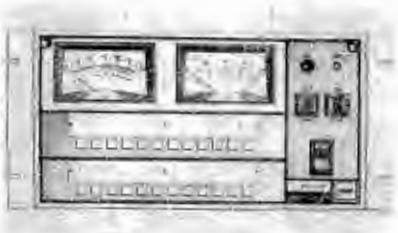
Rust Corp. will show its automatic transmitter logging system AL-100 and AL-100R (remote).

- Remote control is the central theme of Rust Corp. booth. A simulated TV studio will be set up to demonstrate a second-generation Color Video/Audio Remote Dial switching system by Rust. For the first time Rust will display a Microwave/Voice Line pushbutton remote control system which will provide total local control and 24-point metering.
- STL equipment will be in

Preview of Products

PMI's basic automation system one of several on display at NAB.





Rust's pushbutton controls and meters transmitter remotely.

Dynair's video "mini."

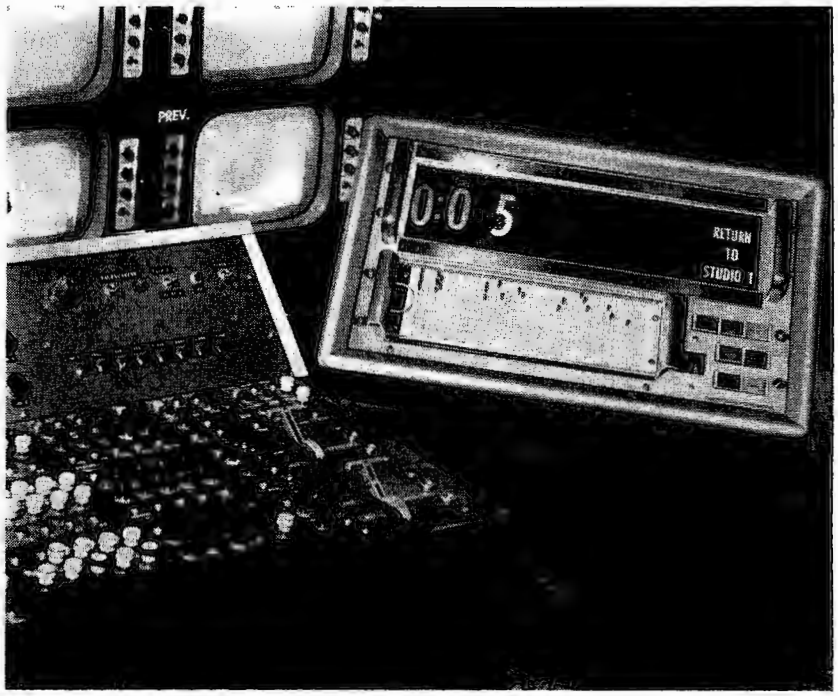
← Circle 22 on Reader Service Card for RCA

good supply. Marti will show a 950-MHz aural STL and intercity system for a-m, fm and fm stereo transmission including remote control. Marti says the system replaces all program and dc lines between studio and transmitters.

Mosley will unveil a brand new solid-state aural STL which provides unusually fast response and low distortion, handles multiplexing, remote control and background music.

A microwave STL system operating between 5925 and 13250 MHz will be shown by Lenkurt (Booth 402). The 76 system is good for STL, intercity TV relay, CATV and ETV. Lenkurt will also show its long-haul system 75A, capable of handling 960 message channels.

Stereo capability has already been mentioned several times. American Electronic Labs, rounding out its fm transmitter line, will show a direct fm stereo exciter, a stereo generator and an SCA generator. Speaking of SCA, Johnson Electronics will show a low cost SCA multiplexer demonstrator (to help sell background music) and a studio monitor.



Automatic station break switcher by Chrono-log.


H-P's 191A ready to test video.


New solid-state STL by Mosely.


Kliegl's new preset plate for lighting.

There will be plenty of video switching gear on display. One company alone, Dynair, will have at Booth 211 about 15 pieces on hand. Among the new items will be the low cost Mini series designed for low-budget CCTV system — modulators, distribution amplifiers and switchers are included. Also featured by Dynair will be a cable equalizer to compensate for cable losses for as much as 10,000 ft. A new all-electronic switcher fader will be shown.

There will be a new TV monitor from a new source at NAB. Hewlett-Packard's Harrison Division will present a new all solid-state (except for the pix tube) 17-in. monitor for broadcasters. Model 6940A has high sweep linearity, rock-solid sync (no hold control needed), and flat video response, the manufacturer says.

You probably won't get by the Albion Optical Co. booth. They'll have a cartoon character huckster there on CCTV who guarantees to catch your attention. "Albie" will show a new 16:1 Vartol lens (for the first time in America) and a quick-change extender for handling auxiliary lenses without removing them from the camera.

A number of cartridge playback units will be visible. Audio Devices Inc. will be demonstrating its model A Audiopak cartridge which features constant tape-to-head contact.

There will be a fair share of test equipment on hand. Hewlett Packard for example will show its scope (Model 191A) for special VITS (vertical internal test signals) tests which are ideal for checking out color video systems. The Loveland Div. of H-P will show a new telephone voltmeter, an automatic nulling distortion analyzer and 3-μV sensitive microvoltmeter.

Management/Engineering Sessions

Again this year there will be separate management assemblies in addition to the engineering and general assemblies. Although the subjects to be aired were not finalized as this issue went to press, convention goers can expect provocative discussion on editorializing, election coverage and commercial time, sure to stimulate managers and timely reports or colorcasting, lighting, and automation to inform and advise engineers.

A highlight on Monday afternoon, April 3, will be the Film Conference-'67. Scheduled to appear are Danny Thomas, David Wolper of David Wolper Productions, Joseph Barbera of Hanna-Barbera Productions, David Susskind, and Otto Preminger.

This portion of the program is presented by the Television Film Exhibit (TFE '67).

If You Haven't Seen the Polychrome Camera, You're Missing the Finest Color in Television

Not to mention the most advanced live color camera on the market

Here's why...

1 Choice of pickup tubes. Some broadcasters prefer the four-Plumbicon* type camera. Others lean toward the IO-Vidicon tube complement. May even be that the best answer is still to be developed. Makes no difference with the Tarzian Polychrome camera. It accommodates any present or contemplated pickup tube. How's that for flexibility? And you avoid costly obsolescence, too.

2 Color fidelity. Exceptional. Original optical design delivers superior color performance—limited only by the capability of existing pickup tubes. Separate luminance channel assures excellent color and monochrome results.

3 Design. Rugged magnesium housing trims size and weight down to what you'd expect to find only with monochrome equipment. Viewfinder is removable for added mobility and accessibility. Bold contemporary styling and textured door panels mark a fresh departure from old fashioned, bulky look.

4 Electronics. All camera and processing circuitry is fully transistorized with plug-in module construction throughout.

More? There's plenty. Like 10:1 zoom lens. Looks built-in, but detaches readily. Powered zoom, focus and remote iris for smooth control. The list is nearly endless.

Exciting? You bet it is. Why waste time. Call today—collect. We're anxious to fill you in on the details. Area Code is 812/332-7251. That's Sarkes Tarzian, Inc., Broadcast Equipment Division, Bloomington, Indiana.

* Reg. T. M. of N. V. Philips Co., Holland

Symbol of Excellence in Electronics

EIMAC has advanced power amplifiers for low power UHF-TV transmitters

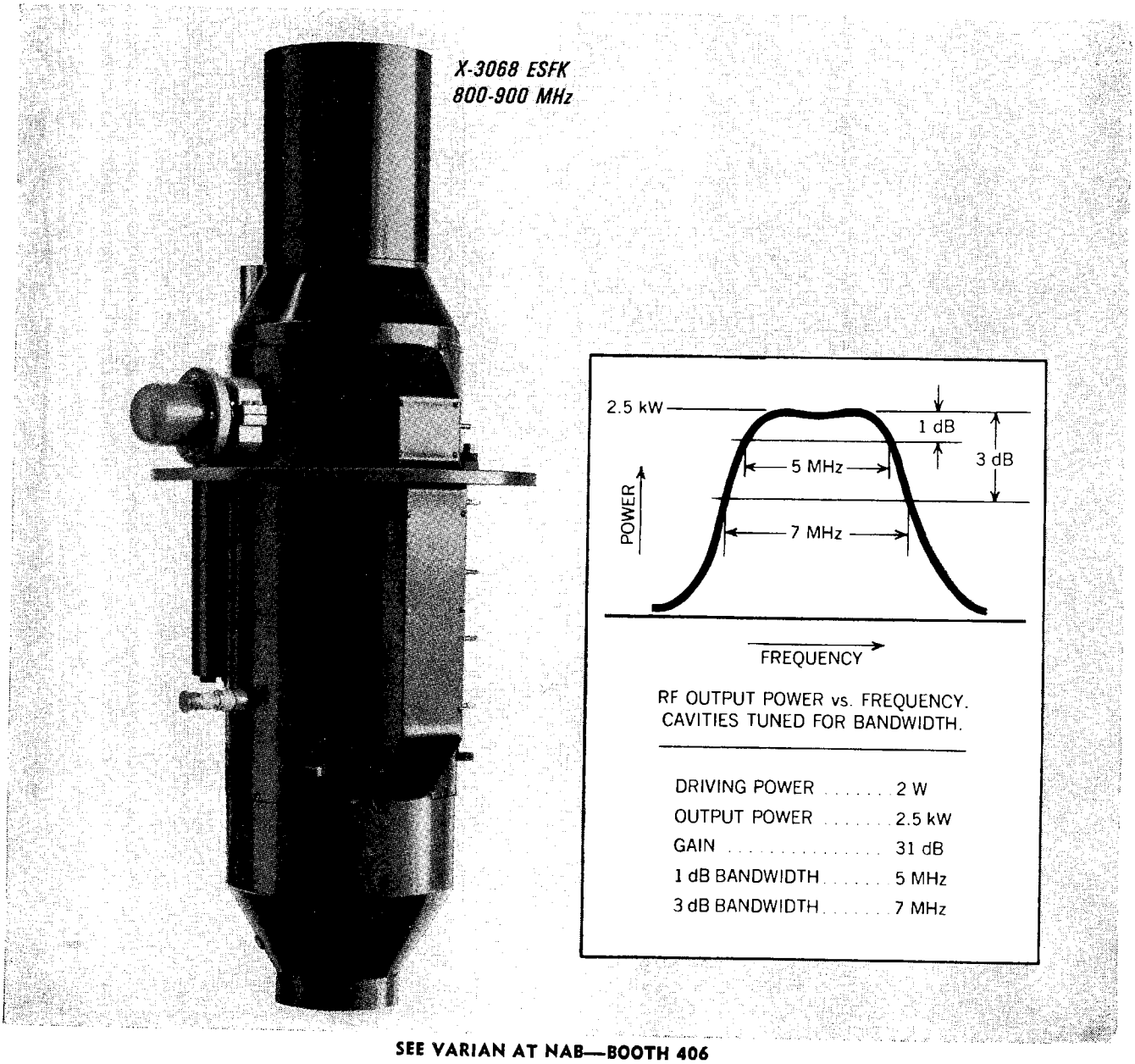
These power amplifier tubes are electrostatically focused klystrons (ESFK). They need no magnets. Our entire ESFK family offers you the best power-to-weight ratio of any power amplifiers. That means when you use one of our new ESFK's in your next design, your UHF-TV transmitter will be smaller—and easier to maintain. And since these tubes are air-cooled, they need less heat dissipation equipment, so your transmitter is less expensive to operate.

One example: the X-3068 amplifier. Note its 35 db gain with 36% beam power efficiency. At UHF frequencies, power outputs between 1 and 3 kilowatts are available.

For S-band transmitter designs, check our X-3065. It offers 500 watts output yet weighs only 5 pounds and measures just 6 inches. And provides 30 to 40 db gain with efficiency between 35% and 45%; heat-sink or air-cooled.

We have spent more than ten years in advanced materials research, ceramic-to-metal technology, and beam focusing studies. To make an advanced power amplifier, it takes experience. You can count the number of experienced ESFK manufacturers on one finger.

EIMAC
Division of Varian
San Carlos, California 94070



RF OUTPUT POWER vs. FREQUENCY.
CAVITIES TUNED FOR BANDWIDTH.

DRIVING POWER	2 W
OUTPUT POWER	2.5 kW
GAIN	31 dB
1 dB BANDWIDTH	5 MHz
3 dB BANDWIDTH	7 MHz

SEE VARIAN AT NAB—BOOTH 406
Circle 25 on Reader Service Card

FROM The EDITOR

Public Television: Who Pays?

The Carnegie Commission report on uplifting educational television clarifies at once some of the great issues facing those who would fill us with worthy information and saturate us with culture. For one thing, the commission in supporting local autonomy and grass roots programming will prevent an PTV czar or a fourth network from becoming the public tastemaker. The plan also hopes to insulate PTV from federal control despite federal assistance in paying the PTV bill.

The commission's charge for "extensive and innovative studies" to discover "the manner in which television can serve education" reminds all in ETV of the past failures and of the honest need for new effort.

Some commentators have labeled the report noncontroversial and "lacking in ambition for PTV"—but as a consequence see solid congressional support. Certainly the proposed means of finance—a 2-percent federal excise tax growing to 5 percent on new TV sets removes heavy opposition from broadcasters. The Ford Foundation's proposal of a public domestic satellite to be used by commercial broadcasters for a fee had the broadcaster paying most of the freight for better public television.

So although the Carnegie Commission report will undoubtedly draw opposition from TV set manufacturers and the Electronic Industry Association, it will not necessarily be opposed by broadcasters, Comsat, or common carriers (neither of the latter want public satellites used).

From a practical viewpoint those adversely affected by the commission's finance plan are fewer in number than those who would be upset by the bolder Ford Foundation plan. The idea of the viewer paying for better public television seems to be equitable even though it establishes some revolutionary precedents in taxation power.

However there is merit to the idea that broadcasters, licensed to use the air waves, contribute to a service that is deemed necessary to fulfill the public's interest. Indeed many broadcasters have contributed to ETV (whether their motives were public minded or selfish, wanting to keep the channel noncommercial is beside the point). And if advertisers are socked for some of this contribution via higher time charges, this too seems fair, since the advertiser largely sets the standards of commercial station programming (commission member McConnell's argument).

The only major industry interests exempted from paying a share in the plans so far are broadcast equipment manufacturers. (We don't include publications serving the industry as major interests and, therefore, happily exempt ourselves.)

We hasten to point out that broadcast equipment sales per year are far less than the set sales or broadcasting advertising revenue. Taxing equipment producers wouldn't do much uplifting.

Congress, then, if it elects to support public television by tax or fee should draw revenue from both set maker (viewers) and broadcasters (airwave users). What a fair proportion is, we have not decided Certainly funds for expanding instructional TV should not be a burden on either manufacturer or broadcaster but paid directly by taxpayers. If a satellite link for instructional TV and/or public television is economically feasible and not in conflict with the orderly use of space it should be authorized. We are all for direct dividends from our $20-billion space program.

In supporting noncommercial television we are encouraged to find it less and less important to be concerned about in depth news reporting. Commercial broadcasters supported by advertisers have brought on recently a veritable TV news explosion. Floyd Kalber's 30-minute late evening news on WMAQ-TV (Chicago) grosses $175,000 weekly reports James Harden in the *Saturday Review* (Feb. 11) and is Chicago's top-rated TV program, including entertainment. The three network evening view shows, now all 30 minutes in length gross some $30-million annually. With advertisers paying like this, who else is needed?

James A. Lippke

Analyzing Video System Performance

By Harry A. Etkin

Using several standard test signals, here's how video channel quality can be checked.

MOST TV STATIONS usually have a common goal, namely to see that their signal, monochrome and color, is of the best possible quality. Generally, there are two program signal sources with which the broadcaster must concern himself: locally originated programs, and incoming network programs. No matter how good signal quality is to begin with, the video signal can be impaired seriously by station or network facilities. If signal impairment appears, a diagnosis of its probable cause should be made. This would naturally lead to corrective action to obtain the best quality TV picture.

Signal Fundamentals

Prior to an examination of the most frequently-used test signals, it seems appropriate to discuss the characteristics of the signals a TV system must produce and/or process. Fig. 1 shows the information which must be contained within the 6-MHz TV channel. It can be seen that the chrominance information is confined to the higher frequency portion of the band. Basic transmission requirements are uniform frequency response, uniform time delay (linear phase), and minimum differential gain and phase.

The vector diagram in Fig. 2 shows the phase and amplitude of the color subcarrier for fully saturated primary and secondary colors. The subcarrier is formed by amplitude-modulating, in suppressed carrier technique, two carriers that are 90°apart, with the I and Q video signals. Thus, the amplitude and phase of the resultant color subcarrier is a distinct representation of the I and Q color video information.

Fig. 3 shows the video waveform envelope

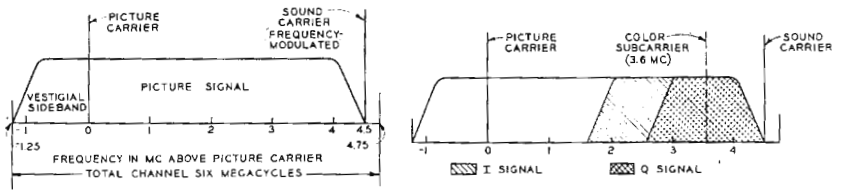


Fig. 1. Signal spectrum for the standard 6-MHz TV channel.

composition for a composite color bar signal. Note that the monochrome signal is always located between black level and reference white or unity. The monochrome signal level represents various shades up and down the gray scale. Fig. 3b shows the subcarrier signal levels for the primary and secondary colors and the color synchronizing burst. When the subcarrier signal is added to the monochrome signal, parts of the composite signal representing bright colors, such as yellow and cyan, are at the white level, while other portions are at the black level (blue and red). It is important that these levels be maintained, regardless of their positions in the black-to-white amplitude range. Moreover, there must be no change in the relative phases of the signals. If a change is introduced, in either amplitude or in phase (differential gain or differential phase), serious color distortions will result.

A studio picture monitor might display a test pattern which is free of any discernible distortions. However, a definitive analysis cannot be made by observing the picture monitor alone. During normal operation it is necessary to analyze the video signal on a waveform monitor.

Fig. 4a shows a horizontal video signal display of a monochrome test pattern. The horizontal sync pulse is shown during the horizontal blanking interval with a voltage level at D. Picture brightness level varies between A and B. In test pattern signals, these peaks are like the reference white and reference black levels, the range in which normal program picture signal will be found. Any voltage less than A will produce less brightness until the black level at B is reached.

With reference to the IEEE scale, the setup value for network transmission is usually 7.5 units. Black peaks should not extend below the reference black level. The usual procedure is to try to maintain a reference black level to produce the most pleasing effect at all times. FCC TV technical standards, Section 73.682 (a) (17), indicate that the reference black level must be separate from the blanking level by the setup interval, which is 7.5 ± 2.5% (between 5 and 10 IEEE scale divisions).

Fig. 4b shows the video test signal at the vertical scanning rate. The levels of white peaks, black peaks, blanking, and sync tip displayed are of the same value on the IEEE scale. This display will reveal many common types of low-frequency malfunctions, such as clamping failures, 60- or 120-Hz interference or other serious signal distortions.

Fig. 5a shows the horizontal display of an NTSC color video signal. The color sync burst, comprising 8 or 9 Hz of a 3.58-MHz sine-

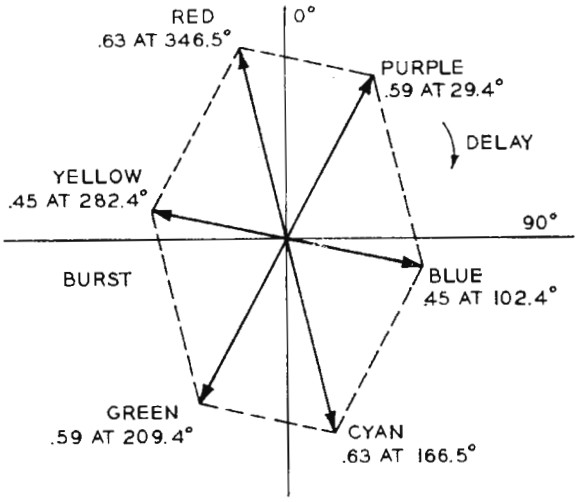


Fig. 2. Vector representations of chrominance signal amplitude and phase for primary and secondary colors.

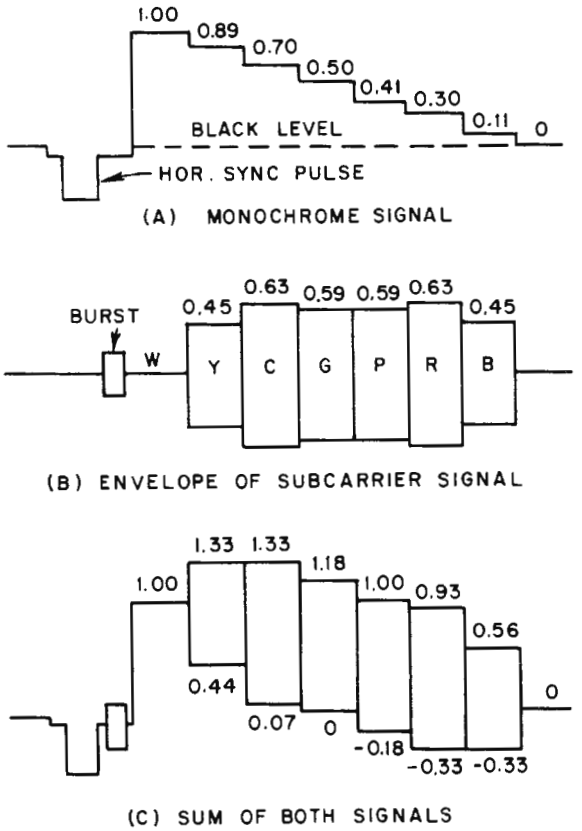
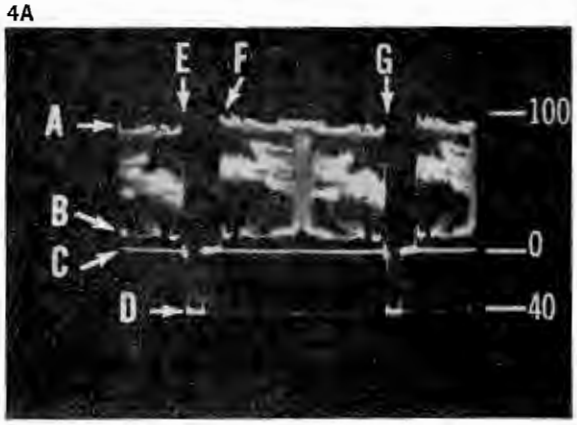


Fig. 3. Illustration of monochrome and color signal levels for NTSC colors.

wave signal can be seen on the back porch of the horizontal sync pulse. The color burst peak-to-peak amplitude is the same as that of the horizontal sync pulse, 40 divisions on the IEEE scale. The color burst is timed to occur in the middle of the blanking level and starts at about 1/10th of the way into the back porch interval from the trailing edge of the sync pulse. Some picture information exceeds the back level; this is 3.58-MHz chrominance signal representing such colors as purple, red, and blue. Fig. 5b shows the IEEE roll-off characteristic, a prescribed attenuation for reducing the higher frequencies and eliminating peaks which would

4A



4B

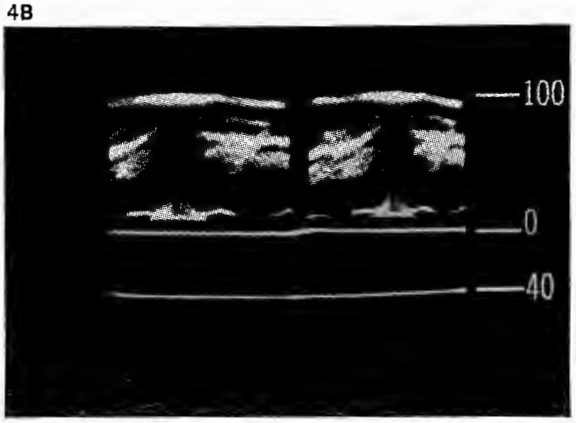
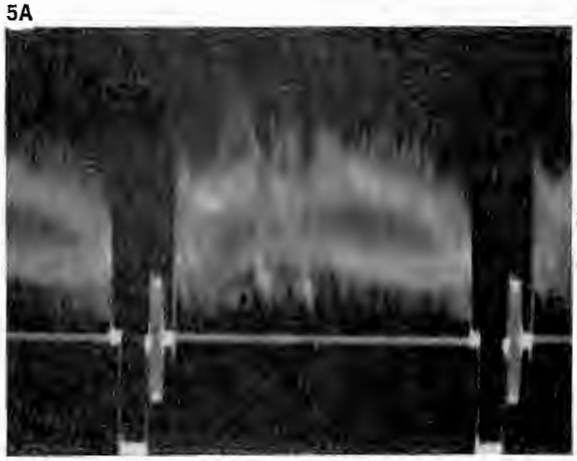


Fig. 4. (Left) Horizontal video signal scope display of test pattern: A-white peak; B-black peak; C-blanking level; D-syn level; E,G-horizontal scan interval; E,F-blanking interval; F,G-picture signal. (Right) Vertical rate display.

5A



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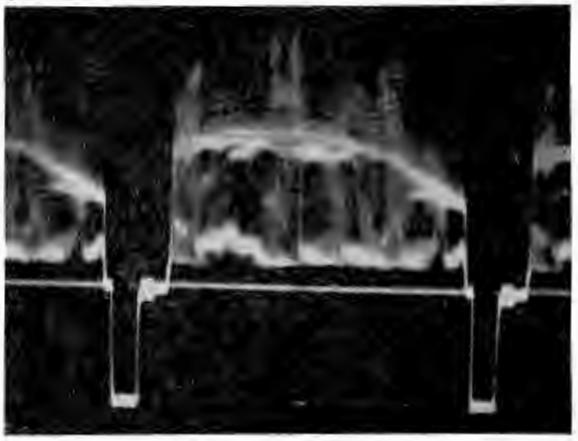


5C

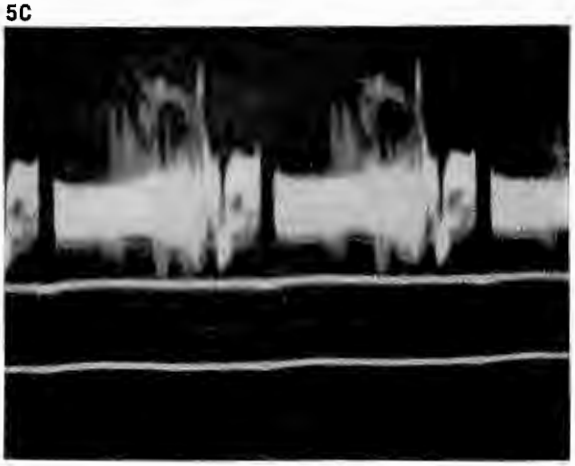


Fig. 5. (a) Scope display of color video signal; (b) display showing IEEE roll-off; (c) same display at vertical scan rate.

otherwise exceed white and black levels. Note the reduction in 3.58-MHz levels, as compared with Fig. 6. Fig. 5c shows the same color signal at the vertical sweep rate, which more clearly shows the limitation at the black level.

Test Signals

There are a number of test signals used to check picture quality and to analyze equipment capabilities for handling both monochrome and color signals. For proper operation the control operator must know how the video signal delivered by the camera looks in comparison with the signal shown on the monitor equipment. If this comparison indicates that distortion is being introduced by the transmission system, the received video signal can be checked and compared with the signals of other monitors along the video chain in order to isolate the faulty section.

In general, the test signals most commonly used are the window, sine-squared, multiburst, stairstep, and color bar displays. Recommended test equipment includes picture monitors (color and monochrome), oscilloscope ("A" scope waveform monitors), multitest signal generator, vectorscope or color signal analyzer, video sweep generator, oscilloscope camera, and receiver-type demodulator.

Window Signal

Fig. 6 shows the picture monitor view of a window signal, a large white square in a black background. Modern generators which produce the window signal also produce a secondary line (to the right in the monitor display) called the sine-squared pulse. The sine-squared pulse is more useful on a waveform monitor than on a picture monitor since the combined window and line display can be used to check transient response at both low and high frequencies. This test provides an indirect method of measuring time delay or a phase-versus amplitude characteristic of the video signal. The window signal is the most effective test signal available for detecting cases of picture streaking. Depending on the rise time of the window signal, an indication of overpeaking or extremely rapid cutoff may be revealed. Certain defects may also become obvious when a clear white window on a black background fails to appear.

The picture signal has two normal levels: reference black and reference white. The white level can be adjusted, but is usually set at reference white. To locate the maximum energy content of the signal in the lower part of the total frequency band, the white area is adjusted to cover ¼ to ½ total height. The signal is also very useful on a waveform monitor. Fig. 7a, a horizontal line display, shows the effects of disturbances in the vicinity of the line frequency or the midband region. This is a primary reason for the cause of tilt, rounding, or other distortions in the wide pulse corresponding to the window. To the left of the broad pulse, a narrow spike is visible as the sine-squared pulse. Fig. 7b shows the window signal at the vertical scanning rate. It is a 60-Hz square wave with sync and blanking pulses. The vertical sine-

Quality Control Considerations

Equipment required for TV broadcast installations varies widely, depending on the type of station and the magnitude of operation. However, practically all studio installations, large or small, are similar. The output of each studio or film camera is fed into an input on a video control console in the control room. At this console, the camera video signals are mixed and switched in the same manner as the microphone and transcription inputs are mixed at the audio control console. As with audio, any single equipment maladjustment or malfunction will impair the qualities of the picture signal fed directly to the transmitter line or to a master control room where the signal is mixed with signals from the studio, the network line, or outside points.

The video output section of the TV camera has several controls (brightness, contrast, focus, etc.) which require constant supervision if optimum quality is to be maintained. In all but the smallest TV stations, the supervision of individual camera video signals is controlled by an operator who sits at a video control console containing several camera control units, one for each studio camera and one for each film camera. Each section contains a picture monitor displaying the image picked up by the camera which it controls. It also has an oscilloscope for waveform monitoring and the required controls for adjusting brightness, contrast, focus, and other functions. During operation one video operator can adjust several TV cameras. Therefore, the person who does the switching is free to concentrate on program action without worrying about the camera controls. Video switching is usually performed by the director. A panel containing a pushbutton switching system with lap-dissolve levers, signal lights, monitors, etc., is mounted in a console. The director uses these controls to select the desired picture for transmission. Master or program and camera monitors supply the directors with a constant visual check on the transmission.

Video quality control responsibility, of course, does not end at the transmitter input, or for that matter, at the transmitter program line or STL. Adjustment and/or performance defects in either the equipment used to relay the signal from studio to transmitter, or in the transmitter, itself can destroy the best quality signal produced at the studio. Transmitter facilities should be designed to FCC and EIA specifications for color and monochrome operation, and they should be constantly checked for proper adjustment and performance.

squared window and pulse provides a very sensitive test for tilt at very low frequencies.

Information which can be obtained by using the window signal on both picture and waveform monitors includes:

Level or continuity check: By using a window of known white level, the peak-to-peak voltage of the video signal can be measured on a calibrated oscilloscope using the IEEE roll-off characteristic.

Minimizing picture streaking: By using the IEEE roll-off characteristic at both vertical and horizontal rates, and by observing the test signal on the waveform monitor, it is possible to evaluate the degree of picture streaking so that corrective adjustments can be made on the clamper-amplifiers and low-frequency equalizers. It is important to understand that the degree of streaking observed on a picture monitor depends on monitor amplifier characteristics and the proper adjustment of the ratio of brightness and contrast control settings.

Ringing Observations

Ringing may be observed on a properly calibrated wideband oscilloscope by expanding the horizontal display to a convenient scale. The ringing amplitude may then be read directly and the frequency may be calculated by adjusting the horizontal scope gain until the sync pulse covers 5 scale divisions. Then, using the scope centering controls, the ringing in the window display is placed on the horizontal scale. The frequency in megahertz can be determined by dividing the number of complete hertz by the number of divisions over which they extend. Ringing can also be observed on the picture monitor.

Sine-Squared Signal

A still more useful test signal is the sine-squared pulse. By expanding it horizontally on the waveform monitor, the presentation will yield the type of display shown in Fig. 8. This pulse permits the evaluation of amplitude-versus-frequency response, transient response, and phase and envelope delay. High-frequency response can be determined by the pulse height and width and the phase response by the relative symmetry about the pulse axis.

The sine-squared pulse is essentially a transient test signal used to check transient response and phase decay. When phase decay is not uniform with frequency, undesired overshoot or ringing may occur. This pulse waveform closely matches the TV camera output and should pass through most studio systems with no apparent distortion. If there is evidence of delay with increasing frequency, one or more overshoots will appear following the main pulse as shown in Fig. 9, which clearly indicates a phase or envelope delay problem somewhere in the system.

Decreasing delay with increasing frequency shows as overshoots or ripples *preceding* the main pulse. Under some conditions of constant delay, with too rapid a cutoff, overshoots will appear both preceding and following the main pulse.

The pulse used for checking TV systems should have a repetition rate equal to the line frequency, and durations at half amplitude equal to one-half of the period of the nominal upper cutoff frequency of the system. The spectrum distribution at the half-amplitude width of 0.125 microseconds is almost flat to 2 MHz; down 6 dB at 4 MHz and practically zero beyond 8 MHz. The pulse most commonly used is 0.125 microseconds wide at the 6-dB points.

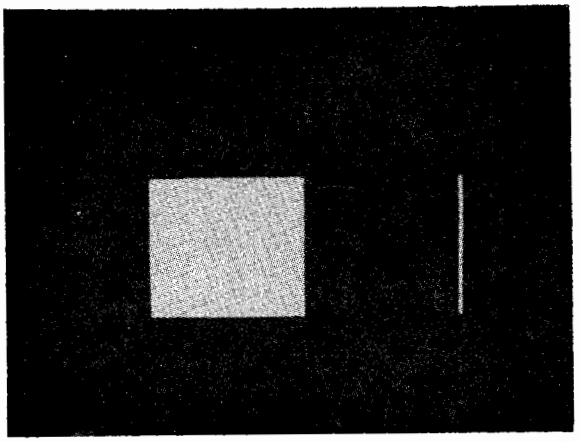
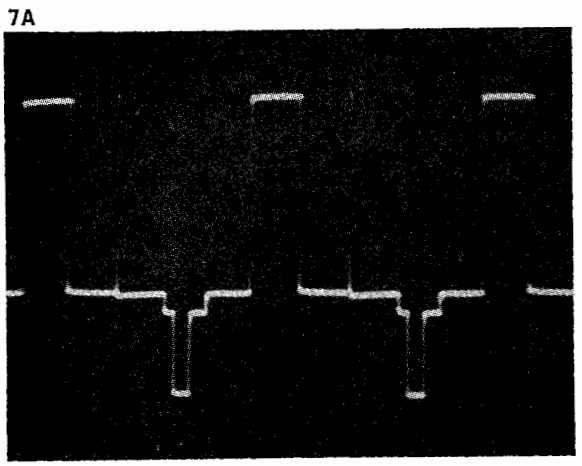


Fig. 6. Monitor display of typical window test signal.



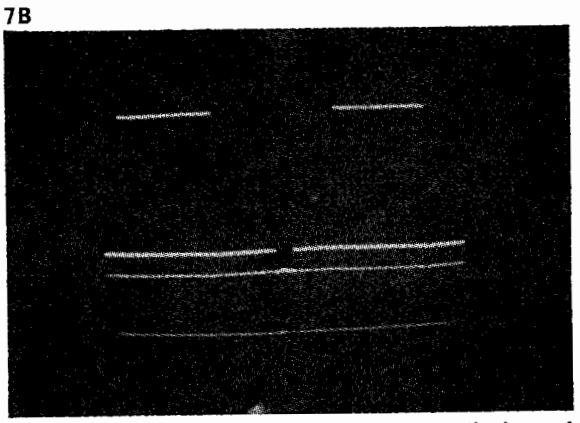


Fig. 7. Horizontal and vertical scan scope displays of window signal.

Multiburst Signal

The multiburst signal is the most convenient

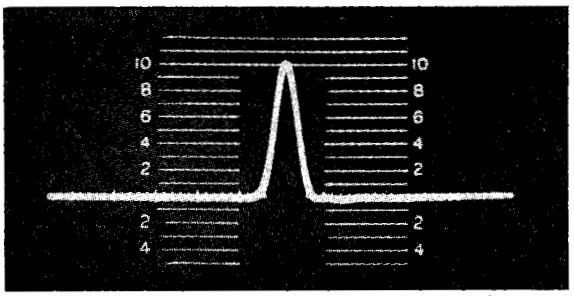


Fig. 8. Scope display of sine-squared test signal.

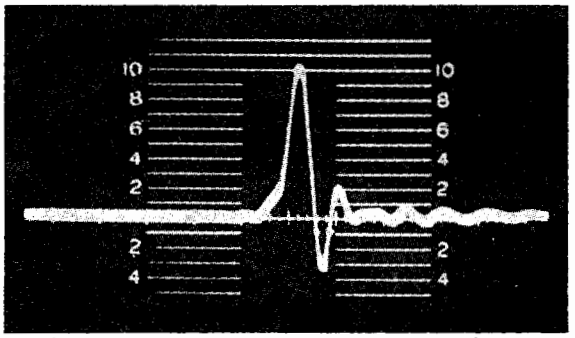
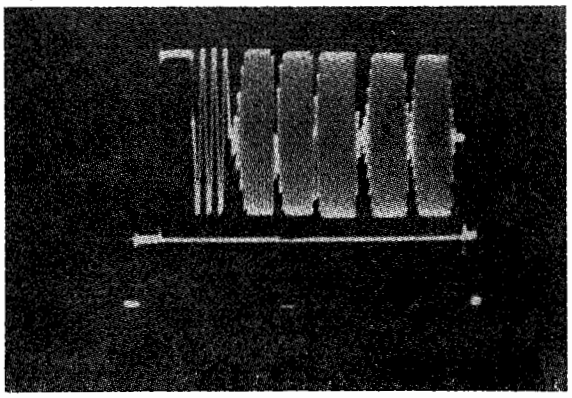


Fig. 9. Scope display of sine-squared test signal impaired by severe phase delay.

10A



10B

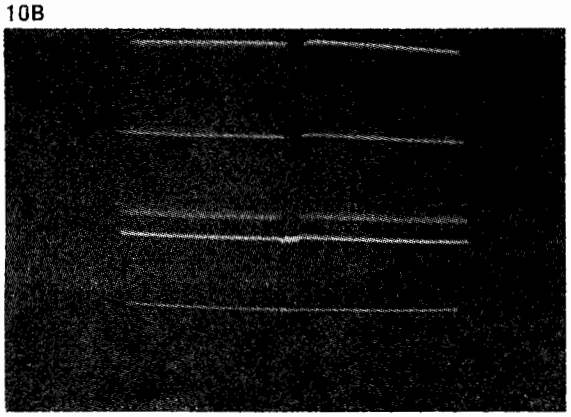
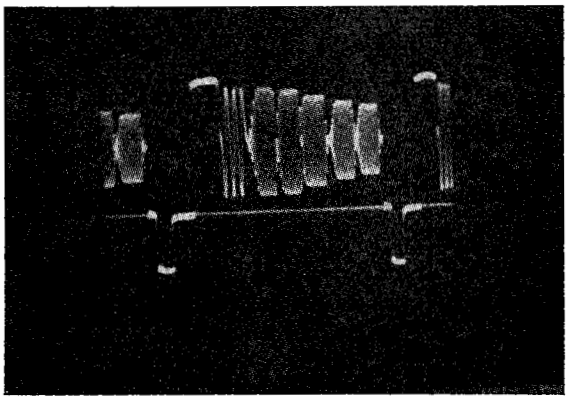


Fig. 10. Scope display of multiburst test signal: (a) horizontal scan; (b) vertical scan.

11A



11B

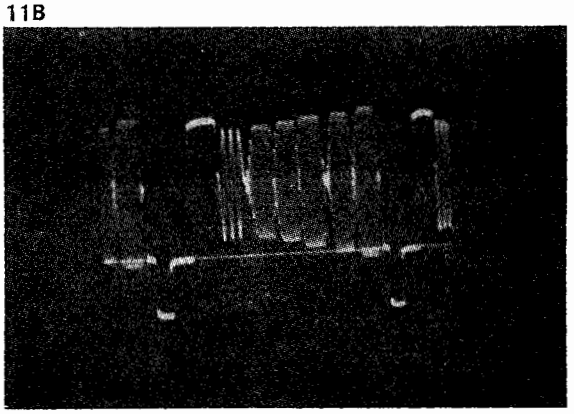
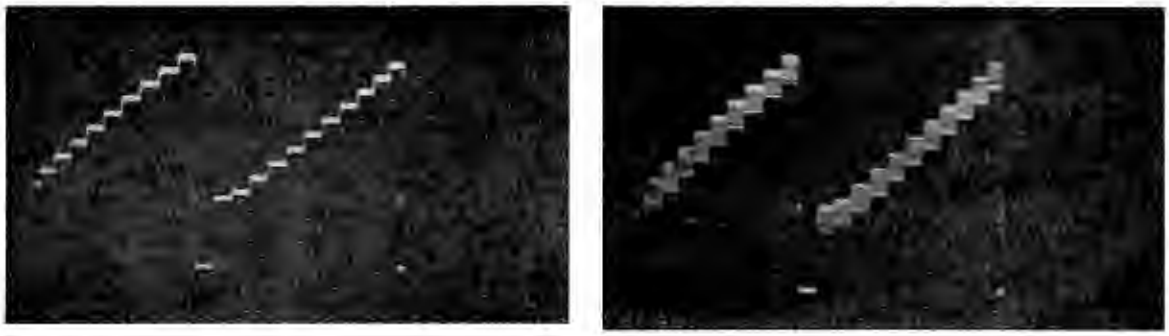


Fig. 11. Scope display of multiburst test signal at horizontal scan rate: (a) impaired by gradual high frequency loss; (b) impaired by gradual high frequency gain.

for a rapid spot check of line or system frequency response and gain, using few predetermined frequencies. It is like a true TV signal with the usual sync and blanking pulses (Fig. 10a), consisting of a burst of peak white followed by a series of bursts at 6 sine-wave frequencies normally set at 0.5, 1.5, 2, 3, 3.6, and 4.2 MHz, plus a horizontal sync pulse, all transmitted during one line interval. The white pulse provides white level reference. The vertical multiburst signal waveform is shown in Fig. 10b. For comparison purposes Figs. 11a and 11b show gradual dropping and rising frequency gain characteristics. This allows patterns obtained with test signals to be compared with the normal signals in Fig. 10.

Stairstep Signal

Fig. 12a illustrates an unmodulated 10-step stairstep signal which provides a means of checking linearity and differential phase and



A B

Fig. 12. Scope display of stairstep signal: (a) unmodulated; (b) modulated.

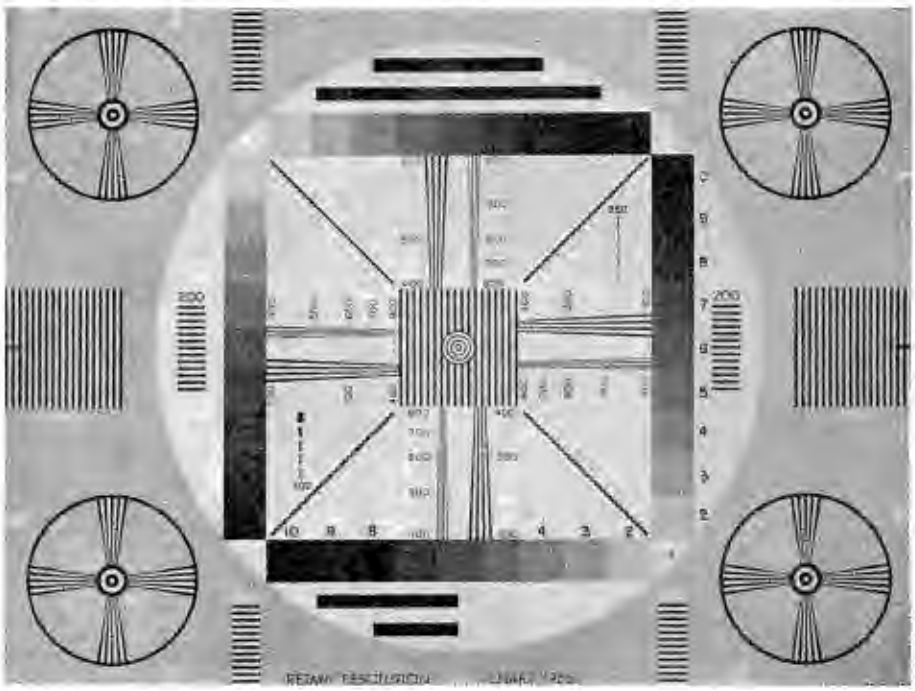


Fig. 13. Standard EIA test pattern.

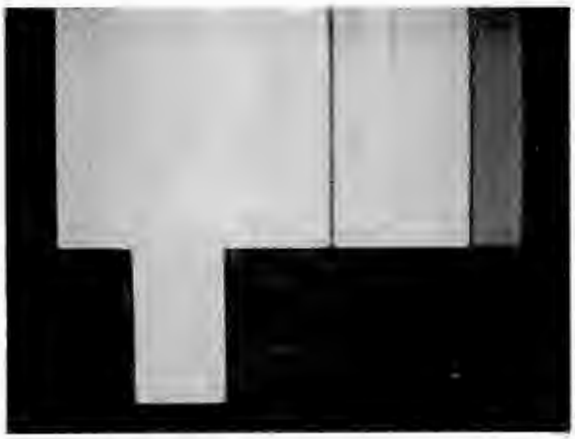
gain measurement. The relative height between steps is used as an indication of compression or nonlinearity. By superimposing a sine-wave or a subcarrier signal (Fig. 12b), the stairstep signal may be used to check differential gain and phase characteristics of color transmission facilities. The high frequency sine-wave or subcarrier component is filtered off the low frequency steps so that it can be examined for any possible malfunction resulting from the subcarrier's transmission at various levels all the way up through the gray scale. If the signal is not distorted the subcarrier signal will contain a clean envelope. A case of white compression will cause the level of the signal to drop off towards the end of each horizontal interval.

EIA Test Pattern

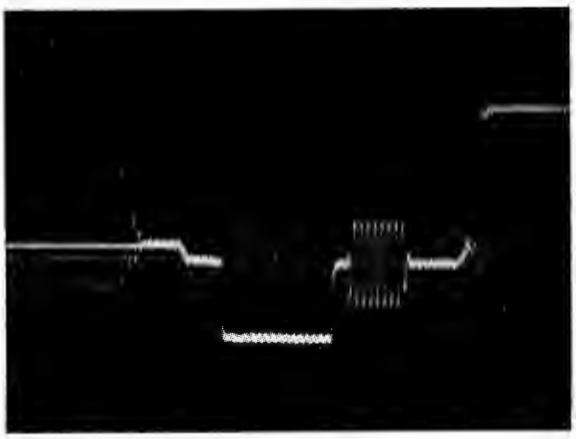
A standard test pattern developed by the Electronic Industries Association is shown in Fig. 13. It may be used to determine the fidelity of equipment operation from camera to transmitter by revealing the following video signal characteristics: horizontal linearity, vertical linearity, contrast, aspect ratio, interlace, streaking, ringing, vertical resolution, and horizontal resolution. Results may be interpreted by checking the detailed EIA test chart instructions.

Color Bar Signal

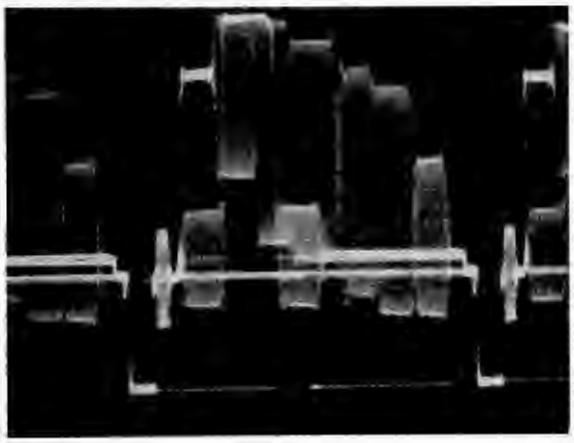
A test signal which is becoming increasingly more important is the color bar signal, since it can be viewed on a color monitor or displayed on a vectorscope. As more stations originate color and use such equipment as the vectorscope, vectorimeter and chromascope, the signal presented on these units will allow the operator to check quickly hue and saturation levels of the color bar signal. Fig. 14a illustrates a color bar signal displayed on a monochrome picture monitor. The video signal appears as corresponding bars in various densities of gray,



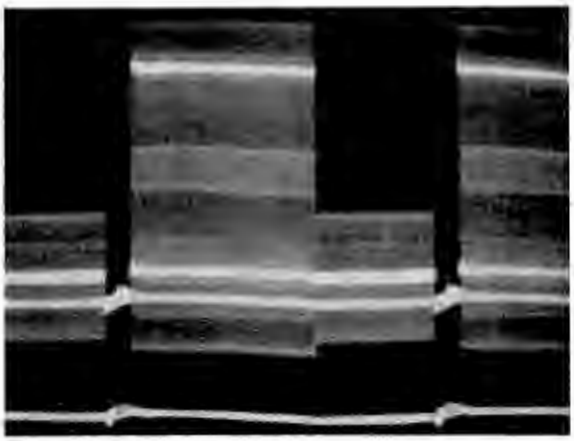
A



C



B



D

E

Fig. 14. Color bar signal displays: (a) monochrome monitor; (b) scope display at wideband horizontal scan rate; (c) expanded horizontal scan; (d) vertical scan; (e) graphical representation.

depending upon the values of luminance. The wideband horizontal signal shows if the white reference and chrominance levels have a normal amplitude relations hip. The oscilloscope display for this pattern is shown in Fig. 14. This display will indicate that a system is in good condition from an amplitude standpoint if the positive travel of the cyan bar is at white level and the negative excursion of the green bar is at black level. Figs. 14 and 14d are expanded horizontal and vertical oscilloscope displays.

Using these test methods, it is possible to analyze rather quickly the operating characteristics of an entire TV system from camera to antenna input. However, it is important that all test instruments, monitors, etc., be in proper working order; otherwise, the resultant measurements will not be a true indication of a system performance.

A subsequent article, to be published in early '67 will explore causes and effects of video signal impairment. ●

The Case for RPB

What is RPB? How do remote pickup broadcast facilities serve the broadcaster?
On what frequencies is RPB operation permitted? Here are the answers to these and other questions.

By John H. Battison

BEFORE ATTEMPTING to plan a remote pickup broadcast (RPB) system, a broadcaster must familiarize himself with appropriate FCC rules and regulations regarding the use of such equipment Appropriate rules are found in subpart D, Paragraph 74.401 and other sections of Part 74 in general. A remote pickup broadcast mobile station is defined as "a land mobile station licensed for the transmission of program material and related communication from the scene of events occurring outside a studio." Care must be exercised here to distinguish between a fixed remote studio and a portable or mobile remote studio. For example, a fixed remote studio — located in another city, but within the service area of the radio station —could fall under the classification of Intercity Relay, for which the 950-MHz band is specifically assigned. In any discussion of remote pickup facilities as it applies to radio station programming, whether a-m or fm, it is well to remember that the broadcaster is neither morally nor legally obligated to use land lines to do his remotes, whether or not they are available to him. This is a popular misconception among broadcasters and one which needs to be made quite clear.

Available Frequencies

Operational eligibility is covered by Rule 74.432(A), which states that a license for a remote pickup broadcast base station or mobile station will be issued only to the licensee of a standard a-m, fm, or TV broadcasting station. More than one remote pickup broadcast base and mobile station may be authorized to a single licensee. A separate license and construction permit (new station) is required for each transmitter, whether it be mobile or base. Application for both CP and license must be filed at the same time; otherwise, there is a good possibility that one may be granted and not the other, making it necessary for the applicant to refile.

An application for a new remote pickup broadcast base or mobile station must specify the frequency or frequencies desired, and the transmitter must be capable of operating on each frequency requested. The frequencies available for remote pickup operations are shown in Table 1. The responsibility of selecting a clear frequency for any given area falls upon the applicant, and the FCC makes no guarantee that a requested frequency will not be assigned, even though it may be in use in the same town or in the same area.

As will be seen from Table 1, RPB operation is permitted on four distinct frequency bands. Group A includes three frequencies in the 1.6-MHz band, Groups D through J provide twenty-six (26) frequencies in the 26-MHz band, Groups K, L and M provide sixteen (16) frequencies in the 150- to 160-MHz region and Group N provides twenty (20) frequencies in the 450-MHz region. At this point, it is advisable to examine the propagation characteristics of each band as well as to consider other users of the various frequencies.

The 1.6-MHz band is probably the least attractive because these frequencies provide long range propagation characteristics; also, operation in this band is shared with a number of other services. Moreover, if any kind of radiating efficiency is to be attained, an antenna comparable in size to a standard broadcast antenna is desirable. The 26-MHz channel grouping also presents the possibility of shared operation. In the 25- to 26-MHz band there are 26 available frequencies with 20-kHz channel spacing, a factor which limits modulation swing. This disadvantage pretty much restricts operation to voice communications. Transmissions on these frequencies also have a tendency to skip and fade, making reliability uncertain; it is not at all uncommon for 26-MHz signals to break the squelch on receivers several hundred miles away. In addition, antennas are large, unwieldy, and difficult to maintain under high wind and heavy icing conditions.

On the credit side of the ledger is the availability of equipment. New equipment is readily available from several manufacturers at modest cost. The surplus market yields ample quantities of equipment, often at extremely low prices. For those broadcasters who are already using 26-MHz equipment, it is often desirable to maintain such equipment either strictly for communications from base or studio to the mobile unit or remote point, or for news coverage of fires, accidents, etc., and to convert broadcast program operations to the 150- or 450-MHz band.

In the vhf Group K band are 14 frequencies ranging from 152 through 161 MHz; again, shared operation is encountered, with Industrial Land Mobile Services taking priority on the 152- to 153-MHz frequencies. Actually, the word "shared" is somewhat of a misnomer; the way the rules read is that frequencies may be used for remote pickup *provided* "it does not interfere" with the Land Mobile Services. This is interpreted to mean that if a clear 152- to 153-MHz frequency is found at the time of the search, there is no guarantee that some industrial user might not move into the area on that frequency with full protection for its use.

Within Group K, however, there are five (5) frequencies in the 161-MHz band which are set aside and assigned for exclusive radio broadcast use. These are

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

Fred Mershon, KTMS-FM newsman, is first to get a fire story live and direct from one of several helicopter pads in the fire area.

Some of KTMS's gear. In the foreground is a Sony portable tape recorder. Just behind this is a Moseley RPL-1 30-W Transmitter. The Jeep Wagoneer was both good transportation and mobile studio. The five element Scala yagi is used when high forward gain is required.

Portable tape was used to get story on fire when live coverage was not practical.

WNWC-FM (Arlington Heights, Ill.) remotes cover supermarkets, banks, stores, service stations and sports events as far away as 30 miles with its Marti equipment. Over 250 remotes have been performed since September of 1965—with only one outage—no air time was lost since the station had two pieces of equipment. WNWC general manager Wayne Smith figures the equipment saved over $5000 in phone line charges.

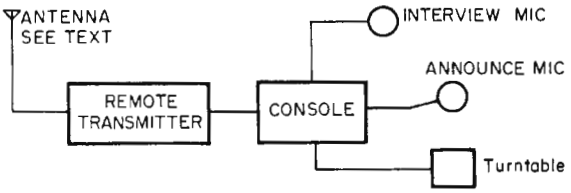
WDGM, Douglas, Ga., uses a Vega remote cordless microphone with its Marti equipment. WDGM program director and chief engineer Jim Dixon does a remote at Harvey's supermarket.

161.64, 161.67, 161.70, 161.73, and 161.76 MHz, and are the desired frequencies for operation in this band. These frequencies, spaced at 30-kHz intervals, allow adequate transmitter modulation swing and provide for excellent audio quality. There are two additional frequencies which have a certain exclusiveness — 166.25 MHz in Group L and 170.15 MHz in Group M. There are certain areas of the country in which these frequencies may not be used, but this is principally in the Southwest and within 100 mi. of New York City; however, they can be used to the same advantage as the 161-MHz frequencies in approximately two-thirds of the U.S. Equipment with very close to a-m quality is available for operation within this frequency range, typically offering frequency response of 2 dB or less from 70 to 7500 Hz, distortion of less than 3 percent, and a signal-to-noise ratio of 45 dB or better.

In attempting to select one of the exclusive broadcast frequencies, there are several factors to consider. Normally, it is desirable to have at least a 50-air-mi. separation between stations using the same channels. Often, this is insufficient due to high-power base stations and high-gain antennas mounted at considerable height above ground. For example, in many larger metropolitan areas, stations provide a traffic watch. With only a 2- to 3-dB gain antenna used for transmitting from an aircraft this can blanket an area of 100 mi. radius or greater.

In the 450-MHz band there are 20 frequencies — 10 in the 450-MHz range and 10 in the 455-MHz range. These frequencies are also set aside for the exclusive use of radio broadcasters. In addition, within the last 18 months, the FCC has authorized use of these frequencies for unattended automatic relay. This was done as a result of the need by broadcasters, particularly in the mountain states, who cannot effectively cover their service area. This allows broadcasters to originate remote pickups on either 150 or 450 MHz and relay it to the studio via unattended relay stations operating on 450 or 455 MHz. Broadcast pickups from the mobile unit or remote point go through the relay, as do return communications from the base back to the remote point. It might be well to point out that an *unattended* automatic relay can be operated *only* on 450 or 455 MHz; however, if the relay point is attended, rebroadcast can be accomplished on either 150 or 450 MHz. TV towers, CATV sites, or communications tower sites are excellent for relay stations, and antenna space usually can be leased for a nominal monthly fee.

450-MHz channels—and when we refer to 450, it is understood that we are speaking of 455 MHz as well—are separated by 100 kHz, allowing ample modulation swing to obtain extended frequency response. 450-MHz equipment very closely approaches the quality of standard fm broadcast with a frequency response range of 60 to 12,500 kHz, within 2 dB or less.



Block diagram of typical RPB setup. In many cases, a single mic is all that is required; however, this setup enables a crew to produce an entire program including the music.

Characteristics of 450-MHz Band

There is considerable skepticism within the industry concerning the effectiveness of 450-MHz transmissions compared with 150 MHz. Practical application, however, has proved that propagation in the 450-MHz band will very closely approach that normally obtained in the lower band. It is desirable to have a line-of-sight path for 450-MHz transmissions, but the secret of good, consistent broadcast coverage still lies in the receiving antenna and transmission line installation; the antenna should be installed at the maximum permissible height above ground with a good low-loss transmission line feeding the receiver. Many stations are working 450-MHz equipment as far as stations using 150-MHz equipment with basically the same antenna conditions.

Practical application has proved that transmitter output is of minor importance; an efficient antenna and transmission line system is the more economical means of delivering the required signal strength at the receiver terminals, and after all this is the major objective. It is interesting to note that, within the past few years, the trend has been toward higher-gain antennas. The 450-MHz band does have the advantage of being more free from man-made noise, and it is capable of a better response due to the increased bandwidth.

In a cost comparison of 450-MHz equipment versus 26- or 150-MHz equipment, at least one major manufacturer of RPB equipment has a typical one-way, broadcast-quality circuit listed at only some $275 above the selling price of its comparable 150-MHz equipment. Generally, though, the price of 450-MHz equipment can be considered to be higher than 26- or 150-MHz equipment.

TABLE 1. RPB Frequency Assignments (MHz)

GROUP A	GROUP D	GROUP E	GROUP F
1.606	25.87	25.91	25.95
1.622	26.15	26.17	26.19
1.646	26.25	26.27	26.29
	26.35	26.37	26.39
GROUP G	**GROUP H**	**GROUP I**	**GROUP J**
25.99	26.03	26.07	26.09
26.21	26.23	26.11	26.13
26.31	26.33	26.45	26.47
26.41	26.43		

GROUP K		
152.87	153.17	161.64
152.93	153.23	161.67
152.99	153.29	161.70
153.05	153.35	161.73
153.11		161.76

GROUP L	GROUP M
166.25	170.15

GROUP N			
450.05	450.55	455.05	455.55
450.15	450.65	455.15	455.65
450.25	450.75	455.25	455.75
450.35	450.85	455.35	455.85
450.45	450.95	455.45	455.95

Common Carrier Links

Before proceeding to technical system design discussions, it should be mentioned that it is possible to obtain mobile radio telephone service from a local common carrier, assuming the carrier has been sufficiently ambitious to provide this service. In less populous parts of the country it may be feasible to obtain better service at lower costs by resorting to common carrier service. However, in most areas near large cities, the demand for service is frequently so heavy that a broadcaster cannot be sure of obtaining a free channel when it is needed, and one that is free from interference or time restrictions. An improved mobile telephone service has been adopted in many service areas. Utilizing the eleven (11) channels assigned for common carrier use, it is theoretically possible for four channels to serve six times as many users as would have been possible before the advent of the improved mobile telephone service. However, the somewhat dubious advantages of common carrier remote pickup operation must offset the continuous monthly, and in some cases fairly high, service charges. In the case of station-owned equipment, the user can do what he likes with it, provided that it continues to comply with FCC rules and regulations.

Engineering Design

In the past it has been necessary to rely exclusively on vacuum tubes for receiving and transmitting equipment. However, the advent of the transistor has changed the picture considerably, and whereas it was fairly common to encounter a battery drain of 30 A or more with tube equipment, currents of 2 or 3 A—and far less than this on standby—are the rule rather than the exception for today's transistorized gear.

In this article we are going to user the term "system design engineering" as applied to the power requirements and propagation path characteristics, and not the actual design of receiving and transmitting equipment. In most cases it is probable that a broadcaster will take an existing piece of remote equipment and modify it as necessary to meet his needs and FCC requirements. It is still possible in many places to pick

Equipment Essentials for Remote Operation

- 2 microphones
- Turntable (optional)
- Records
- Mic cables and extensions (500 ft.)
- Power cables
- Cue receiver—can be car or station wagon radio
- Selection of antennas (unless it is known that the regular antenna will suffice)
- Permit, if required by local authorities
- Spare battery
- Control console or some form of local switcher
- Mic cover to prevent wind noise
- Transmission line for antenna, if other than regular antenna is used

Facts About RPB

Operation

A typical remote pickup might be a commercial program from a motor show. The station vehicle (station wagon, perhaps) with the remote equipment installed is driven to the event. Equipment could include a small remote console, two mics, and perhaps a single turntable. An on-the-scene director handles music and local color direct from the site, and another announcer/interviewer provides other program material. Obviously, this type of operation is a most efficient use of remote pickup equipment. It would not be worth the cost of installing remote telephone lines just for one occasion; by driving the equipment to the event and erecting a good antenna, adequate coverage can be achieved.

Antennas

In the 25/26-MHz band, physical antenna size is generally too great to allow use of anything but a vertical whip with very little gain or directivity. However, if the event is considered important enough, and of sufficient duration, it might be worthwhile to erect a directional antenna on a pole or tree at the remote location. Often, citizens band directional antennas can be used to advantage, especially at the receiving end where interference may be experienced with a vertical nondirectional antenna.

In the 150-MHz band, almost any high-band TV antenna can be used for directional control at both ends; in any event it is not often that interference is experienced on this band. However, in general, the station's auto installation with its vertical whip will be used. At a fire, for example, local conditions generally will not allow much choice of antenna type—the station will be lucky to find a place to get the mobile unit near the fire. The inexpensive "hatpin" type antenna, often seen mounted on a car roof, is good, but a better choice is a TV antenna, oriented toward the station by turning either the car or the antenna.

Radio Remote vs Phone Line Costs

Remote pickup equipment may cost from $25 up if it is purchased second-hand from a taxi company or police department, and then modified to provide broadcast quality sound. Its cost also depends on whether it is designed for operation at 25 or 150 MHz. A new piece of equipment may run as high as $500 for 25- or 150-MHz gear. For between $50 and $600 a good remote pickup installation can be built.

Phone lines usually cost about $7.50 for the installation and a certain minimum for each quarter mi, but can be used at only one location. Rates usually run about $20 for the initial cost and about $10 monthly thereafter. So if the remote is for a regular program, phone lines may be cheaper. But for a one shot program, radio remote is usually the better choice.

KTMS Remote: Unique Setup

By Don Helvey

KTMS, we believe, is unique in the arrangement and use of its remote broadcast facilities. Our coverage area begins at the Pacific Ocean and extends 50 mi along the coast in either direction from Santa Barbara, California. Coverage also extends north-north west from Santa Barbara over a 4300-ft mountain range across sweeping farmlands, a missile base, and through rugged and mountainous terrain to the San Luis Obispo area. Our a-m transmitter is located 80 ft above sea level at the ocean; the fm transmitter, on the 4300-ft mountain range overlooking a large portion of the coverage area.

Facilities at the station were rearranged a little over a year ago when we purchased an fm station, resulting in extended coverage to the north. With a 67-kHz SCA and a 161-MHz remote setup at our disposal, we expanded our mobile operation beyond the limits of Santa Barbara. It was decided that an existing fm facility would be acquired because no additional channels were available. We were fortunate in obtaining an fm station with transmitting facilities ideally situated for main-channel coverage and reception of our mobile units.

The next step was to find mobile equipment that met our specifications. We needed gear that provided dependability and stability under rugged handling and operating conditions, studio quality to at least 8000 Hz, versatility for ac and dc operation, ease of operation (nontechnical personnel would operate this equipment) and continuous operation—all at the right price. We were aware of what was available on the market, but we found that units like those made by RCA and General Electric didn't give us the desired quality nor the feature of continuous operation. We could find only two manufacturers of mobile equipment who could supply what we needed. The equipment we finally selected was the Mosley RPL-1. This unit both met and surpassed our requirements and those of other users we talked to. This solved our communications needs, but we had another problem—transportation. We wanted a rugged vehicle for shuttling between the studio and the fm-transmitter site. The vehicle also would have to serve as a mobile unit for news coverage in the tri-county area, so appearance was a factor. We se-

Photo shows two-tone oscillator fed into mic to activate unattended repeater facilities.

up older mobile units which include a base station and a number of remote pickup units for sums ranging from $25 and up. The engineering time and effort required to modify them for remote pickup use — particularly for a communications circuit from base to mobile—is not very great, and is generally well within the capabilities of a broadcast engineering staff.

A station engineer can make use of a large amount of reference material in planning his system, and it is the author's experience that planning is important. Dashing out wildly to buy the first piece of surplus equipment that seems interesting is not recommended. In general, the rules limit transmitter power to no more than that which is necessary to do the job. This does not mean that an applicant cannot request the power he desires to use; in fact, he will have to state the proposed power in his application, and the Commission may decrease this or, in some instances, increase it. A point to bear in mind when using surplus mobile equipment is that remote pickup equipment generally will have to operate continuously at full transmitter power for periods ranging from 5 min to 2 or 3 hr. The average mobile communication equipment is not designed to stand this load, and for this reason it may be necessary to replace a number of components with heavy duty units and to provide better ventilation, including the use of forced air. A mobile transmitter generally will (in fact, it should) include some method of controlling the output power so that no more is used than necessary.

By selecting a suitable directional antenna, considerable improvement in remote performance through increased antenna gain often can be obtained. However, the mobile antenna, which generally is a vertical quarter-wave (or less) radiator, usually will have zero or minus "n" dB gain. This is another reason for avoiding the lower-frequency bands. However, if provision can be made for the transportation of a yagi type radiator, it is possible to obtain gains of 3 to 6 dB on the 26-MHz band. In the 450- and 150-MHz bands it is possible to achieve gains up to 10 dB with a small antenna due to the shorter wavelengths at these frequencies.

Even average available surplus mobile communication equipment provides adequate speech circuit performance. This means that the frequency response normally ranges between 300 and 3000 Hz, with harmonic distortion of up to 10 percent. While this is adequate for a remote type of presentation in which "telephone quality" (news, etc.) is desired, it is hardly adequate for sustained remote pickups of broadcast quality. Thus, it is generally advisable to modify the audio circuits of surplus equipment to provide a broader bandpass of up to 5 kHz and to add the feedback needed to reduce distortion.

Propagation Characteristics

Having considered how to pro-

lected a Jeep Wagoneer with four-wheel drive.

The bath of fire for the new equipment literally came during the Summer of 1966 when a major fire in Wellman Forest sparked its way into the news. Broadcasting from Fire Control Headquarters at Santa Ynez north of the 4300-ft mountain range, we beamed our signal to the mobile receiver at the fm transmitter and fed the receiver output into a Mosley SCG-4 and recovered the subcarrier on a McMartin TBM-2000 (modified for greater frequency response) at our downtown Santa Barbara studios. The hookup worked flawlessly. Apprehensively, we decided to go into the fire area without running signal reliability checks. The Wellman fire area was, for the most part, located in inaccessible terrain. The Forest Service quickly had to improvise temporary roads to reach the fire. Experiencing no difficulties with our equipment to that point, we decided to drive into the fire area to broadcast directly from the scene. We were on the spot when many of the back fires were set and were able to obtain exclusive interviews and reports from people directly involved with fire-fighting operations. Whenever we were not able to get the signal out to our receiver we used a portable tape recorder to obtain actualities of fire fighters, equipment operators, fire bosses, sounds of the fire, and brought them to a relay point where they were sent to our news department.

These are typical of the comments of listeners and competitors: ". . . Amazed you were able to broadcast from some of the areas . . .," ". . . Quality was so good that if I hadn't known where you were I would have thought you were re-creating the fire in your studio . . ." Our audience was impressed with the type of coverage we gave them, but the intelligibility and quality of the signal coming from the wildlife area of Santa Barbara was what we feel really kept them glued to their speakers. This application of broadcast facilities in situations of this type definitely is superior to conventional police-type setups most radio stations are saddled with. Sponsor and ownership reaction was very gratifying as well.

We use our equipment in many situations where normally we would install a broadcast loop or run to an often-nonexistant telephone. The saving just in covering our local sporting events without using lines amounts to hundreds of dollars. We use a 26-MHz talk-back system for communicating with Engineering Department and have conducted tests with a 41-kHz subcarrier for talk-back from studio to mobile.

During the November, 1966 election we worked in conjunction with KVEN Radio in Ventura (about 35 mi down the coast from Santa Barbara) and found that by using their subcarrier for both stations we were able to expand our coverage even farther. Because we and KVEN occasionally broadcast separate sporting events in each other's area, we are investigating the feasibility of swapping subcarriers. A swap would enable both stations to cover events which normally are available only on telephone lines at greatly-reduced quality.

vide a reasonably good quality signal to the modulator, let us now consider the most important link—the propagation path. Noise is the usual limiting factor in remote pickup operation, and is generally controlled by the ambient or general noise level produced by man-made and natural static at the receiving location. Much has been written about signal-to-noise ratio, what it means, and how it is employed. However, for general broadcast use, if a 40 dB signal-to-noise ratio can be maintained, with distortion below 10 percent, the remote pickup engineer should be well satisfied. A signal-to-noise ratio of this value will provide ample margin for practically any kind of propagation fluctuation.

In the 160-MHz band, a receiver sensitivity of 0.3 μV is reasonable, and a signal-to-noise ratio of 16 dB can be achieved if carried deviation of $\pm$ 5 kHz for a 1-kHz tone is used. To obtain a 40-dB signal-to-noise ratio, a 24-dB stronger input signal will be required. This can be obtained with a 6-μV signal. To compute the power required to overcome the propagation path loss over a given distance in Watts per square meter (W/m^2), the following formula is employed:

$$P_D = \frac{P_{erp}}{4 \pi R^2}$$

where:

P_D = power density produced at the receiving point, a distance R from the transmitter;

P_{erp} = power transmitted (antenna output plus antenna gain minus transmission line loss).

With an erp of 50 W and a receiver 30 mi away, a power density of 6855 $\mu\mu$V per square meter will be produced.

We now need to know the voltage produced in a 50-ohm transmission line. Let's assume a receiving antenna gain of 6 dB and a frequency of 160 MHz. Applying the formula for antenna aperture effect:

$$A = \frac{G_R \lambda^2}{4 \pi}$$

where:

λ = wavelength

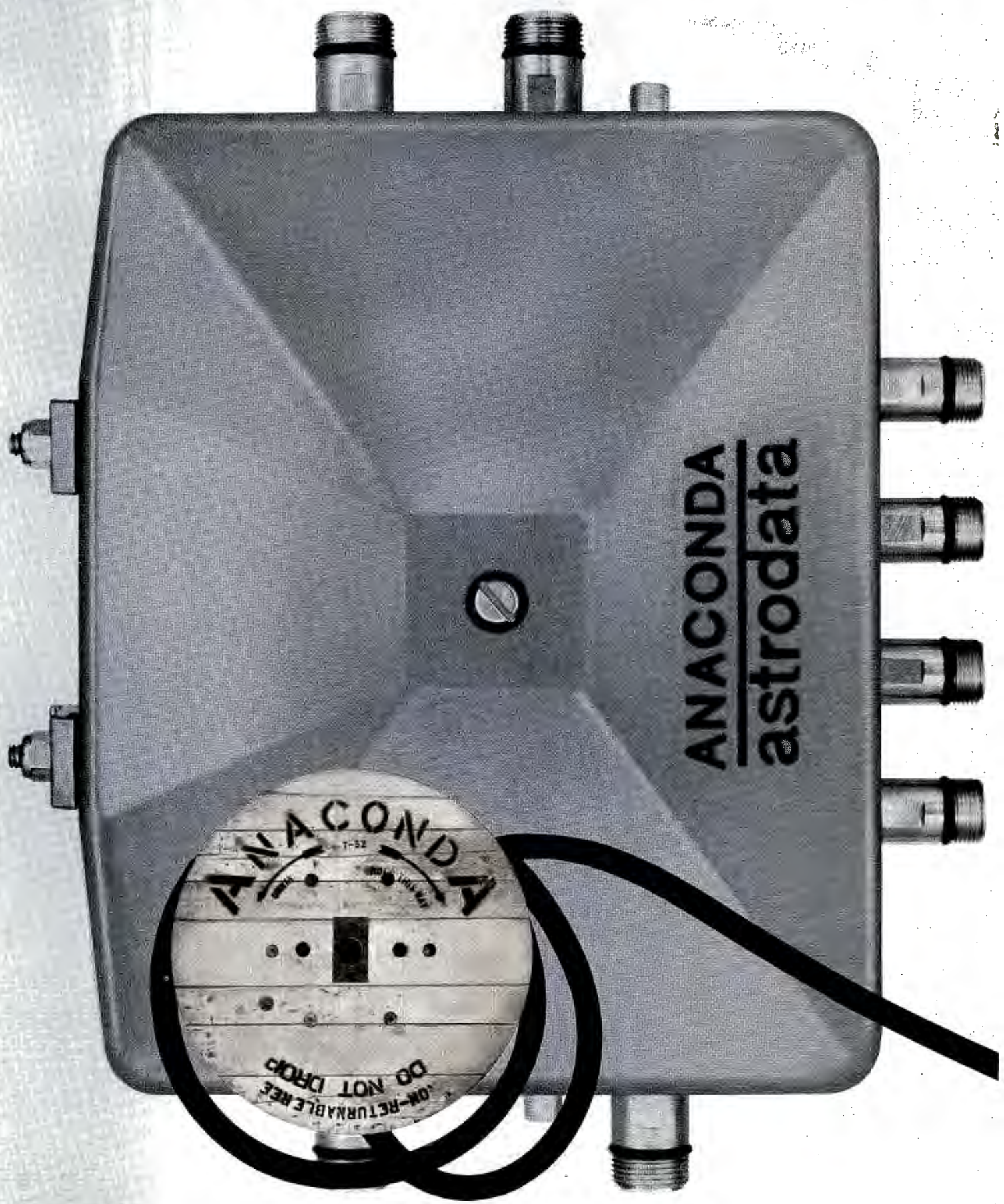
A = antenna aperture or effective area;

G = gain of the antenna related to an isotropic antenna.

Substituting in the second equation, we find that the aperture of the receiving antenna is 0.521 m^2; therefore, the power received is 0.521 $\times$ 6855 $\mu\mu$W/m^2 which comes to 3571 $\mu\mu$W. Applying Ohm's law, we find that the answer is approximately 400 μV across a 50-ohm transmission line.

The figures obtained in the preceding calculations will not necessarily hold for every situation because the equation is based on free space attenuation only. In practice, higher attenuation figures are often encountered due to shielding, screening, and the effect of the antenna-to-ground proximity. Also, in some cases a higher signal than the computed value may be received. •

BROAD NEW



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For more information on how Anaconda Astrodata's broad new perspective can help solve your CATV problems, write or call us.

in

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Circle 26 on Reader Service Card

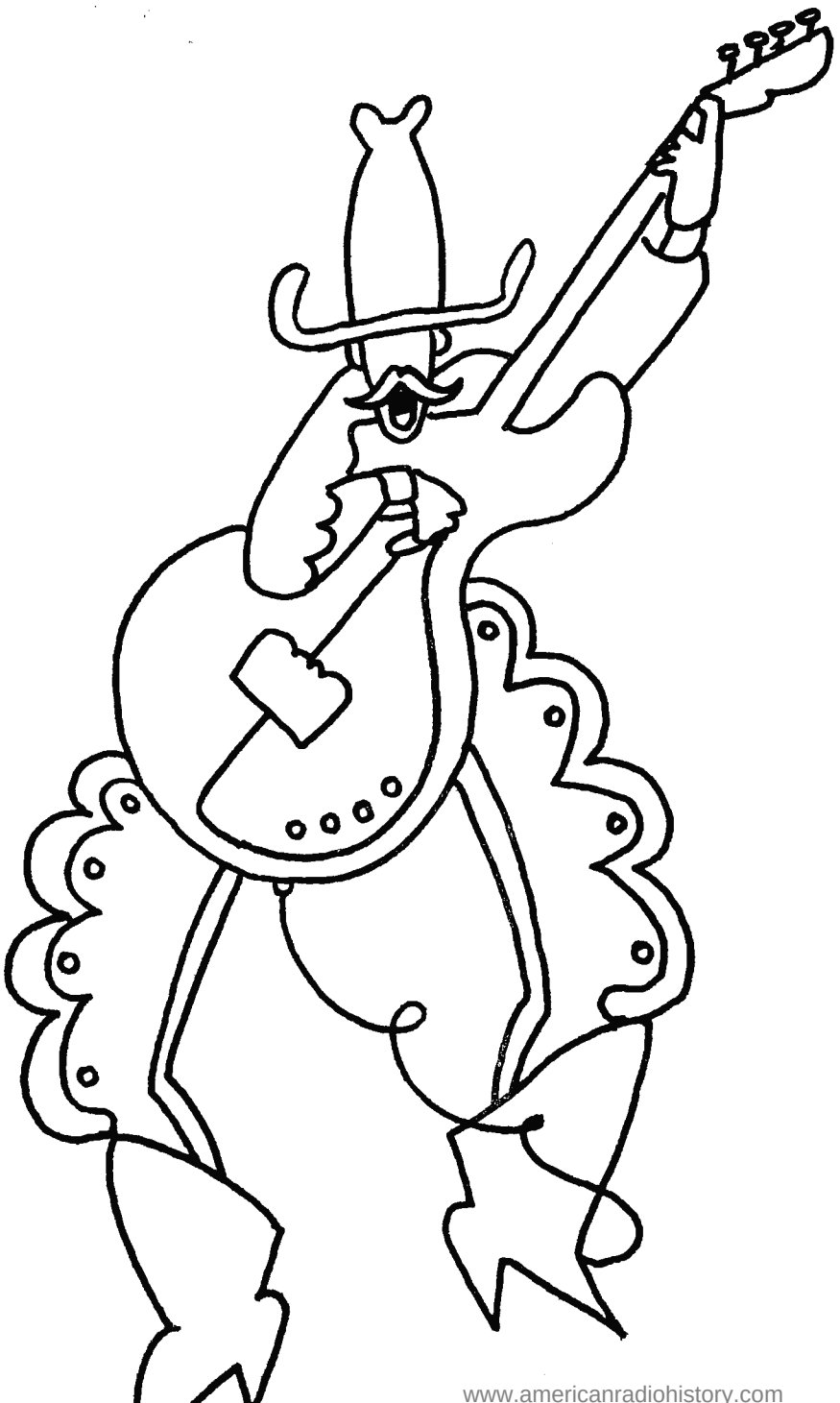
AN FM GOES COUNTRY

By Jerry Holley

For WIBW-FM Topeka, the change to country music has meant dollars and sense.

IN EARLY FEBRUARY 1966, the strains of Bach, Beethoven, and other classical composers ended rather abruptly on WIBW-FM Topeka, Kan. In its place, the music of such country and western stars as Buck Owens, Hank Snow, Ernest Tubb, Loretta Lynn, and Dottie West began to fill the airwaves of Eastern Kansas. Since that time, there has been a noticeable absence of red ink on the station's profit-and-loss statements, as well as an ever increasing response from a growing fm audience.

In relating the story of WIBW-FM, I hasten to point out that I am certainly not opposed to the beautiful music of the masters. Neither is this a pitch that a country and western format is the answer to all problems. Each radio market is entirely different; what works for WIBW-FM in Topeka may not work in other markets around the country. In our case, some of the problems we faced — and indeed, are still facing — are unique in our area, while other problems are those that all broadcasters face virtually everywhere. With a country music format, we have been able to achieve greater success with our fm property from listener and financial points of view.



The Starting Point

WIBW-FM was added to the broadcast family of Stauffer Publications in early December 1961. It went on the air with very ample equipment and an RCA BTF 5D transmitter with an effective radiated power of 47 kW. The station operates with an RCA BFA 12A antenna, side-mounted on the 1249-ft guy-supported WIBW-TV tower, which is located 18 mi west of Topeka at Maple Hill. The electrical center of the fm antenna is 1028.6 ft above average terrain.

At the outset, classical music was chosen as the basic programming format. WIBW-FM programmed this type of music every evening on *Opera Stage*, and during weekend periods. Weekdays, however, we really livened things up with Montavanni or Clebonoff Strings, and every once in a while, we really went wild with a Broadway or show tune. In response to our programming two or three music lovers would write each week and thank us for playing this type of music. It was also reassuring to learn that our programming made a fine background music service for all the grocery stores and funeral homes in the area. However, this format was not doing what we wanted it to do. The feeling was that a background music service was not the answer to the programming needs of our audience, and it was certainly not successful in the sales area.

At the time WIBW-FM first signed on the air, a classical format was the recognized thing for an fm station, and several sta-

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Mr. Holley is manager, WIBW-FM Topeka, Kan.

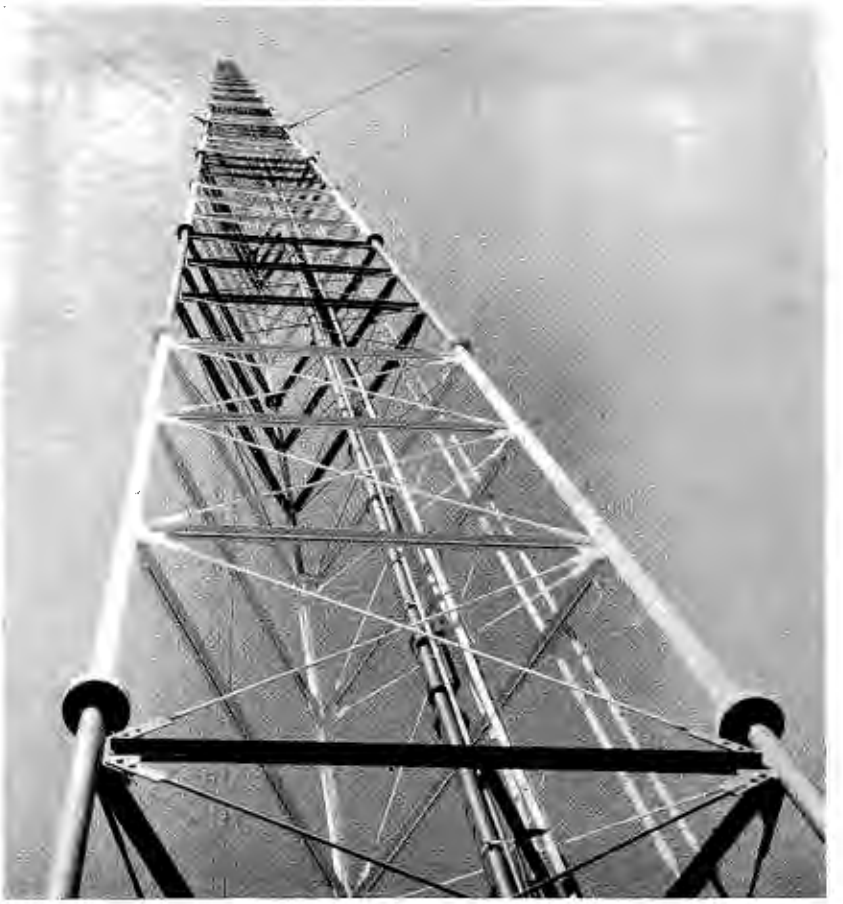
tions in the country have been successful with this type of format. However, after nearly three and a half years, it just was not working for WIBW-FM. The station did have a small group of loyal listeners, but the profit-and-loss statements were a steady string of red figures.

The Switch to C&W

In February of 1966, the drastic switch was made from classical music to a country and western format. The change was not a shot in the dark, however. Management took a long hard look at the market before ever considering such action. First of all, there are a number of powerful commercial and educational fm signals penetrating the Topeka market from outside the area. At the time of the format switch nearly all these stations were programming a daily variety of some form of classical or semiclassical music—a situation which tended to dilute the market and make it increasingly difficult for WIBW-FM to be successful with a classical format. Most of these stations had been on the air prior to WIBM-FM's debut; therefore, they had the advantage of longevity with the audience.

Topeka has four a-m stations, one of which has an affiliate, in addition to our fm operation. Of these a-m stations, one is a rocker, one is semirock, another blocks commercials at the quarter hour and tends to play old standard melodies on both a-m and fm. The fourth a-m station is our own sister a-m station. WIBW-AM is 40 years old, operating with 5,000 W on 580 kHz. The change to country music on WIBW-FM was based on our a-m experience. WIBW-AM, at least to some degree, has a long history of serving a large area; it has been known for years as "The Voice of Kansas," and it is programmed with a talk-and-information format. When we do play music on a-m it is good melody—a big-band type or some easy listening top 40 tunes, but no rock.

Our a-m programming is heavy on farm information, sports, weather, and news, and we still have live musical talent in our early morning farm block. Our a-m coverage area is extensive, serving almost all of Kansas as well as parts of five other states; therefore, we are accustomed to serving the needs of listeners a



The WIBW-FM Antenna is located on the station's television tower, eighteen miles west of Topeka at Maple Hill. The Antenna is 1220 ft. above average terrain.

WIBW-FM currently uses an RCA BTF 5D transmitter with an effective radiated power of 47 kW. Plans are underway to inrcease the station to full power.

Personality Joe Morrison handles the C&W top 40 program each evening.

Free and open discussion is the rule when WIBW-FM staff members meet for weekly planning sessions. Everyone contributes to the overall programming and sales effort.

WIBW-FM makes extensive use of a studio bus for remotes from shopping centers and other business places. It has worked out well for sales, and it is also a good promotion medium.

long way from Topeka and Northeast Kansas. Our fm operation, on the other hand, with 47 kW puts a good signal out over just Northeast Kansas, so the coverage areas of the two are quite different.

Basis for the Switch

After appraising the market, it was quite evident that one potential audience was not being served in the area—the country and western audience. Ratings at that time indicated that only one station outside of Topeka penetrated the metro market survey, and that was a C&W station in Wichita, some 120 mi to the south. This was quite surprising because Topeka is only 60 mi to the west of Kansas City, yet no Kansas City station showed up in the metro ratings. In addition, we learned that only one type of show ever booked in the Topeka Municipal Auditorium consistently sold out at every performance—the country and western type of show. This fact only strengthened our belief that there was a definite need and desire for country and western music in Topeka and the surrounding area.

Almost instantly the change was accepted, but we did receive unhappy comments from the small loyal group of classical music listeners. These unhappy comments were offset, though, by some 40 to 50 phone calls a day praising the change. The mail count also went up drastically in the first two weeks, and after a year is still quite large.

Format Style

WIBW-FM is on the air from 6 A.M. to 12 midnight Monday through Saturday, and from 7 A.M. to 11 P.M. on Sunday. The staff consists of two full-time and nine part-time employees. Our announcers play it straight; we don't sound hillbillyish or try to put on a nasal twang. We don't insult our growing audience by talking down to them; we do have personable announcers who have a lot of fun on the air, though. It is our belief that we are broadcasting to "country gentlemen;" however, most of our listeners apparently live in cities and towns rather than on farms and ranches. The mental picture we have of this typical listener is that of an easy-going guy who drives a country sedan and wears a Stetson hat. We may be wrong

on what he looks like, but we think we know what he likes to hear.

There is nothing radically different in our programming, though we do use every gimmick and promotion idea we can find. Fm is completely separated from a-m with the exception of certain news blocks and a one-hour Sunday morning religious program. News duplication is eliminated because we already have the largest news staff in Kansas, so it seems ridiculous to compete against ourselves in that area; instead, we take advantage of this asset. The daily fm schedule includes a wake-up show, a mid-morning swap shop, an afternoon drive-time show, and our evening top C&W hits program where we borrow some of the top 40 format concept. The evening program consists of the top 40 country and western tunes, a spot-lite album, dusty oldies, and pick hits of the week.

Promotion

Our fm operation has been promoted heavily because we had to; very few knew of WIBM-FM's existance until we switched to the C&W format. The Country Music Association has been very helpful; they have provided id's, promos, and record lead-ins by the nation's top country stars. Contests are used continually—any kind of contest that will be a diversion for our listeners. We call our fm station "The Voice of Country Music" to go hand in hand with "The Voice of Kansas" on a-m. Again, just like top 40 stations, we print hit charts which list the top C&W selections for the week, and distribute them to music stores in our market area.

WBIW-FM and its new format is much more flexible than was the good music station. We try to move among our audience as often as possible; in fact, we go on a remote at the drop of a hat. We broadcast from grocery stores, county fairs, state parks, and anywhere else we can. This is an excellent source of revenue for us, and remote broadcasting really combines programming, promotion, and sales into one very helpful package. There is a lot of new and sometimes hidden revenue in fm remote broadcasting.

Sports

Another feature which has been very important to the fm operation is in the field of sports. WIBW-AM has always been known for tremendous sports coverage; included on the schedule are Big 8 football and basketball, NCAA major sports, NAIA football and basketball, as well as major league baseball and professional football. There has always been more available sports programming than we had time to carry on one station; therefore, we started moving more and more sports to WIBW-FM. We go to small towns around Topeka—towns which do not have their own station—and broadcast the *Game of the Week* from these communities. This has accomplished three things:

1. It gives people in these towns a chance to have their team games broadcast on radio.
2. It is very successful vehicle for fm sales.
3. Probably most important, these sporting events have helped boost the fm set count in each city.

By using our fm station we have been able to double our sports coverage. During this year's busy basketball season WIBW-AM-FM carried a combined total of 131 ball games. In the last 19 days of the season, when college championships went down to the wire and the Kansas State Tournaments were underway, WIBW-AM-FM carried 56 games from 47 different locations; 40 percent of these games were broadcast on WIBW-FM and all were completely sold.

Sales

Enthusiasm for WIBW-FM's music programming is growing daily. Sponsors are finding that they can get results by advertising on fm. There has been a marked increase in fm set sales according to appliance and furniture dealers in the Topeka trade territory.

In 1966, WBIW-FM made a profit for the first time in its history. It wasn't a big profit, but it was certainly better than losing money month after month as had been the case before the programming switch. Incidentally, our entire radio staff is kept informed of the financial and programming situation on WIBW-FM. Knowing that we are now making a profit on fm has created good staff morale, and has shown that the hard work on everyone's part is beginning to pay off.

Generally speaking, we are actually in competition with ourselves. We promote and sell each station as a specific medium and the separation is carried right into sales. Although our sales staff is combined, we are looking to the day when we will have separate sales groups for a-m and fm. A separate rate card is used for each station; no combination rates are available. Since we program to different groups, and really to different market areas, the separation is very important. Quite naturally, our a-m rate is a great deal higher than fm, so we compensate our salesmen with a higher commission on the sale of fm time.

The Future

I really believe that fm can be profitable, and will be in many areas quicker than we might think. As long as it is a member of the family, we shouldn't treat it as a stepchild. It takes a lot of attention to make it succeed. In an a-m/fm operation, I feel that separation is the answer. Even in small markets it makes sense to go after two different audiences. There is no sense in running two identical radio stations. If fm isn't radio, what is it? The success of WIBW-FM has simply been the result of correctly determining what was wanted in our particular market, and then conforming to the wants of a large-enough audience segment to make the difference. But again I stress—what works for us may not work in every market.

After over a year with our present C&W format, we feel we are ready to move into a broader area. Plans are now underway to increase power from the present 47 kW to a total of 200 kW—100 kW horizontally polarized and 100 kW vertically polarized for the benefit of automobile fm receivers and small table model radios with built-in antennas.

Radio has changed many times in its relatively short history, and may change again tomorrow. All we can do is hope that we can see changes when they take place, and that we can be ready to serve the needs of our audience when they do change. The future of fm radio in America looks increasingly bright, and at WIBW-FM we hope it stays that way. ●

INTER-CITY MICROWAVE PAYS OFF

Here's how an intercity microwave link is used to provide network and intercity programming between two sister stations.

By Ron Krous

THE USE OF A TRANSISTORIZED MICROWAVE SYSTEM as an intercity and studio-to-transmitter link has resulted in a 200% improvement in TV signal quality for Columbia Empire Television stations. The system, engineered and furnished by Lenkurt Electric Co., was installed by Columbia Empire between its KNDO-TV studios in Yakima and its sister station KNDU-TV in Pasco, 95 path mi away. Prior to the installation of the microwave system, KNDU-TV utilized an off-air pickup, which is now used as a backup facility.

On-Air Reliability

In addition to the decided improvement in the quality of the signal radiated by the stations, the microwave system has increased overall reliability. Since the installation of the transistorized equipment 15 months ago, outage on the entire microwave system—due to all causes—has totaled only 4 hr, even without path mi way. Prior to the in-Through the use of the off-air backup facility and videotape, only 30 min of programming was lost.

Mr. Krous is engineering manager, Columbia Empire Broadcasting Corp., Yakima, Wash.

By providing a high-quality TV signal via its intercity microwave link, Columbia Empire was able to install a new high-powered transmitter at KNDU, thus allowing it to cover its market area more effectively and to increase its circulation by 20,000 viewers. As a result, Columbia Empire has increased its revenues more than 20% since the intercity link went into operation. In addition, it has met the demand of its viewing public in providing quality color and black-and-white coverage.

System Description

In the present system, the NBC network feed is picked up at Bell facilities in Yakima. From KNDO-TV studios the network TV signal (as well as all KNDO-TV programming) is sent via microwave to the KNDU-TV transmitter site, located some 5 mi south of Yakima on Ahtanum Ridge. This first 5-mi hop serves as a studio-to-transmitter link for KNDO-TV. At this point, network programming (plus other desired commercials or programs) are picked off and microwaved to the KNDU-TV transmitter site at Jump Off Joe Butte. A microwave repeater station at Chandler Butte, 50 mi from the KNDO-TV transmitter site, and 24 mi from the KNDU-TV transmitter site, is utilized to relay the line-of-sight microwave signal. The KNDU-TV transmitter facility at Jump Off Joe Butte is connected to the KNDU-TV studios in Pasco by another studio-to-transmitter microwave link over 10 path mi.

Path survey for the Columbia Empire system, which was the first intercity broadcast microwave network in the area, was made by Lenkurt. The installation of the microwave system was completed by a 3-man crew from Columbia Empire within a month's time.

Parabolic antennas are mounted on the roofs of the company's studios in Yakima and Pasco. At both TV-transmitter sites, the microwave antennas are mounted on the TV-antenna towers. Due to the high winds—which sometimes reach 100 mi/hr at the Chandler repeater site—a special H-Frame guyed tower was erected by Columbia Basin to accommodate the antennas. Also, because of icing conditions and the high winds, radomes were utilized on all antennas except those at the two studio sites. Except for the 6-ft antenna at Ahtanum Ridge and one at Chandler Butte, all others used in the system were the 4-ft type.

Intercity Programming

The 7-kHz microwave system is duplex and allows transmission of TV signals in both directions simultaneously. While over 90% of the programming originates at KNDO-TV and is mostly NBC network feed, the microwave link is used extensively and effectively for intercity news and special events, as well as providing for a more comprehensive use of personnel and facilities. This ties two studios, 100 mi apart, into one master control at Yakima.

Following the Huntley-Brinkley network news program, KNDO-TV and KNDU-TV conduct their own "Huntley-Brinkley type" regional news telecast between Yakima and the Tri-Cities of Pasco, Kennewick, and Richland. "Hot line" cut-in's are a daily feature of this newscast.

System Capability

The Lenkurt Type 76 system was designed with a wide choice

of accessory equipment for TV application, and Columbia Empire is taking full advantage of the equipment's capability. One unique application of the equipment is utilization of program channeling. In addition to video, the baseband is used to carry one 60-kHz subcarrier program channel, providing transmission facilities for TV audio. On the same program channel, through the use of high-pass/low-pass filters, Lenkurt's 34A equipment is used to multiplex two 4-kHz circuits which provide message channels for order wire/communications, cueing, directions, log changes and other programming requirements.

System Cost

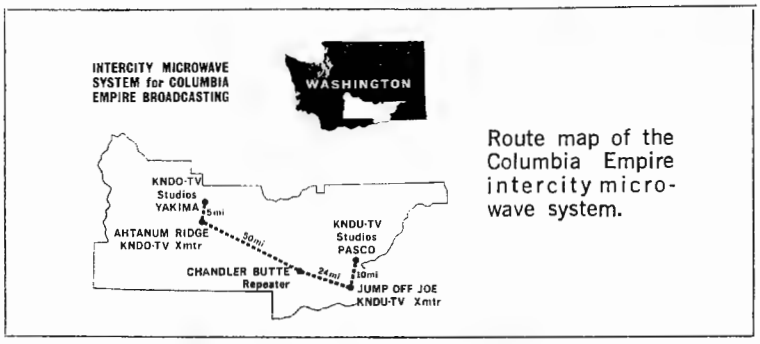
Total cost of the microwave system was approximately $75,000. This expenditure was part of a $300,000 modernization and updating program which was completed early in 1966. Included was the addition of a color camera, another videotape machine at both Yakima and Pasco, building expansion, an increase in TV transmitter power at Pasco from 20 to 166 kW, and the design and installation of a master control console at Yakima. The master control console, which includes a 9-in. transistorized monitor for each video source, provides complete central control over all Columbia Empire TV operations. The facility, which can be operated by one technical director, allows him to control 6 cameras and two videotapes from a single panel which measures only 12 x 18 in. This compares to a control panel space of 12 x 6 in. required for each of the 8 sources before the console was installed.

Columbia Empire, which serves the rich agricultural and lumbering area surrounding Yakima and a rapidly growing tri-city industrial complex, was formed by 15 stockholders in 1951. In 1965, Hugh Davis, General Manager of Columbia Empire, assumed full ownership of the company. The TV firm, which was first with color in its market areas, and boasts the highest transmitter power in both Yakima and the Tri-Cities, employs 32 people. •

The author (r) is shown adjusting the microwave equipment at the Ahtanum Ridge KNDO-TV transmitter site.

Radome-covered microwave dishes are mounted on the TV tower at both transmitter sites. Shown here is the KNDO-TV transmitter building at Ahtanum Ridge.

The author shown operating the custom-built master console during a videotape session at KNDO-TV studios. Mr. Krous designed and built the unit.



Route map of the Columbia Empire intercity microwave system.

Downtown Yakima studios of KNDO-TV, a full-color NBC affiliate.

Consideration for CATV Program Origination

By C. E. Feltner, Jr.

Here's how to get started with a schedule tailored to your system.

"BE SURE TO BE WITH US AGAIN TOMORROW for another edition of *Birthday Club* with your host, Arthur Andrews. And now, stay tuned for the 6-P.M. News here on Channel 9."

A local TV station break? Perhaps. Local CATV program origination? Increasingly likely! Today, more and more CATV systems are originating local programs, and the pace of this new field of interest, in an already burgeoning industry, is increasing rapidly. The basic idea of program origination goes back to the first days of CATV in the mountains of Kentucky, Pennsylvania, and West Virginia. However, it was not until the introduction of the vidicon tube in the early fifties that live program originations became economically possible.

In recent months many key figures, within and without the industry, have urged CATV operators to start local program originations. Members of the FCC have been fast to point out that few communities outside the top 250 cities now have their own local TV stations.

For the CATV operator considering program origination, the questions are many, the problems are compounded by local needs and interests, and the competition for viewers is formidable. Let's consider, step by step, the route to program origination for a typical system and create a typical program schedule.

Equipment Requirements

First, there's the very important matter of equipment to consider. Basic requirements are one vidicon studio camera (preferably with a built-in monitor and equipped with a zoom lens), a film chain with at least one 16mm projector and a 2 × 2 slide projector, an audio-video control panel and switcher, mics, lights, a turnable, an audio tape recorder, and a 35mm "still" camera for making transparencies. More sophisticated operations might include additional studio cameras, complete film chains, mobile studios for remote pickups (including microwave gear), videotape recorders, film processors, and other facilities comparable to those owned by commercial TV stations.

For an initial investment of $5,000 a CATV system can offer good local originations, simply by recognizing the limitations of such an operation and working within those limitations. For example, one man can operate all the equipment if the camera is placed in a fixed position near the control board where the operator can adjust the zoom lens and change from set to set as required (see Fig. 1). All audio and video controls can be easily located in front of the operator, and the film chain may be installed directly behind him.

Many procedures can be borrowed from a typical small-market TV station. For example, all audio breaks between programs can be prerecorded on one daily master tape. Sets used in daily programs can be built into the studio on a permanent basis. For other infrequent programs drapes can be pulled over the permanent sets and special props set up, still using the fixed-set lighting. Projectors can be rethreaded during a program where the audio and video requirements remain fixed for any period of time. A capable operator can rethread a projector in less than 15 seconds and change slides in less than 10 seconds. Most CATV operators can take over equipment maintenance without difficulty. It is important to stress a weekly program of preventive maintenance and to follow it rigidly.

Personnel Requirements

For operating personnel it is very wise to hire someone with actual TV station production experience. There is no need to hire a complete staff—one good man with experience can develop a part-time production crew of local school boys. In this manner costs can be kept to an absolute minimum, and at the same time you can provide opportunities for local boys who aspire toward careers in TV and the performing arts.

After the equipment has been purchased and installed, a brief period of training for production personnel is essential. Two weeks prior to the start of on-cable programming, the staff should begin dry runs to develop their proficiency. All training methods should stress the very basic fact that any origination must look as good as programs produced by off-air stations carried on the cable. Here is where working within limitations really pays off, and a good production man will know the tricks of operating with limited facilities.

Program Sources

Probably the most difficult decision the CATV operator will make is what to program. For a partial answer he should confer with local civic leaders; also, he should conduct surveys to determine the desires of present and future subscribers. One point is self-evident: to be acceptable, originations must fill a local need. In one instance, a system in a Kentucky town of 14,000 actually programmed four hours of local programs daily, six days a week, using two Dage vidicon cameras. In addition to news, weather, and sports, this system programmed one full hour of educational shows daily, a half-hour telephone quiz show, a local talent show (careful—there is nothing worse than local talent), and motion pictures. The system stopped

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programming for several years, but just last year has returned to a policy of program origination.

An analysis of systems currently operating origination facilities shows the following program classifications:

City Council Meetings: Several systems carry local city council meetings and these programs have met with immediate subscriber acceptance. While many city councils welcome coverage of their activities, they obviously cannot tolerate a production crew which creates a nuisance. Therefore, it's very important to pay particular attention to the location of cameras and the off-camera announcer, since distractions can lead to official action to terminate such programs.

Telethons: At one time or another, most operating systems have attempted a telethon as a means of raising funds for a local charity. To be successful a telethon must be carefully planned and programmed against the weakest opposition possible, and be assured of dozens of volunteer workers. The telethon should be staged in a convenient downtown location for maximum exposure. A recent telethon in the small Kentucky mountain town of Hazard (population less than 6,000) raised $4,000 for an orphanage.

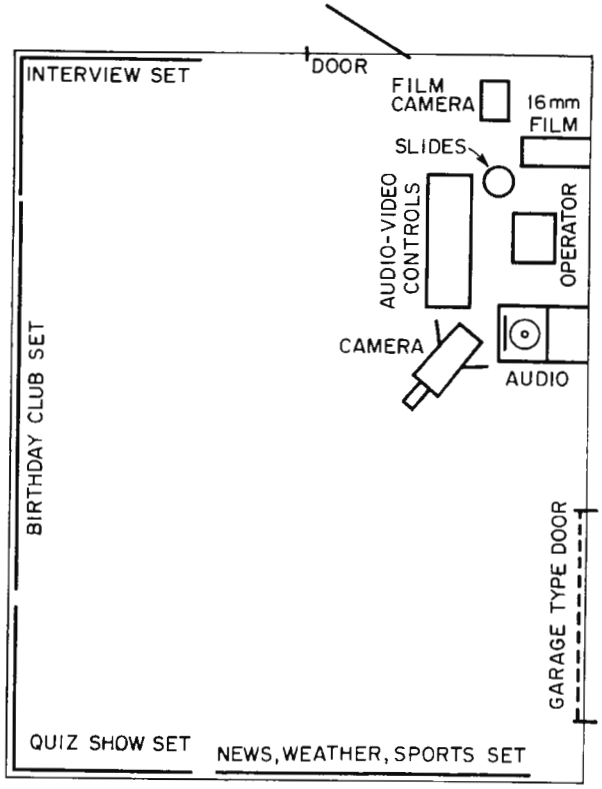
Local Civic Calendar: Many local organizations conduct regular drives for important community projects: the Girl Scout's Cookie Sale and the Mother's March are just two good examples. To discover how many events take place in the average cable community, a visit to the city editor of the local newspaper will prove very interesting. Good city editors keep calendars and specific information for months ahead on community drives, concerts, political events, and other local interest affairs.

Each day the local news program is delivered by studio manager Bill McMakin, a former radio announcer. In Gatlinburg the CATV system provides the only daily news and advertising medium in the town. The local weekly newspaper cooperates with the preparation of the news.

Local origination facilities at Gatlinburg, Tennessee, include 16mm sound-on-film, 2x2 slides, balops, flip cards, videotape, and local live. A time and weather system (not shown) completes the facilities. Studio manager Bill McMakin (left) prepares to insert a local live announcement to be delivered by general manager W. Marion Palmer.

Local Sports: With the introduction of low-cost videotape recorders, many systems have started local sports programming on a delayed playback basis. Many schools, however, limit local coverage, but the real opportunity here lies in telecasts of away-from-home games. For professional results it is absolutely essential that a professional play-by-play sportscaster do the announcing. Two cameras are required for the average sports contest and both should be mounted on the same side of the playing field. Equipment should be completely checked out 30 min or more prior to game time. At sports contests always expect the unexpected.

Local News: Except for news highlights few systems have started actual programming of a daily in-depth local news program due to the many problems involved. Since TV is basically a visual medium, local news



With studio and control facilities similar to these, one man can run production. In a typical operation, prop storage, film editing, and office space should require an area no larger than 800 ft².

TIME	PROGRAM	SOURCE
12:30 PM	Man on the Street	LR
1:00	Telephone Quiz	LS
1:30	Free Film	F
2:30	Feature Film	F
4:00	Birthday Club	LF
5:00	Western	F
6:00	News, Weather, Sports	LS
6:30	Local Clubs	LS
7:00	Of Local Interest	LR

F—Film, LF—Live and Film, LR—Live Remote, LS—Live Studio.
(See text for weekend program suggestions)

This suggested schedule provides for a wide variety of community interest and entertainment programming.

coverage should include a maximum amount of picture coverage—either still, movie, or possibly videotape. In this vein, costs for doing a competent job run high.

Feature Motion Pictures: Several systems carry feature motion pictures, either during periods of no commercial TV service or during daytime hours in competition with game shows and soap operas. One system in Texas programs daily movies on two channels—one in English, the other in Spanish. Another system repeats a movie four times daily, back to back, much in the same manner as theatres.

Special Events: Most systems with origination facilities carry local election returns. The Rogersville, Tenn. system originates local returns direct from the courthouse. This system also provides subscribers with weekly church services.

Emergency Programming: In cooperation with local radio stations, CATV systems have programmed emergency information during floods, tornadoes, fires, and other disasters. In addition, many systems operate an audio-only paging service for doctors and police and fire departments, plus any other emergency announcements.

Time-Weather-News: Several hundred systems offer 24-hr time and weather service, utilizing one of the self-contained units offered for this purpose by a number of manufacturers. Many systems have installed the newswire services offered by the Associated Press or United Press International; equipment for this purpose is offered by at least two leading CATV equipment firms.

Of the more than 200 systems that now have origination facilities, only a small handful maintain a regular daily schedule. To become a factor in the community, a daily program schedule must be planned and maintained. This program schedule should cover a period of from two to eight hours daily in order to be effective.

A Typical Schedule

An ambitious schedule (see Fig. 2) would start at 12:30 P.M. with a video adaptation of a long-time stalwart of local radio programming, *The Man On The Street.* The format is simple: an announcer interviews local people during the noon hour on a busy downtown sidewalk, using a daily theme or question to tie various interviews together. At 1 P.M. programming returns to the studio for a telephone quiz show. The announcer calls cable subscribers and asks relatively easy-to-answer questions. Prizes are available for these programs from commercial prize supply firms at a nominal cost (normally 15 to 20 cents on the dollar), or from participating sponsors. On a program of this type it's best to give away prizes other than money. For added interest a jackpot question can be asked those participants who correctly answer the first question. As an alternate suggestion for this period, try bingo with a local supermarket as sponsor.

From 1:30 till 2:30 P.M. the program schedule calls for *Free Film,* and this period can be quite exciting if the film is scheduled properly. Some 2000 firms offer over 22,000 different films free of cost, except for return postage. This period could include a half-hour travel film, a quarter-hour homemakers' film, and a quarter-hour safety film. Feature films for the 2:30 till 4 P.M. period can be leased from any commercial film distribution firm. A list of these firms can be found in any TV reference publications. To show a film rented from a nontheatrical or educational distributor can carry a fine of up to $5,000 for each showing as a violation of Section 101 of the U.S. Copyright Laws. When ordering films be sure to state that they are intended for showing on CATV and that the lessee must own TV rights. In one recent instance a system was using films from a private library which had no rights other than those for home showings. In another case feature films were videotaped for CATV showings. Practices such as this

occur in any new venture, but the penalties are entirely too excessive to ignore.

Following the daily feature film is a show that's certain to get new subscribers. The *Birthday Club* features an announcer, local children observing their birthdays, and cartoons. Each child appearing on the show is treated to soft drinks, potato chips, candy, and other sponsor products, plus an official membership card in the (name of system) CATV Birthday Club. A canvas of all homes in the area can be conducted by telephone to secure names of children and their birthdays. A card file with this information, according to dates, can be built up in a matter of days and enlarged as time requires.

Following the *Birthday Club*, there should be a transitional program, one that appeals to youngsters and grown-ups alike. A good "shoot 'em up" western is still one of the best audience attractions available and an excellent lead-in for local news. So-called "adult" westerns are not for this time period; the best bets are westerns where the hero rides a white horse, always drinks sarsaparilla, and never loses his hat in a fierce fight against inhuman odds.

To be effective, local news must have picture coverage of the major events of the day. This program could be created in many areas in cooperation with a local radio station, utilizing a radio newsman for news, weather, and sports delivery. The state, national, and international news should be mentioned only in headline form since many viewers will tune away at 6:30 for the more comprehensive network news.

From 6:30 till 7 P.M. the facilities are turned over to a local civic, educational, or religious group to help promote a current project. These programs should be planned at least four weeks in advance for maximum coordination. Follow-up the first contact with phone calls, both one week and then a day prior to the program. The schedule in Fig. 2 shows another hour beginning at 7 P.M. One night a week this time period could be reserved for the local city council meeting, and continue until its conclusion if necessary. Also, local sports events could go into this period or the operation could close down until the following morning.

Weekend programs should be flexible in order to be compatible with local community activities. Replays of sports events are excellent on Saturday afternoon. Westerns and cartoons are good program fare for Saturday morning, Saturday afternoon, or Sunday afternoon. Free films also fit well into weekend schedules, with films from the armed forces on Saturdays and from religious organizations on Sundays, for example. By all means don't ignore the weekends—these two days often are the zest of the entire week as far as number of viewers is concerned.

To program a daily schedule properly does require hard work, creative imagination (plus a lot of improvising), and a sizable cash outlay. To balance origination costs, most systems probably will be forced eventually to operate on a commercial basis, unless forbidden by the terms of their franchise.

To date, the primary drawback to program origination has appeared to be the many uncertainties connected with such a venture into a virtually untried area. Even those systems originating programs have, for the most part, failed to follow any really firm day-to-day program policies. And yet such a policy is what the subscribers need. Consider, for example, all-night movies. In many areas a cable is an 18-hr daily operation. A policy of showing movies from 1 until 6 A.M. could prove to be popular with shift workers, emergency workers, and plain old insomniacs. The idea of a "Movies 'til Dawn" schedule is being promoted by a least one program supplier and 5 systems are said to be considering such service.

The wise CATV operator contemplating local program service will: (1) shop wisely for origination equipment, ordering only what is basic at first; (2) canvass a cross-section of his community to arrive at a "community service" program schedule; (3) hire capable operating personnel; (4) adopt a policy of constant flexibility. He will discover full community CATV service, once an adequate origination schedule has been established. ●

78V, ONE OF THE NEW HIGH PRECISION PRODUCTS FROM MEMOREX CORPORATION, SANTA CLARA, CALIFORNIA 95050

Our excellent, new 78V high-chroma videotape is showing itself off at the NAB Conference.

Don't miss it.

We designed our new Memorex 78V especially for the new generation of high-band recorders.

That's why it offers
high quality, *alive* colors no other tape can match,
as well as the best frequency response,
the most uniform audio output, the stablest reference track,
and the least dropouts of any videotape around.

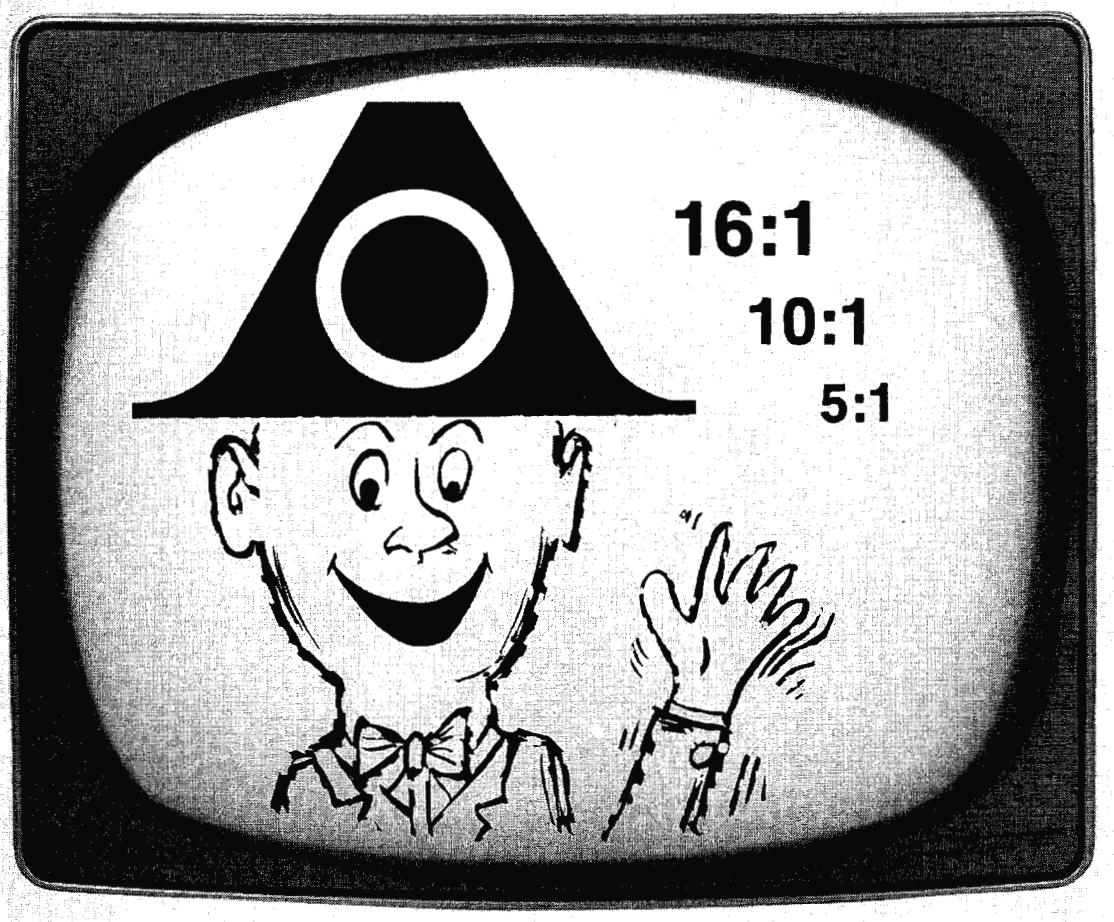
Stop by Memorex Booth 312 and watch a demonstration
of the 78V on a high-band recorder
in simulated studio situations.

We think you'll be as excited about it as we are. Reel after reel after reel, month after month after month.

MEMOREX

Circle 28 on Reader Service Card

Be sure to talk with Albie at the NAB Show.



You can't miss Albie. He'll be the only one with the funny-looking hat (which looks more than co-incidentally like our new logo). Although he'll be on-screen, he'll be able to carry on a lively conversation with you and answer most of your questions. Of course, if you want to know something real technical, he may have to defer to one of our representatives. They will be there to field the tough ones. But then, they've been solving tough optical problems for quite a few years now.

While you're visiting Albie, you'll probably want to see:

The new 16:1 Varotal lens. This new Rank Taylor Hobson lens, with a large aperture 16:1 zoom range, will soon be available for use on Image Orthicon or Color Plumbicon cameras.

The new Varotal IX lens. If you've been using the Varotal V on your Image Orthicon camera, you'll be pleased to know that it's now available as a IX for Color Plumbicon cameras.

The new Varotal XX lens. This new little brother to the V (it's lighter and considerably less expensive) is ideal for Image Orthicon users in the Educational TV field.

The new Albion Q C E. This quick change range extender is a new concept in handling of these auxiliary lenses which permits installation in a few moments *without removal of the lens package from the camera.* Sound like the kind of flexibility you should have? Then come on over to booth 251 . . . the same booth that we had last year. It's only what's in it that is all new.

albion

SOLE U.S. AGENTS FOR TAYLOR HOBSON COOKE

BROADCAST EQUIPMENT

ETV Electronic Blackboard Transmits Graphic Directly

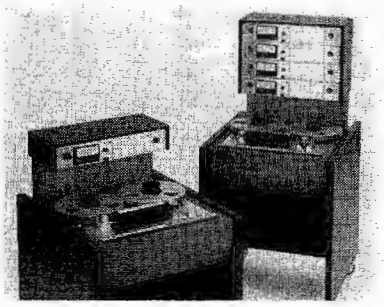
Model ECS-100 Educational Communication System, made by General Telephone & Electronics Corp. of New York, N.Y., transmits audio and graphics over two pairs of telephone wires to TV monitors in schools. Containing a decoder, a storage display tube, a TV camera, and two differential amplifiers, the ECS-100 makes use of frequency mod-

ulated carriers for horizontal, vertical, and pen-up or pen-down coordinates. By writing on a 6 × 8-in. surface, instructors transmit symbols, figures, or words—all capable of being erased at the touch of a button. Transmission of graphics is supplemented by two-way audio communication for student questions and additional instructional clarification. Price of system is $7000.

Circle 105 on Reader Service Card

New Series Audio Recorder for Studio

Model AG-440, recently introduced by Ampex Corp. of Redwood City, Calif., is part of a new series of recorders that convert quickly between ¼- and ½-in. tape operation. Quarter-in. head assemblies are standard on all one-channel and two-channel recorders. Half-in. head assemblies are standard on all three- and four-channel recorders. Single-channel versions of the AG-440 can be built up to a four-channel, four-track recorder by adding 3½-in. electronic panels to the



overbridge, and the proper head assembly, without making the existing components obsolete. Frequency response ranges between 50 to 7500 Hz and 30 to 18,000 Hz at speeds of 3¾ and 15 in./s. Other features include plug-in solid-state modular electronics, plug-in head assemblies, three-way editing capability, and scrape flutter idlers. Prices range from $1970 for a full-track unmounted unit to $4540 for a four-track console version.

Circle 161 on Reader Service Card

Color from Monochrome Camera and Slides

Model Colorizer, manufactured by Riker Video Industries, Huntington Station, N.Y., gives stations with monochrome cameras and color sync generators an opportunity to transmit color slides, even if the slides themselves are monochrome. For stations with color cameras, the Colorizer permits color transmission of station call letters and titles without tying up color equipment. The unit is about the size of a carton of cigarettes and will be sold for approximately $1500. With peripheral equipment, a total of $4500 will put a station on the air in color.

Circle 162 on Reader Service Card

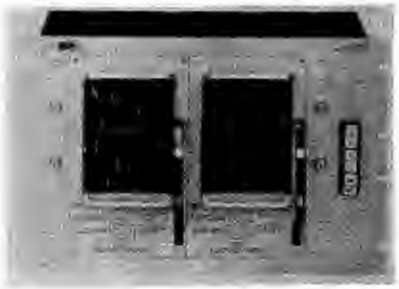
Portable Console Has 14 Inputs

The AC-155 console, made by Sparta Electronic Corp. of Sacramento, Calif., contains a five-channel solid-state audio console (A-15) which accepts 14 inputs and accommodates six low-level and eight high-level audio sources. Console also contains two TC-12 custom turntables, complete with tone arms, cartridges and TE-2 dual equalizer. The A-15 console also contains an all-channel cue system, muting, monitor amplifier, and speaker. The A-15 console can be removed and used as a separate remote amplifier, operating from battery power if necessary. AC-155 is offered with a full line of accessories including a tape cartridge system and a matching bench lid. Price of basic console is $1095.

Circle 163 on Reader Service Card

Patch Board Holds Selections

"Salvo Control," model SC-15x5-4 PA, made by Dynair Electronics, Inc. of San Diego, Calif., is a patch board that permits preselection of five inputs on each of four 15-input, 5-output program boards. The selected five inputs

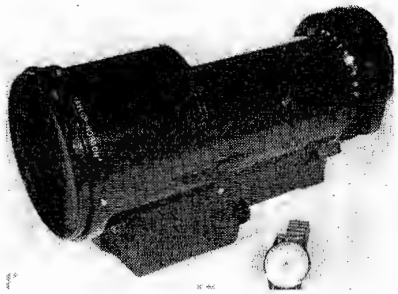


of a given board may then be switched to the five program output lines by pressing a related pushbutton. A fifth pushbutton provides facilities for remote program actuation. If desired, the unit may be controlled by a time clock, providing completely automated programming. Prices start at $2000.

Circle 166 on Reader Service Card

Portable Zoom Lens Has 10:1 Focal Range

Manufactured by Albion Optical Co., Inc. of West Nyack, N.Y., the Varotal XX zoom lens for image orthicon cameras provides a focal range of 40 to 400mm in a package weighing 10 lb and measuring slightly more than 11



in. in length and under 5 in. dia. at its widest point. Lens also features selection of low absorption glasses and application of anti-reflection coatings, resulting in a light transmission factor of 81 percent. Lens is priced at $4400.

Circle 167 on Reader Service Card

Solid-State Fm Frequency Monitor

Type FDM-19 fm frequency monitor, introduced by Babcock Electronics Corp., Costa Mesa, Calif., features zero-center meter for direct readout of Hz deviations. Monitor drives 10 k ohm remote metering loops without additional

amplification or bridging circuits. Input impedance is 100 k ohms; input level is 0.05 to 10 Vrms at 19 kHz, with 0.05 V for 6-dB limiting. An internal zero calibration standard is incorporated. A regulated power supply provides for operation from 105 to 130 V, 60 Hz, at less than 30 W. Price is $395.00.

Circle 168 on Reader Service Card

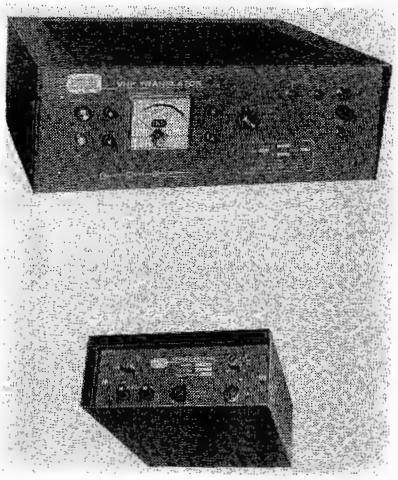
Double-Section Fm Transmitter Runs 40 kW

The FM-40G fm transmitter by Gates Radio Co. of Quincy, Ill. is designed for the maximum power in Class C operation at stations utilizing both horizontal and vertical polarizations. Transmitter consists of two 20-kW fm transmitters operating into a combiner. Single or dual exciters with automatic switchers are available as accessories.

Circle 164 on Reader Service Card

Solid-State Uhf/Vhf Translators

Models SSV-1 and U-SSV-1, manufactured by Emcee, Inc. of Mount Vernon, N.Y., provide the capability of translating vhf to vhf or translating uhf to vhf with 1-W video and 0.5-W aural outputs. The units—each composed of a receiver and a translator/amplifier



—convert input signals in the remote receiver to a 45-MHz i-f and feed them via coaxial cable to the power amplifier. Units may be specified with 75- or 50-ohm impedances. Power requirements are 115 V ac or 24 V dc. Price for SSV-1 (vhf in/out) is $2190; U-SSV-1 (uhf in/vhf out), $2420.

Circle 165 on Reader Service Card

Color Camera Operates at Monochrome Light Levels

The Mark VII solid-state color camera (made by Marconi Co. Ltd., Essex, England and marketed in the U.S. by Ampex Corp. of Redwood City, Calif.) uses four Plumbicon tubes—producing color pictures in normal light levels of 80 to 100 ft candles and satisfactory pictures in levels as low as 15 ft candles. The Mark VII has tricolor joystick balance adjustment and sufficient color stability to make hands-off operation practical. Cables up to 2000 ft in length —using the same size connector as smaller studio cables—may be used with Mark VII for long-distance remote pickups. Camera is available with wide range of

Local color can do a lot for your profit picture

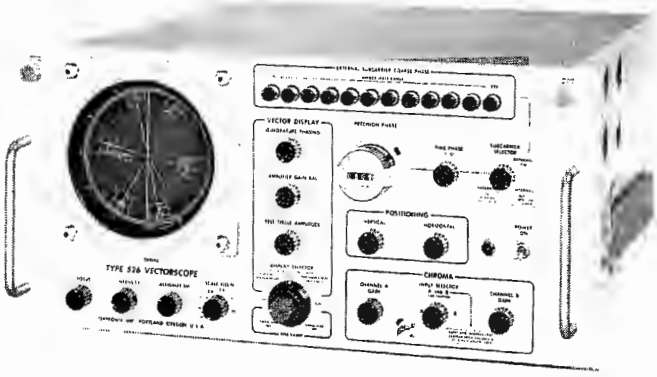
Now that you're transmitting network color, the next step is obvious—and necessary and profitable. You should be filming your news in color and broadcasting it to a rapidly growing TV audience that appreciates this extra concern you show for local events. Kodak makes it all possible with a versatile new system: *Kodak Ektachrome* EF Films and a virtually foolproof process with easy-to-use chemistry. Immediate laboratory processing is available in many areas. But if not in yours, consider processing the film yourself. Kodak engineers will "fine tune" your process. They'll provide your cameramen with technical information, your lab technician with training and reference materials. Naturally, they'll always be available for continued service. For complete information, call your nearest Eastman Kodak motion picture engineer.

Eastman Kodak Company

Atlanta: 404/GL 7-5211 Chicago: 312/654-0200
Dallas: 214/FL 1-3221 Hollywood: 213/464-6131
New York: 212/MU 7-7080 San Francisco: 415/PR 6-6055

Kodak
TRADEMARK

measuring differential gain and differential phase



...with a Tektronix Type 526 Vectorscope

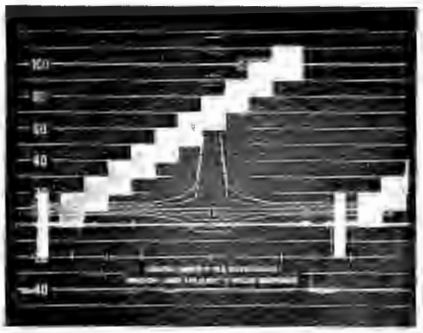


Fig. 1. Display of the modulated staircase showing 10 steps with 3.58 MHz modulation on each step and color burst, viewed on a Tektronix Type 529 waveform monitor.

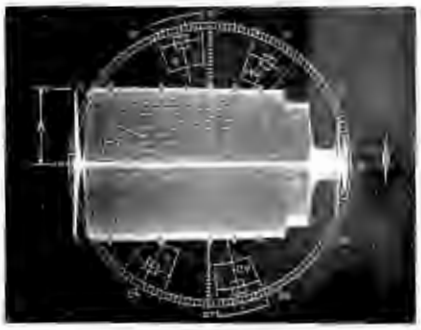


Fig. 3. Display of the 3.58 MHz staircase with the internal oscillator free-running. Differential phase information does not affect differential gain measurements.

Fig. 5. Display of the modulated staircase (magnified) with the step at extreme left (black level) nulled to the center line.

Measurements of differential gain and differential phase can be made simply and precisely with a Tektronix Vectorscope using a modulated staircase signal. Display of the staircase, with its 3.58 MHz modulation, appears in Figure 1, as viewed on a television waveform monitor, and in Figure 2, as viewed on a Vectorscope. The vector presentation shows changes in amplitude and phase of the 3.58 MHz modulation with changes in the staircase amplitude.

Changes in amplitude of the 3.58 MHz modulation with changing signal level (from black level to white level) is *differential gain*. Changes in phase of the modulation relative to burst with changing signal level is *differential phase*. Measuring amplitude changes and phase shifts can be done accurately, conveniently, and independently with the Vectorscope.

Measuring Differential Gain. A line-sweep presentation of the modulated staircase appears in Figure 3. The display shows that gain has decreased markedly as staircase amplitude has increased. In this instance, gain has decreased approximately 80% from the first to the last step, shown as the difference between the amplitude of the first step **A** (waveform top to reference line) and the last step **B** (waveform top to reference line). Differential-gain displays can be made by using the VIT linearity stairstep signal during color-program transmission. The interfield signal key permits VIT MONITORING.

Measuring Differential Phase. Three line-sweep presentations of the staircase, with modulation locked to color burst, appear in Figures 4, 5, and 6. Figure 4 shows a display of the sine function of the vectors (plotted in Figure 2). Figures 5 and 6 are used to determine differential phase in the system. Figure 5 shows the lowest step on the staircase nulled to the horizontal center line of the graticule and Figure 6 shows the highest step nulled to the center line. The difference in settings of the precision phase control required to null these two points is the difference in phase, in this instance 4.9 .

Type 526 Vectorscope $1665
Size is 8¾" high, 19" wide, and 18" deep. Weight is ~ 45 pounds. Designed for rack mounting. U.S. Sales Price f.o.b. Beaverton, Oregon

Fig. 2. Display of a distorted modulated staircase, viewed on the Vectorscope. Phase is displayed on the graticule in a circular direction and amplitude in terms of distance from the center.

Fig. 4. Display of the modulated staircase with the oscillator locked to color burst, with subcarrier phasing adjusted nearly to null at the white level.

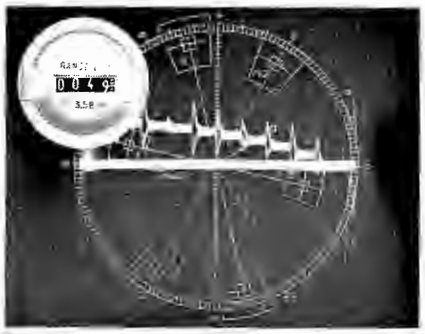


Fig. 6. Display of the modulated staircase (magnified) with the step at extreme right (white level) nulled to the center line.

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 IEEE—BOOTH 2C03-2C13

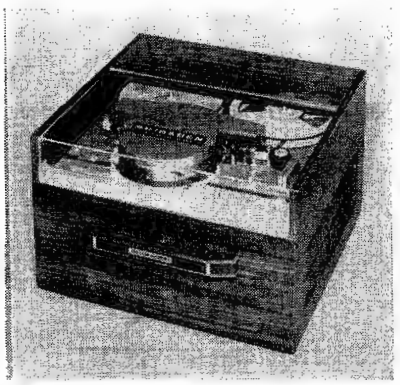
Circle 31 on Reader Service Card

accessories. Basic Camera with manual zoom lens is priced at $81,000.

Circle 160 on Reader Service Card

Low-Cost VTR Has 300-Line Resolution

Model SV-700 VTR, made by Shibaden of Woodside, N.Y., employs dual helical-scan rotary magnetic heads providing better than 3-MHz response with 300-line horizontal resolution and a 36-dB signal to noise ratio. Recorder uses ½-in. tape on 7-in. reels rotating at 7.5 in./s, permitting 60 min of continuous recording. Other specifications include 50 to 10,000 Hz audio response with signal to noise ratio of +40 dB. Recorder operates from ac line and weighs 66 lbs. Price is $1100.



Circle 98 on Reader Service Card

Solid-State Stereo Console

Model 912S, made by Bauer Electronics Corp., San Carlos, Cal., provides four mic and seven

Superior never compromises on quality

Superior Coaxial Cable has earned respect for built-in reliability and stable performance — proved in CATV applications which already total millions of feet.

Superior manufactures coaxial cable under specially devised systems of quality control and sweep-tests every reel over its entire length prior to shipment.

There is no need to settle for less than the ability to make all frequencies available to your customers. There is no reason to risk any attenuation discontinuity — or any of the skipping and jumping frequencies often found in ordinary cable. For long-term transmission stability, full spectrum capability and outside plant reliability — you can rely on every foot of Superior Cable.

75 ohm coaxials with "Coppergard" corrugated copper shield

Cell-O-Air® expanded polyethylene dielectric is for aerial installations; "Solid-D" solid natural polyethylene dielectric is for direct burial installations. Guaranteed five years.

75 ohm coaxials with "Alumagard" solid aluminum shield

Newest addition to the Superior line — for aerial installation — Cell-O-Air® expanded polyethylene dielectric; extra high strength solid aluminum sheath. Guaranteed five years.

Balloon coaxial cable, 75 ohm air dielectric, also available.

For detailed information and prices, write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION / HICKORY, NORTH CAROLINA 28601

10264

Circle 35 on Reader Service Card

high-level inputs. Solid-state unit incorporates vertical attenuators in five mixer positions. Console measures 19 in. wide × 18 in. deep, and is available for $1395.

Circle 101 on Reader Service Card

Tool Grips Screw as it Drives

Model Screwlauncher screwdriver, made by Vaco Products Co., Chicago, Ill., holds screws as it drives them. Using a slotted spring steel blade that forms a V-shaped wedge in the slot of a screw, the tool permits one-handed driving

of screws, even in difficult-to-reach spots. Blades range in size from ⅛- to ¼-in. dia; lengths from 5¾ to 11⅝ in., with six sizes between. Prices range from $1.25 to $2.05.

Circle 174 on Reader Service Card

Fm Wireless Mic Tuner

Model 651 by Trutone Electronics, Inc., Van Nuys, Calif., is designed for use with wireless mics operating in the 88- to 108-MHz band. Circuit includes limiting and automatic squelch which silences the audio when transmitter

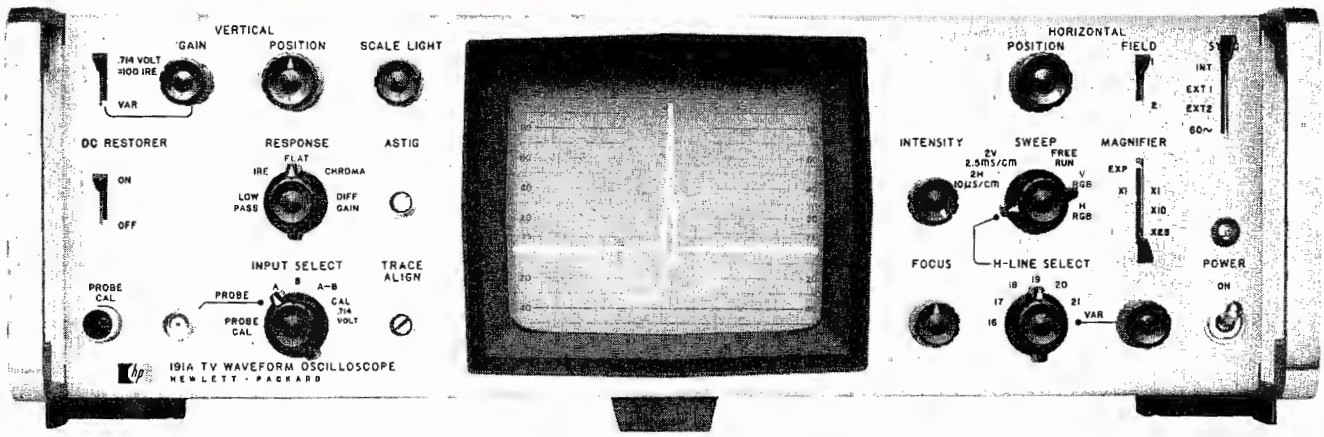
is turned off or when signal-to-noise ratio falls below usable level. Tuner uses 4 tubes, 1 silicon transistor, 1 silicon signal diode, 1 silicon power rectifier, and 3 germanium signal diodes. Price is $85.00.

Circle 175 on Reader Service Card

Circularly-Polarized Fm Broadcast Antenna At Reduced Weight

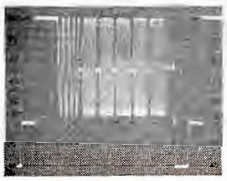
Type BFC fm broadcast antenna, manufactured by RCA, makes use of a radiating element made of two circular dipoles—a design that reduces by 50% the weight and wind load of a combination of separate horizontally and vertically polarized antennas. An

All-Solid-State Scope Gives 1% Measurement Accuracy!

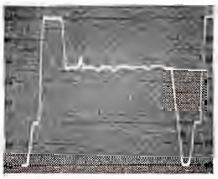


Sine-squared T/2 pulse in Flat Response position magnified X25.

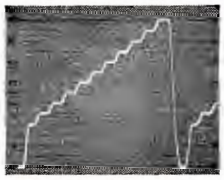
IMPROVE BROADCAST QUALITY — MAKE ACCURATE, RELIABLE VITS AND COLOR SETUP MEASUREMENTS



Multiburst signal accurately displayed using Flat Response Position of vertical amplifier, gives frequency-gain characteristics.



Multiburst signal shown using Low Pass Response position allows exact determination of average value of video signal.



Stairstep levels shown in Low Pass Response position. Deviation from designated values indicates compression.

Continuous monitoring of your broadcast operation with 1% measurement accuracy; easier, faster, more precise setup of cameras and recorders; and high speed trouble-shooting are yours with the all-solid-state hp Model 191A TV Waveform Oscilloscope! Now you can update your system for color. This scope is designed to meet today's requirements and tomorrow's demands! It now is the standard of interstate transmissions—and will be your standard to measure incoming video signals.

CHECK THESE FEATURES:

High tolerance filter design plus the parallax-free internal graticule CRT combine to give you 1% measurement accuracy. The 191A has a vertical amplifier with an extremely wide bandwidth to allow exact response shaping with five filters including Flat, Low Pass, IRE, Chrominance, and Differential Gain—without introducing any phase distortion into your signal. CRT is large 7 x 10 cm with a 20 kv post accelerator drive to provide bright, easy-to-see traces, including low duty cycle T/2 sine-squared signals—even in brightly-lighted control rooms.

You get the reliability of all-solid-state construction. All components, except the CRT, are solid-state, to allow low power consumption (only 70 watts) and convection cooling. *No ventilating fan is needed!* Solid-state components also means the 191A is rugged and can be used either in control rooms or for remote broadcasts. Model 191A maintains 1% measurement accuracy from +15° to +35°C (59°F to 95°F)—and still gives 3% accuracy at the ambient temperature extremes of −20°C and +65°C (−4°F to +149°F) for remote broadcasting accuracy.

Positive, digital Field-Select is insensitive to noise, and syncs to the right field every time without adjustment because of computer-type circuitry. You *know* which field you're examining! Line-Select system is discrete for lines 16 through 21 for quick, easy viewing of VITS. Variable-Select lets you manually select *any* line. Five sweep modes allow optimum examination of the entire composite TV signal, individual lines, video setup and color setup. Free Run and WRGB sweep modes facilitate signal level measurements and color setup.

You can switch rapidly from normal operating mode to check calibrated gain or to check VITS without resetting scope. With the 10' accessory probe connected to the front of the scope you get high-speed accurate trouble-shooting without interfering with the feed-through broadcast signals!

To see how the hp 191A TV Waveform Oscilloscope can improve your broadcast quality and to get full specifications, call your nearest hp field engineer. Or, write to Hewlett-Packard, Palo Alto, California 94304; Telephone (415) 326-7000; Europe: 54 Route des Acacias, Geneva. Price: hp Model 191A Oscilloscope, $1475.00; hp Model 10009A Probe, $50.00. This oscilloscope is also available as hp Model 193A for telco interstate television signal relayers. Price: hp Model 193A, $1350.00.

106A

HEWLETT hp PACKARD

An extra measure of performance

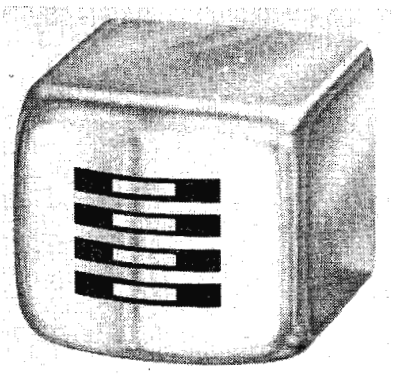
Circle 39 on Reader Service Card

added advantage of the BFC antenna is that the transmitter power legally may be doubled since the added power is radiated in polarizations other than the horizontal.

Circle 104 on Reader Service Card

4-Track Head Records Half an 8-Track Tape

Type BQL head, made by Nortronics Co. of Minneapolis, Minn., has track width of 0.021 in. and track spacing of 0.0635 in. between centers. Head records half



of an 8-track, ¼-in. tape and may be used in pairs for simultaneous recording of 8 tracks.

Circle 183 on Reader Service Card

ETV Studio Expands to EIA Broadcast Standards

Series Porta-Studio Model ST-2, made by Blonder-Tongue Laboratories, Inc. of Newark, N. J. consists of camera, console, and accessories, and easily can be operated by one student. Basic system is available for $6195. Series may be expanded to EIA studio standards, including one viewfinder camera, one nonviewfinder camera for film chain, control console for up to twelve video and audio inputs with composite rf outputs. Cost of expanded ST-2 series is $17,000. Series operates on any specified vhf channel between 2 and 13.

Circle 109 on Reader Service Card

Special-Effect Module Generates 16 Patterns

Model EF-100 special effects generator for 4-channel split screen operation is a plug-in module containing a total of up to sixteen special effects patterns, plus external keying and matting. The unit, made by Ampex Corp. of Redwood City, Cal., enables

WHY DOES TA USE AMPEX TRANSISTORIZED MODULATORS IN THEIR UHF KLYSTRON TRANSMITTERS?

MANUFACTURING ENGINEERS FOR KLYSTRON TRANSMISSION SYSTEMS

The common complaint that we have heard about television transmitters over the years is that visual modulators are poorly designed, do not include all of the necessary functions or just do not perform well. Since TA has built and installed amplifiers which have been used with other manufacturers' drivers and modulators, we have become very much aware of the shortcomings of existing designs.

Consequently, when we began design work on our transistorized driver a year ago, we studied the problem of modulator design in great detail. The first step was to review the state of the art of similar equipment. Our conclusion was that much sophistication already existed in transistorized equipment similar to visual modulators. Specifically, we studied several stab amp and processing amplifier units available commercially.

Our comprehensive tests showed that the Ampex processing amplifier normally used in VTR machines and which is recognized by industry engineers as the ultimate in processing amplifier design, contained the essential qualities for a high performance modulator.

Ampex engineers then repackaged the processing amplifier for use as a modulator for TA. The result is truly a breakthrough inasmuch as the modulator is entirely transistorized and contains all of the functions of the processing amplifier such as control of burst gain, sync height, pedestal level, video gain and reconstructed sync. In addition, the unit includes all of the transmission corrective circuitry required of a good modulator. All of these features are remote controlled in TA transmitters when required.

The inclusion of Ampex modulators in TA transmission systems has resulted in the finest television transmitter available today.

We are proud that we lead the field with the first transistorized driver and doubly proud that we use the ultimate in modulator design—the Ampex transistorized modulator.

For more information write today to:

TOWNSEND ASSOCIATES INC.

P.O. BOX 215 • FEEDING HILLS • MASSACHUSETTS • 01030

AREA CODE 413-733-2284

Circle 43 on Reader Service Card

the user to show four different pictures on a single television receiver, or insert areas of special interest on to the screen at the same time an overall picture is being shown. Prices for the unit start at $1375.

Circle 108 on Reader Service Card

Mic Cable Repair Kit

TK-1 mic cable repair kit, made by Shure Brothers of Evanston, Ill., includes a pair of crimping pliers, 75 solderless clips, and a length of copper lead wire. The pliers are specially designed to help repair tinsel or copper retractable cables on hand-held mics. Kit is priced at $7.50.

Circle 179 on Reader Service Card

Hand-Held Torch Has Hot Flame

Model Little Torch, manufactured by Tescon Corp. of Minneapolis, Minn., provides a 6300°F flame from oxygen and fuel gas (acetylene, hydrogen, LP-gas or natural gas) while being held in the hand. Torch may be used with any of

five different size tips—each with sapphire orifices—to weld metal smaller than 0.002 in. or wire up to 16-gauge steel. Torch operates with gas pressure from 2 to 4 lb/in.^{2}, and consumes gas at the rate of 0.023 to 2.54 ft^3/hr.

Circle 182 on Reader Service Card

Dichroic Filters

Colortran filters, made by F&B/CECO of New York, N.Y., permit film and television producers to simulate daylight lighting conditions by placing them in front of yellow lights, thus boosting the Kelvin color temperature to the correct degree. The Pyrex glass filters transmit 85% of corrected light available. The filters provide 5600° of Kelvin temperature — an output that does not vary with heat or age. Sizes range from 4¾ x 4¾ in. to 7⅞ x 7⅞ in.; power-handling capacity from 650 to 1000 W. Prices range from $23.75 to $59.50.

Circle 76 on Reader Service Card

NAMES IN THE NEWS

The National Association of Broadcasters has chosen ABC's **Robert M. Morris** to receive the NAB annual Engineering Achievement Award. The award will be presented by NAB Vice President, George W. Bartlett on April 5, 1967.

Anthony S. Katona

E. Noel Lundy

Anthony S. Katona appointed Product Sales Manager of American Electronic Laboratories' CATV/Broadcast Transmitter Div.

RCA announces the following appointments: **E. Noel Lundy** to position of Manager, Broadcast and Communications Consultant Relations and **A.W. Power** to Manager, Eastern Professional Television and Systems Sales, RCA Broadcast and Communications Products Div. John

T. J. Lyons

N. C. Cox, Jr.

J.H. Bowman, Vice President, Superior Cable Corp. has announced the appointments of **T.J. Lyons** and **N.C. Cox, Jr.** to positions of Region Sales Manager in the Midwest and Atlantic Regions, respectively.

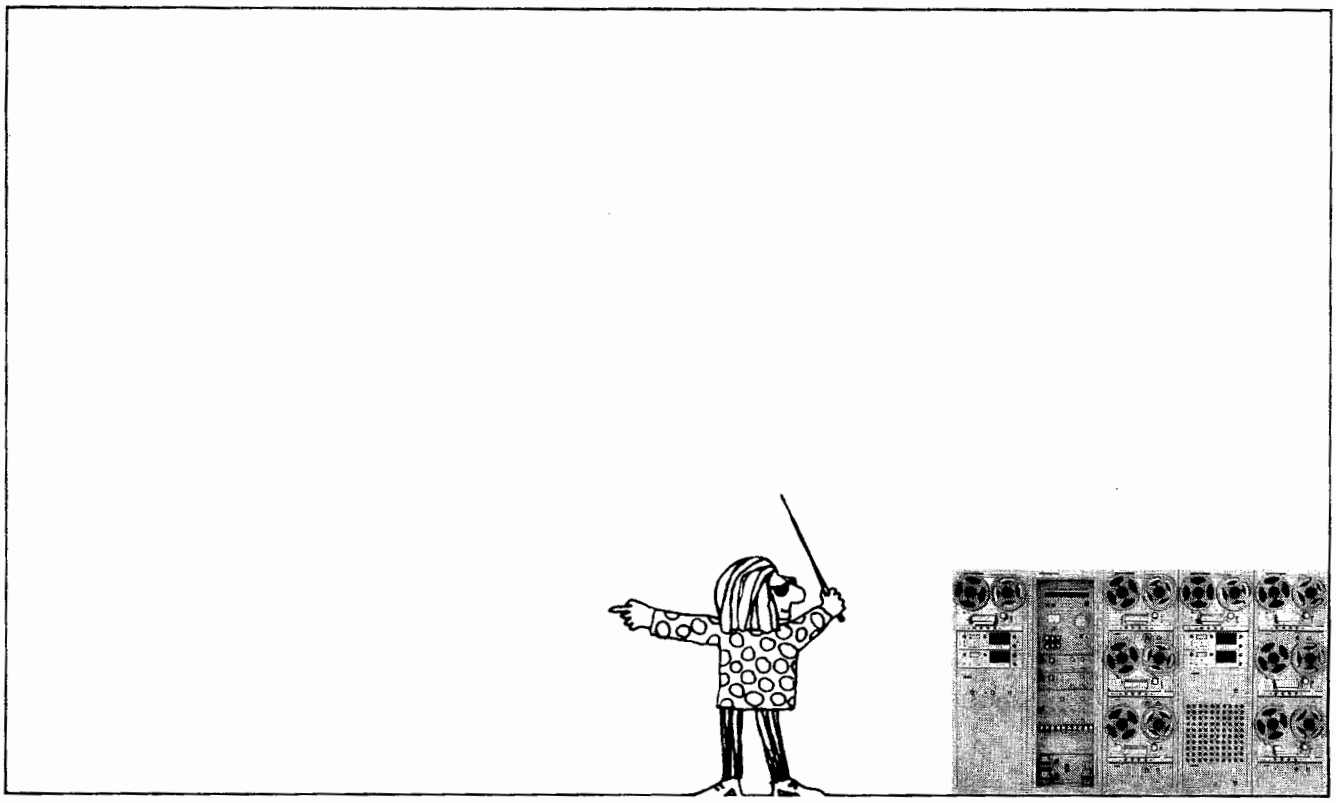
Ted F. Akins

Charles M. Rice

Ameco, Inc. names **Ted F. Akins** CATV Sales Engineer and **Charles M. Rice** National Sales Manager.

RKO General announces that **Warren Earl** has been appointed General Manager of KHJ-AM-FM. Replacing Mr. Earl as General Sales Manager of KFRC is **Paul Stoddard.**

person ality!



Personality is that special something which communicates with the listener. Only a Schafer System can automatically provide the "live-sound" necessary for the success of the station's operations. See and hear a Schafer System in operation. Convince yourself how simply "live-sound" is achieved automatically. Amplify your personality through automation by Schafer. See us at the Annual NAB Convention, The Conrad Hilton Hotel, Booth 210 West Hall, April 2-5 or contact us and we will provide a complete demonstration on personality preservation at your convenience.

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Circle 46 on Reader Service Card

National Association of Broadcasters' President, William G. Harley, announces the election of eight NAEB members to three-year terms on the NAEB Board of Directors. The new Board members are: **Loren B. Stone**, Station Manager, KCTS, Seattle, and **Hartford Gunn Jr.**, General Manager, WGBH, Boston, representing the Educational Television Stations Division of NAEB; **Will I. Lewis**, Director of Broadcasting, WBUR-FM, Boston University, Boston, and **Myron Curry**, Manager, KFJM, University of North Dakota, Grand Forks, representing the National Educational Radio Division; **Dr. George Bair**, Educational Director, South Carolina ETV Commission, Columbia, and **Hugh Greene**, TEMP Project Coordinator, Radio-TV, KUT-FM, University of Texas, Austin, representing the Instruction Division; **Kenneth K. Jones**, Director of Broadcasting, KEBS-FM, San Diego State College, San Diego and Dr. **Lee Dreyfus**, University of Wisconsin, Madison representing the Individual Membership Division.

Barry Holland

Gordon W. Wolfe

Visual Electronics Corporation appoints **Barry Holland** as Television Systems Engineer and **Gordon W. Wolfe** as Sales Engineer. Vice Presidents George H. Wagner and Charles E. Spicer made the announcements.

Kaiser Broadcasting announces the appointment of **Gary Floyd** as Operations Manager for WKBD-TV.

KTUC of Tucson announces the following appointments: **Thomas A. Maples**, General Manager KTUC-KFMM. **Eugene Kelly** replaces Mr. Maples as Sales Manager.

Richard B. Helhoski of Blonder-Tongue Laboratories announces the appointments of **Irving M. Solotoff** and **Marcus L. Winchester.** Mr. Solotoff was named Eastern Regional Sales Manager and Mr. Winchester was designated CCTV Sales Engineer.

Robert W. Behringer, Executive Vice President and General Manager of Kaiser-Cox Corp. announces the appointments of **Jean Welch** as Director of Advertising and Public Relations and **John R. Bryant** as Western Regional Sales Manager.

Continued from page 26

Are Plumbicons okay on remote?

Ettlinger: Our experience has been excellent. We were originally concerned about dynamic range but this seems to be no problem.

Please comment on Plumbicon vs IO regarding color saturation.

(Ed. note: This discussion became too involved to report. *Ettlinger* reported that in theory there should not be any difference in color saturation capability. Gamma corrections can be made. Adjusting for identical chrominance does not bring everything completely under control but by proper staging, problems can be minimized.)

Should encoders be in the camera or equipment rack?

Ettlinger: We grouped our vacuum tube encoders in a rack and assigned a man to keep them tuned. With the advent of solid-state encoders, we put these in the camera chain. A portable Vectorscope is available. We check them out once a day.

Renaud: We put them in a rack so we could easily control the phase before the signal was piped into a complex switch. However this precaution may not have been necessary.

Williamson: We don't have to check encoders every day and it can be done with a scope. Our one Vectorscope is assigned to the film camera.

Please comment on practical aspect of vertical aperture correction.

Ettlinger: We include correctors in the camera chain and are satisfied with the results even for news programs where the input sources are many.

It is true the Plumbicon lacks red sensitivity at the extreme end of the band but this is troublesome only when the source of red is self-illuminating such as a traffic light. In the studio where proper skin tone is the objective, we don't feel we have a problem.

Continued from page 25

problems encountered by the new and more stringent — although unwritten — commercial standards. *First*, the licensee can follow the advice of Demosthenes (renowned Greek orator and statesman), "The readiest and surest way to get rid of censure is to correct ourselves." Or, in the vein of Epicurus (a Greek slave immortalized by his philosophy), the licensee may assume the attitude that, "The greater the difficulty the more the satisfaction in surmounting it." To date, "95%" of the licensees have chosen the former and brought their commercial proposals in line with the NAB Code limits. Curious, but apparently true.

BM/E propounds neither view and concludes simply that the licensee's commercial proposals, today as in the past, should set forth standards which (*in the licensee's opinion*) are consonant with good taste, public need and the economic viability of his operation. *If* the resultant proposal exceeds NAB Code ceilings, the proposal should be *very specific* as to the following:

(1) when such excesses would occur,
(2) how frequently such excesses would occur,
(3) the commercial ceilings that would then apply,
(4) the percentage of total broadcast time in which NAB Code limits would be exceeded, and
(5) *detailed and convincing reasons to* justify these excesses.

If necessary, you can revise and reduce your commercial proposal subsequently. If questioned, you need not "run scared;" defend your *honest* judgment (and freedoms). On the other hand, if the NAB Code limits satisfy the needs of your audience and station, it would be most prudent to propose accordingly. ●


RCA
TK27
"BIG TUBE" FILM CAMERA...
RCA
TK27

television's most widely accepted color film camera

400 already shipped!

Since its inception in 1964 more of these "New Look" color TV film cameras have been shipped than any other. Number 400 has been delivered to the ABC Network. Others are on their way to a growing list of users. Choice of the top stations throughout the country, it's the color film camera with the "big tube" concept for finest pictures.

The big tube adds snap to the color picture. It increases resolution and definition, eliminates more of the noise element, resulting in a sharper, more pleasing picture.

When you look inside the TK-27, you get the idea that this camera is different in other ways, too. It's the only film camera that's all transistorized, all modularized. The only film camera with plug-in vidicon camera assemblies, sealed beam optical system, electrostatic-focus vidicons.

The TK-27 is part of a "matched" color film system. For example, over 750 TP-66 film projectors have been delivered, together with more than 400 TP-7 slide projectors (and accompanying multiplexers). Such wide acceptance makes the RCA film system the standard of the industry.

GET THE FACTS—For more facts about the TK-27, call your RCA Broadcast Representative. Or write RCA Broadcast and Television Equipment, Building 15-5, Camden, N.J. 08102.

RCA® The Most Trusted Name in Electronics

Circle 48 on Reader Service Card

BROADCASTERS SPEAK

Sirs:
We enjoy your publication and look forward to your feature articles and advertisements on new equipment each month. In an upcoming article, would you consider doing a feature story on automatic program logging?

David E. Pavlock
Operations Manager

Glad you like the book, D.P. We've got an article on logging in the works.

Sirs:
I am a former chief engineer of WGOH Radio in Grayson, Kentucky. There I received your magazine *BM/E* and enjoyed it very much.

I am now in the army as an electronics instructor, stationed at Redstone Arsenal, Alabama. I would like to continue receiving your magazine since I'm still interested in broadcasting and your magazine keeps me well-informed.

Am I still eligible for a free subscription? If not, would you please send me your rates so I can subscribe to the magazine?

Kenneth Robinson

Many things change when a man joins the army, K.R. You'll be receiving a questionnaire from our Circulation Fulfillment Department. Your answers will determine whether you will continue to receive BM/E at no charge. Hope you stay with us in any case.

Sirs:
Your January, 1967 issue, page 11, showed John Lannan doing an interview for the radio series, "Your Health And Your Life." Can you supply the address of National Science Network which produces the program?

William M. Brady
Radio Coordinator

The address you requested, W.B., is WNCN, *2 West 45th Street, New York, N.Y. 10036.*

Sirs:
If memory serves me correctly, a short time ago you published a schematic and explanatory notes on a six-channel remote amplifier. This was submitted by one of your readers.

We now find ourselves in a position to make very good use of such an amp., but on checking through my old copies of *BM/E*, I find some gaps.

Would you please send me one copy each of June, October and November 1966 issues if they are still available? Besides finding the schematic, I would like to have a complete set on file.

I find *BM/E* very informative as well as interesting, a pretty hard combination to achieve, but one which you have successfully accomplished.

Keep up the good work.

M. R. Morton
Ch. Engr.

We're sending what we can, M.M. Unfortunately, the October/66 issue was so popular that it's no longer available.

Continued from page 16

blocked by Post-Newsweek station who claims questionnaires proving need were misleading. . . . **Derry, Pa.** council is studying competitive bids of Highland Cable and WHJB-TV of Greensburg. . . . **High Point, N.C.** awaits the study of the City's Utility Commissioner. . . . **Green Bay, Wis.** has delayed independent action on granting franchise until a "national study" of cablevision is completed. . . **South San Francisco** sitting on seven applications since last June, still hasn't acted.

After **Richmond, Indiana,** granted Clearview Cable a nonexclusive franchise other applications said Clearview rates were too low and communitions of Indiana, seeking uhf license, said CATV was not needed.

Business of Broadcasting

Pye Gets Orders. Pye TVT reports orders from the Ethiopian Television Service for a complete television studio to be installed in the new television center in Addis Ababa. Orders augmenting cameras and telecine equipment also have been received from the Malta Television Service Ltd., the South Arabian Television Service and the Cyprus Broadcasting Corp.

EMI Exports TV. EMI Electronics recently was awarded a contract for the supply of four telecine chains to Rediffusion Hong Kong, the contractors who supply the wired Television service for the colony. EMI also will supply complete video equipment for the New Zealand Broadcasting Corp's latest news studio in Hamilton, North Island.

Ticker Tape for Homes. Trans-Lux Corp., whose stock transaction display devices have been used in brokerage offices for more than 40 years, are now available on a lease basis to CATV and TV stations. The first installations of the new Trans-Lux system are being made by CATV systems in Palm Springs, Cal., Sedona, Ariz., and New York City as well as station KWHY-TV, Los Angeles.

WNCN recently increased its power from 20 kW erp to the equivalent of 50 kW, maximum allowable under FCC rules. This has improved the signal within the present four-state coverage area and extended coverage beyond former boundaries. WNCN has all-new solid-state equipment, horizontal and vertical antennas atop the Empire State Building as well as modern broadcasting facilities. Stan Guerll, Vice President and General Manager, is pressing "plates on" button that increases transmitting power from 20 to 50 kW erp.

Kenya Buys From Marconi. The most powerful medium wave broadcasting station in East Africa has been opened at Ngong near Nairobi by the Government of Kenya. The Marconi Company has installed and tested four 50-kW transmitters including aerial masts, switchgear, power supplies and links between the station and the broadcasting studios in Nairobi.

Another Color Tube Plant. In January RCA began tube production at its new $26-million plant in Scranton, Pa.

Spot Etiquette. Amy Vanderbilt has started producing 30-second radio spots on etiquette. One-hundred-twenty spots are in the process of being recorded and the series has already begun to run twice daily on the Toronto station, CKEY. Demonstration tapes are available through Transcription Services, Toronto, and 200 Park Ave., New York, N.Y.

Business of ETV

Local ETV at **Berkshire, Mass.** Representatives from all elements of the county's educational system have met jointly to plan for CCTV linking all schools ranging from kindergarten through college. Cable interconnection is being planned with CATV operator, Telesystem's Corp. . . . **Prospect Heights, Ill.** District 23 is considering two cameras, a VTR, CCU, automatic switcher, and nine monitors. . . . At **Eau Claire, Wis.** the board of education has okayed CCTV equipment for the local high school and plans additional expenditures for junior high schools. . . . **Palm Beach, Fla.,** school system has retained a consulting engineering firm of Adair and Brady, Lake Worth, to plan ETV installations. . . . **Watseka, Ill.,** county schools are considering an area TV channel. Superintendent in charge is Brooks Courtright . . . **Indianapolis** school board is considering a radio-TV studio in its new $2.75-million education center. . . . **Allendale, N.J.** has installed a CCTV system in the Northern Highlands Regional high school, built around Sylvania equipment. . . . **St. Louis College Pharmacy** will use a $10,000 grant to purchase CCTV equipment. . . . **Willoughby-Eastlake** School District (Ohio) is considering establishing a broadcast center. . . . $1 million is being raised for an ETV station in **W. Va.** including the three counties of Kanawha, Cabel, and Wayne and Marshall University. $470,000 has been requested from the Federal ETV Facilities Administrator. Production centers will be located at Charleston and Huntington according to H. M. Brawley of West Virginia Educational Broadcasting Authority. . . . **Syracuse (N.Y.)** City School District is planning to expand CCTV within the school as a result of good experience using WCNY-ETV programming for a year. A five-year expansion plan is underway by the ETV Council of Central New York which owns and operates WCNY. . . . **Benilde High School,** Catholic School for boys in Minneapolis began CCTV experiments using equipment donated. . . . Miller Composite High School, **Regina, Saskatchewan,** has over $200,000 worth of TV

and audio equipment aimed at aiding individual student progress, which Toronto education officials are studying prior to equipping the proposed $6,000,000 West End High School at Toronto. . . . The **Mid-Monmouth Educational Council** which consists of four N.J. districts, Long Branch, Monmouth, Ranson-Fair, and Red Bank is considering ETV according to H. A. Korey, Long Branch H.S. principal who is executive director of the council.

Statewide and College ETV. Massachusetts is planning a $3.8-million statewide education system to serve schools and homes according to Commissioner of Education, O. B. Kiernan. . . . **Mississippi's** ETV plans moved ahead in January when the legislature passed a bond bill coupled with a $777,188 Federal grant. Funds will go into a central production facility at Jackson which will include full color. Nine stations are planned, 1 vhf and 8 uhf. First station will be channel 29 at Jackson. Operations will begin on September, 1968. . . . **Ohio University** Board of Trustees approved a $2,838,278 Educational television and theater arts building in January. . . . **Delta College's** WUCM-TV (Michigan) expects to go color. . . . **Wisconsin Association School Board** has recommended establishment of a state-wide ETV system. . . . North Carolina is in the middle stages of establishing its 11-station network. The **University of North Carolina** will expand its coverage and programming. . . .WVIA-TV, Wilkes-Barre, sponsored by **Northeastern Pennsylvania Educational Television Association** is seeking $15 annual contribution from viewers. . . . **University of Tennessee** is seeking $1 million of federal funds to serve eight counties in northwest Tennessee. A four-channel 2500-MHz system is planned. . . . **Calgary's** separate school board has joined the Region ETV association. . . . University of Connecticut ties in three branches **Hartford, Waterbury, and Stamford** with CCTV to teach a first course in electrical engineering. . . . **Missouri Commission** on Higher Education has alloted $341,878 to private and public colleges for CCTV equipment. . . . **Vermont** legislature will consider a bill to increase the allocation for ETV by $800,000—$450,000 for full monochrome coverage and $350,000 for full color compatibility. The four stations planned will total $3.1 million.

Concern Grows Over Nebraska ETV Bootlegging. Pirating or Bootlegging is not a problem, but is a matter of growing concern according to the Executive Director of the Nebraska Council for Educational Television. The network operates on channels 12 in Lincoln, 3 in Lexington, 9 in North Platte, and on 13 in Alliance. Though bootlegging has been known to exist especially in the eastern part of the state since the network began operation about four years ago, membership fees amounting to $2 per person or a min-

Continued on page 85

How to know you're buying the finest live-color camera.

It's not one single feature that makes the difference.

It's a unique combination of advanced design and operating characteristics that makes one live-color camera the finest in television today for both studio and remote operation. The General Electric PE-250.

Stated simply, here is the winning combination:

Advanced mechanical design—Circuit modules accessible during operation without extenders. Easy, flexible pickup tube replacement. Parallel and planar deflection assemblies for optimum match in all channels. Weighs less than 160 pounds, fully operational.

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Four-channel pickup—Four lead oxide pickup tubes ...the most modern tubes in the most accepted configuration. Separate luminance channel for high resolution and high signal-to-noise ratio...without critical dependence on chrominance channel registration. Optimum chrominance and luminance performance without interaction.

Flexibility—Lightweight, compact, rugged design and low power demand make it ideal for both studio and remote use. Uses U.S. camera cable and connectors. Adjustable compensation for cable lengths up to 2000 feet, usable pictures even beyond 2000 feet. Long cable runs also facilitated by registration controls at the camera and calibration controls at the camera control unit.

Acceptance—Now originating programs for two of the three major U.S. networks and for leading group and independent stations throughout the country.

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That's the combination that gives you the best performance in live-color television today. For the lowest price, too.

And when you see the brilliantly detailed, beautiful color pictures the PE-250 produces, you'll know you've found the right combination. GE-43

Look for it at the NAB Show.

Visual Communication Products Department

GENERAL ELECTRIC

Electronics Park, Syracuse, New York 13201

How to know you're buying the finest color-film camera.

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The background color and texture, the modeling and tone of the flesh and hair and the high-contrast black and white stripes make it a tough, thorough system test.

The General Electric PE-240 color-film camera will consistently reproduce it with sharp detail, striking color fidelity and unmatched stability.

And it's easy to see why. The PE-240 has automatic exposure and black level controls. Transistorized circuits. A simplified all-solid-state encoder. Master black level. Video reversal for negative black-and-white film. Circuit and performance similarity to the live-color PE-250 for simplified maintenance and smooth film inserts to your live shows.

And the right tube for the right job in all four channels. Luminance is supplied by a separate-mesh one-inch vidicon for high resolution without visible lag or flicker.

But judge for yourself. And use any film or slide you like.

The tougher the test, the easier it is to see why the PE-240 is the top-ranking color-film camera in television. GE-43

See it in action at the NAB Show.

Visual Communication Products Department

GENERAL ELECTRIC

Electronics Park, Syracuse, New York 13201

Continued from page 82

mum of $50 per school are being collected from a growing list of 200 schools. Though officials are not unduly concerned about program pirating, what really seems to get under the skins of network officials is that some Nebraska bootleggers are making Xerox copies of program schedules and copyrighted guides.

New ETV users—F. C. McQuistion, Oklahoma State University Mechanical Engineering prof. enters Purdue University for advanced studies. One interest is programmed instruction and self-tutorial methods including videotape lessons for learning thermodynamics and fluid mechanics. . . . LTV Electrosystem's is linked by microwave relay to SMU to receive engineering courses. Other industrial plants in area plan to add TV equipment.

Massachusetts School Construction Now Including Provision for CCTV. In a general effort to upgrade the audio-visual standards of Northampton, Massachusetts schools, officials of the School Department there are attempting to meet equipment standards in 18 major categories, including record players, slide and film projectors, radio receivers etc.

Contracts. 2500-MHz ITV Networks. **Fresno County** (Calif.) and **Palm Beach** and **Broward** counties (Fla.) have purchased multichannel instructional TV networks under contracts announced this week by Micro-Link Systems of Varian Associates. Value of the contracts is approximately $700,000. Funds for all three networks were derived from Title I of the Elementary and Secondary Act of 1965. . . . Inquiry Modules that use personal TV screens to link individual students with a library of information prerecorded on video and audio tapes will be added to the Learning Center at **Brevard Junior College.** The new equipment has been ordered from the Raytheon Co. and includes a selector panel with telephone-type dial, a video monitor, headset, and mic for student response to learning laboratory materials.

LITERATURE of INTEREST

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

Monochrome solid-state camera using 4½-in. orthicon is fully described in literature from Pye TVT, Ltd of England. **145**

Equipment containers in a variety of configurations are presented in 4-page brochure from Skydyne. **146**

Edition 23 of "News from Rohde & Schwarz" continues its series on antennas; describes the design and operating principle of modern unmanned communications stations; shows how, with the use of an impulsereflectometer, discontinuities on uhf power transmission channels may be located. The journal also reports on the installation of a 20-kW shortwave transmitter by the German Post Office. **147**

"Typical Characteristics of Photosensitive Surfaces" (JEDEC Publication No. 61) lists characteristic defining data for the EIA-registered S-series of photosurfaces. Publication is available from EIA for 30 cents. **148**

Seven major marketing events for 1967 as seen by Norman E. Cash, President of TVB are contained in 1-page newsletter. **149**

Features of quick-erect tower are contained in brochure from Andrews Towers, Inc. **150**

Subminiature and microminiature rf connectors are tabulated with specifications in catalogs 468A and 468-51C from Sealectro Corp. **151**

Acoustical doors with sound transmission class ratings of 35 to 62 dB are subject of brochure 170/Ov from Overly Mfg. Co. **152**

"Industrial Electronics Supplement," 48 pages, from Allied Electronics includes tabulated specifications for wide range of electronic components including bialkali photocathode and other tubes. **153**

Cabinets and consoles made of steel and aluminum made by Zero Mfg. Co. are covered in 16-page illustrated catalog. **120**

Video processor brochure describes Telemation Model TMV-501 unit for reshaping sync pulses, on CATV and ETV systems. **122**

Videotape recorder data sheet V-016 contains specifications, and features of the Ampex VR-2000 high band color recorder. **123**

"CATV System Design Philosophy and Performance as the Basis for Specifying Equipment Components," is a 27-page paper presented at the 16th annual Broadcast Symposium. Paper is published by, and available from C-Cor Electronics, Inc. **125**

"One Week of Educational Television," a biannual survey, reports on the quantitive and qualitative growth of ETV during survey week, April 17 through 23, 1966. The survey is published by NSCT, Bloomington, Ind. **134**

Dynamic microphone frequency range charts illustrating response characteristics of three mics in range of 20 to 20,000 Hz are contained in "How the Sonotone Microphone Covers the Range of Audible Sound." **126**

Technique of photographing hydrogen flames, formerly invisible to the TV camera in their basic state, is subject of 2-page bulletin (8-77) from Cohu. **142**

Quartz iodine lights are discussed in 7-page reprint from Kliegl Bros. Article makes comparisons of quartz iodine lights with incandescent types with the aid of illustrations, graphs, and tables. Technical specifications and lighting diagrams also are included. **154**

CATV equipment exchange and a line of bridging amplifiers are the subjects of two publications from Ameco. Available from the same source are monthly CATV publications entitled "Tech Topics" and "Business Booster." **128**

Market research is the topic of "A Broadcast Research Primer," published by the NAB. The 75-cent booklet's 62 pages provide a nuts and bolts approach to market research for broadcasters, tells what should be left to professionals, and how profitably to compare yourself with competitors. **124**

"FM Wireless Distribution System" is the title of a brochure from Rust Corp. which contains verbal descriptions and specifications of a line of fm transmitters and receivers as well as amplifiers. **121**

Books on all phases of radio-TV-CATV, many unavailable from other sources, fully described and illustrated in 18-page literature package from TAB Books. **170**

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TV Producer-director-production manager. Local and network. All sports, variety, drama. Over 20 years experience. "Emmy" nominee. Former radio announcer, stage actor and theatrical director. Top references. Box 367-3, % BM/E.

Metro market newsman/announcer/D.J. looking for permanent spot in metro or medium market AM or FM. Married with service obligation more than fulfilled. 10 years radio with some TV background. Available March. Levofsky-AFRTS, Box #1133 APO 09240, New York.

Man, 26, experienced, desires employment as news or sports writer on radio or television station anywhere. Contact John Lutz, 1642 Northbourne Road, Baltimore, Maryland. Phone 435-6950.

First class ticket beginner. Married. Mid-thirties. Non drinker. Desires trainee position anywhere. Knows FCC regulations. No experience but well trained in communications. D. M. Rivera, 8360 Janet, Riverside, Calif. 92503.

Experienced young man with eleven years in color TV seeks to improve engineering position. Technical school grad and college. References available. Box 367-4, % BM/E.

Radio news and sportscaster. Wish to relocate. 18 years experience professional baseball, boxing, college football and basketball. Augie Navarro, 1413 South 21st East, Salt Lake City, Utah 84108.

Reasonably well-informed, single, service completed, four years radio, locate good music radio—in or near populated area north eastern U. S. Box 367-5, % BM/E.

Program specialist. Top-rated shows. Producer-director. National Syndications (over 500 stations in 1966). Plus first phone. Paul Potter, 2136 W. Colorado, Dallas.

D-J-announcer. Family man. College background. 3rd endorsed. Recent NY broadcast graduate. Military completed. Will relocate. Box 367-6, % BM/E.

POSITIONS WANTED (cont'd.)

Award winner, host/co-producer own show three years. Solid commercials, live-VTR, interview, remotes, aggressive. Christian. Box 367-7, % BM/E.

Announcer: Eight years & copy. Married. Credit. Want employer who gives equal opportunity. No night work. Box 367-8, % BM/E.

Girl—first phone, student . . . announcing news gathering, woman's program, traffic . . . family . . . Box 265, New York City, 10036.

One year's experience. Some college, third, speech background. Draft deferred. Box 367-9, % BM/E.

Announcer/live TV newscaster—presently employed—34, industrious, intelligent, adaptable. Box 367-10, % BM/E.

Does your station need good No. 2 man? Exp. Ofc. Mgr., Eng., Copy, Accts., books, billing, etc. SE. No hurry. Box 367-11, % BM/E.

First class engineer desires to relocate in northeast area. Box 367-12, % BM/E.

Like money—no sales—long tenure or TV production/direction. Box 367-13, % BM/E.

HELP WANTED

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We are interested in contacting 10 Station Engineers capable of design or field engineering. Excellent opportunities in TV Development Engineering and Systems Engineering with Sarkes Tarzian, Inc., Broadcast Equipment Division.

TV station engineering experience required, BSEE or equivalent desirable. Send resume of experience, or call, Mr. Biagio Presti, Broadcast Equipment Division, Sarkes Tarzian, Inc., Bloomington, Indiana, Area Code 812, 332-7251.

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MAN WANTED—1st class licensed man, perhaps retired, to stand watch and live in trailer at Cable TV reception head-end on La Cumbre Peak, 4½ miles north of city, 40 minutes by road, to maintain all gear, including Conrac receivers, 10 Collins 12Kmc transmitters with three-way split of signal to three distribution centers. This could be scenic way of life for right man and trailer could also accommodate wife. If interested, send fact and picture to: Larry Gunn, Technical Manager, Cable TV of Santa Barbara, Inc., P.O. Box 3295, Santa Barbara, California. Or Phone 805-963-3644.

HELP WANTED (continued)

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Write or Call
Mr. Robert Bromley
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Feeding Hills, Mass. 01030
Area Code 413-733-2284

THE UNIVERSITY OF MICHIGAN has an immediate opening for a studio TV engineer. Applicants should be experienced in installation, maintenance and operation of equipment. License preferred. Opportunity to enroll in part-time University studies may be arranged. Starting salary commensurate with experience and ability. Liberal benefit program. Send resume to R. K. Kirch, Personnel Office, University of Michigan, 1020 Administration Bldg., Ann Arbor, Michigan. An equal opportunity employer.

ELECTRONICS TECHNICIAN: DYNAIR has an immediate opening for a sales-minded technician to specialize in CATV head-end equipment. Will be assigned initially to engineering department on final tests of new solid-state CATV head-end equipment. After orientation, will transfer to sales department as application specialist. Some field work anticipated. An outstanding opportunity to grow with DYNAIR Electronics, Inc., 6360 Federal Blvd., San Diego, California.

Experienced CATV engineer. Permanent position with no travel. System located 30 miles outside of Pittsburgh. Send resume. Box 367-17, % BM/E.

HELP WANTED (continued)

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This progressive CBS Miami affiliate seeks an operations manager who has demonstrated his ability to achieve management objectives, with a combination of practical and creative production abilities. Station is full color with modern equipment; applicant should have working knowledge of equipment capabilities. Position reports to the general manager with full departmental authority in addition to responsibility for heavy schedule of local and national commercial and program production. Salary commensurate with experience and abilities: All replies confidential. Send resume to:

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NEEDED IMMEDIATELY: experienced TV Broadcast Engineers with first phone for expanding staff of WTMJ-TV, Wisconsin's leading AM-FM-TV broadcasting facility. Pioneers in color broadcasting. Presently operating from new studios with latest color equipment. Excellent pay and benefits when you work for this employee owned company. Call or write to Chief Engineer, WTMJ-TV, Milwaukee. (414) 271-6000.

NEEDED IMMEDIATELY. Engineers experienced in the following job categories: Video tape maintenance and recordists; live color video; studio supervisors; transmitter maintenance. The above positions are all top salary. Send your resume or inquiry to the Amps Agency—3974 Wilshire Blvd., Los Angeles, California 90005
By Broadcasters—For Broadcasters.

Microwave Installer Repairman. Applicants must have second class license with radio and multiplex experience. Excellent pay, vacation, holidays, insurance, retirement and opportunities. Send salary requirements, employment history and complete resume to: Plant Manager, Post Office Box 308, Fairfield, Texas. All replies confidential—an equal opportunity employer.

Experienced television engineer with first-class. Supervise and maintain existing microwave, help plan additional installation. Stimulating work in University environment. Immediate opening. Contact Director of RTVF, 217 Flint Hall, University of Kansas, Lawrence, Kansas.

Chief engineer E.T.V. Rapidly expanding University educational TV department with closed circuit and production facilities is seeking licensed engineer to take charge of technical operations. Starting salary commensurate with experience and background. Box 367-14, % BM/E.

WSVA-TV Harrisonburg, Virginia has immediate opening for transmitter engineer. Willing to train beginner. Primarily operational, but maintenance increases as ability increases. Send resume to Thomas B. Jones, Chief Engineer, WSVA AM-FM-TV, Harrisonburg, Virginia 22801.

Radio Engineers—Earn **Extra Money** part time. P/M Associates is national headquarters for contract engineering services. Many current openings for 1st class engineers. For full information write: Personnel Manager, P/M Associates, Inc., 203 Pond Street, Natick, Mass. 01760.

Wanted. Chief engineer, 5kw mid-Atlantic fulltimer. Good pay. Permanent. Box 367-19, % BM/E.

Technical director—for radio-TV group in north east. Engineering degree desirable but not essential. Please give experience and salary requirements with first letter. Color and VTR knowledge important. All replies confidential. Box 367-16, % BM/E.

Wanted: Technician—CATV experience, permanent position—no traveling—220 mile system. $525-$575 month. Liberal vacation, insurance, hospital benefits. Send resume: Cablevision, 716 Francis, St. Joseph, Missouri.

TV technician for operating helical scan VTR, studio video and audio equipment. Some maintenance. Experience preferred. Complete benefit program. Degree work possible. Instructional Broadcasting, Eastern Michigan University, 15 Sill Building, Ypsilanti, Michigan 48197.

IMMEDIATE EMPLOYMENT—ENGINEER, background in video equipment maintenance. Good salary and fringe benefits. Contact Robert Schlorff, Mass Communications, Wayne State University, Detroit, Michigan.

Wanted: engineer for Chicago's Fine Arts Station. Recording, studio work and maintenance. First Class license desired. Send resume to Alfred Antlitz, Chief Engineer, WFMT, 221 N. La Salle Street, Chicago, Illinois, 60601.

Experienced engineer, 1st phone. Openings immediately. Send complete experience and references. Contact Chief Engineer, WIBC, 2835 N. Illinois St., Indianapolis, Indiana.

1st phone—beginners accepted. Must have car. Salary open. 5kw AM, 50kw FM Stereo. Can attend local University if desired. Box 367-18, % BM/E.

Need qualified first phone operator for maintenance, some announcing. Contact WSYB, Rutland, Vermont.

Experienced announcer for 5,000w adult NBC station in hunting, fishing, skiing area. Send photo, resume, tape, Box KK, Twin Falls, Idaho.

Wanted—1st Class Engineer-Announcer, Radio Station WNKY, Box 248, Neon, Ky.

Engineer for transmitter. Will train beginner. WAMD, Aberdeen, Md.

EQUIPMENT WANTED

Wanted: Two, 504-R Power amplifier tubes . . . replacements for 7026 tubes in Federal 3-KW FM transmitter. John McAdam, % KLBS, P.O. Box 672, Los Banos, Calif. Telephone 209-826-4996.

Magnecord PT6 amplifier and PT6 tape mechanism. Must be in excellent condition. LaVern Garton, WMNE, Menomonie, Wisc.

We buy worn-out oscillating tubes, 10 kw and up. We pay freight, Sharon Machinery Company, 49 Gilbert, Quincy, Mass. 02169

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References. Telephone Services of Ohio
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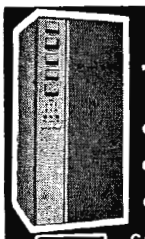

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For Sale: Eighteen 19½ foot lengths of Prodalin 3⅛-inch, 50 ohm transmission line, flanged on both ends. Condition excellent. Price $100 per length, FOB Medford. Contact Ellis Feinstein, Chief Engineer, KMED-TV, Medford, Oregon.

RCA TK30, TK31 field cameras. Mobile unit, complete with three RCA TK31's switcher, sync equipment, monitors. Excellent condition. Sony PV100 tape recorder and other items of excellent value. Box 367-20, % BM/E.

EQUIPMENT FOR SALE (cont'd.)

AMPEX 600 SERIES USERS, gain up to 20 db S/N ratio using VIFKIT 10001 6F5 replacement adaptor containing selected (for low noise) 7025. For postpaid delivery send check for $10.00 each to VIF INTERNATIONAL, P.O. BOX 1555, MOUNTAIN VIEW, CALIF. 94040.

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TUBES—Complete Stock From #10 to #89, 1AB5 to 38022, OC3 to 117z6, and most of the rest. List free. Harold Goldman, 43 Clinton Ave., Rockville Centre, N.Y 11570—Phone 516-536-6697.

Broadcast equipment bought, sold and traded. Ampex, McIntosh, Crown, Gates, etc. Leasing and financing available. F.T.C. Brewer Company, 2400 West Hayes Street, Pensacola, Florida.

AMPEX, 351 Full Track Mono (NEW). $1,450.00; MAGNECORDER, PT6a Full Track Recorder. $175.00; AMPEX 300 Full Track Mono in console. $1,200.00. Write, wire, call: M & M Tape Corporation, P.O. Box 6636, Birmingham, Alabama 35210.

REVERBERATION UNITS (HAMMOND) all models and types. Available without electronics. Write for details, specifications and prices. Harvey Organ Electronics, P.O. Box 268, Harvey, Illinois 60426.

Multimeter—Simpson 266 VTVM $19.00 Guaranteed. Large variety of test equipment on hand. Electronic Trading Post, 43 Clinton Avenue, Rockville Centre, N. Y.

For Sale: Westinghouse FM-10, 10 KW FM amplifier W/P.S., spares, manuals. $750.00 FOB. Might trade for studio equipment. J Feasel, 2757 Woodland Avenue., Columbus, Ohio.

New and Reconditioned Remote Pickup and 2-way radio equip., Fire and Police Receivers. All brands and models. Sales Manager, Box 738, Phone 817-594-5171, Weatherford, Texas.

Microwave Antenna with passive reflector Andrew P10-37. Electronic Communications, M.P.O. Box 567, Springfield, Missouri, telephone 869-4738.

238 ft. insulated, self supporting tower. Republic Steel Corp. Truscon model H-30, with beacon and lights. Dismantled $7,500.00. WWLA, La Crosse, Wisconsin.

SIGNS, NAMEPLATES, LABELS, Decals, Badges, Trophies, Plaques. Seton Corp., Dept. BME, New Haven, Conn. 06505.

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee.

SPOTMASTER CARTRIDGE EQUIPMENT, QRK turntables, will take any trade. AUDIOVOX, 4310 S.W. 75 Ave., Miami, Florida.

Nems-Clarke FMR-101 FM Rebroadcast Receivers. New. Limited Quantity Available. $450. Vitro Electronics, Jesup-Blair Drive, Silver Spring, Md.

For sale: 2-150 ft. galvanized self-supporting AM towers. Good condition. Call or write Louie W. Queen. Antennna specialist, 201 Barron Street, York, South Carolina. 684-3381.

New & used tower ground wire available. Bill Angle, Box 55, Greenville, N. C. Tel. 752-3040.

Ampex, other equipment. Buy, sell, trade. Write for listing. M & M Tape Corporation, P.O. Box 6636, Birmingham, Alabama 35210.

1 Ampex 450, Magnecord 414. Seeburg 200. G.E. 10 watt, 2,000 mcs. transmitter & receiver. Box 367-15, % BM/E.

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AMPEX HEAD ASSEMBLY RECONDITIONING SERVICE for all Ampex professional model recorders. This professional service features precision relapping of all heads for maximum head life. Your assembly is thoroughly cleaned and guides are replaced as required. Price includes optical and electrical inspection and complete testing on Ampex equipment in our plant. Full track or half track assemblies . . . $35.00. One to two day service. "Loaner" assemblies available if necessary. LIPPS, INC., 1630 Euclid Street, Santa Monica, California 90404. (213) EX 3-0449.

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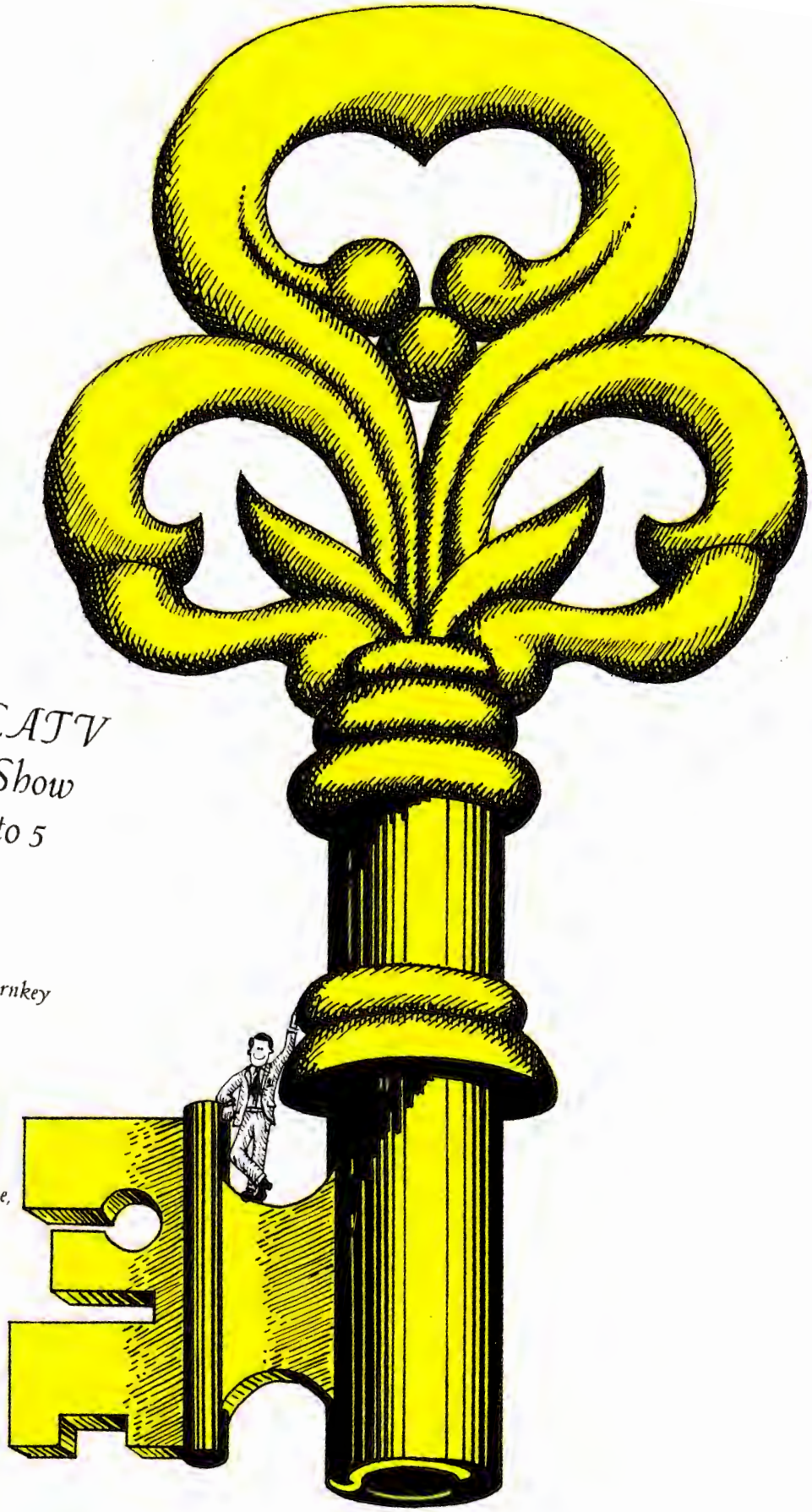

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ENGINEERING
CASEBOOK

KTLA's "Ready-Standby" TV Transmitter

KTLA, LOS ANGELES, has become the first West Coast TV station to operate RCA's "working standby" 25 kW transmitter system which makes use of two transmitters in parallel to eliminate effectively any loss of air time. The channel-5 station broadcasts from a site on Mt. Wilson with a peak transmitter power output of 17.6 kW visual, which produces peak erp of 50.1 kW visual.

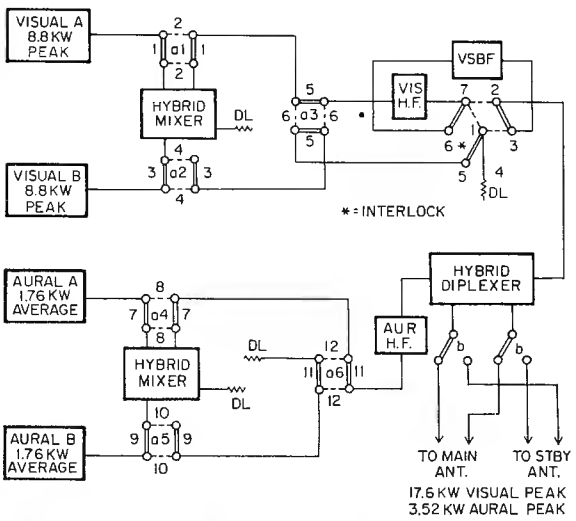
Automatic Switching

In the parallel arrangement (see Fig. 1), the transmitters operate independently. In the event one transmitter fails, the station continues on the air with reduced power (¼ normal power) but with no deterioration in picture quality. Only viewers in outlying areas would notice the effect of this reduced power. John D. Silva, KTLA chief engineer, reports that since the new transmitter has been in operation the station has not lost any air time. Also, he reports that transmitter performance has exceeded published specs and differential phase and gain are generally in the 2° and 5-percent ranges, respectively. Basic transmitter equipment is designed to handle color, and includes two TT-12BL vhf transmitters equipped for the addition of remote control. For parallel operation, the system provides for each exciter to be switched as a unit, with visual and aural outputs switched simultaneously. Either exciter can serve as the main exciter for a particular day of operation.

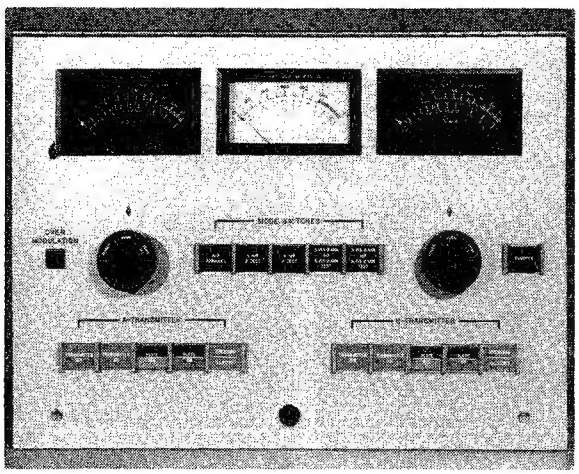
The system provides automatic switching to the alternate exciter in the event of a signal loss from the main exciter. An alarm circuit indicates by light and buzzer when the changeover has occurred. The exciter switching unit is mounted in a side cubicle of the left transmitter for ease of access without interruption of service. Because exciter changeover occurs rapidly, transmitter power output is continuous during the changeover period. Also, the unused exciter output may be patched to the visual and aural transmitters assigned to maintenance. During normal operation, each power splitter receives signals from the exciter in use and in turn feeds the respective aural and visual transmitter rf inputs. Each transmitter is capable of operating satisfactorily with maximum possible output from its respective splitter. In addition, each splitter has associated with it a reject load to accept power resulting from any imbalance of load conditions on its two associated amplifiers.

Visual and aural rf line stretchers are manually-operated, continuously variable trombone types and are mounted in the cubicles with the power splitters. A hybrid coupler combines output signals from the two visual transmitters, and an identical coupler combines output signals from the two aural transmitters. Each hybrid coupler provides both a main output (to which the combined power is delivered) and a reject load output (to which very little power normally is delivered, but to which half the power of one visual transmitter may be delivered if only one transmitter is operating). Air-cooled reject loads, one for the visual and one for the aural combining coupler,

(Continued on page 92)



Simplified block diagram of the rf switching system used in parallel transmitter operation at KTLA.



System control panel, with mode switching arrangement pushbuttons at bottom, left and right.

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each have a 5-kW power handling capacity in continuous operation. A meter across each reject load indicates the full capacity of the load. This meter may be switched to a more sensitive range, and the very low power delivered to the load in normal operation can then be read directly on the meter scale.

Switching Modes

The transmitter output system may be switched by pushbutton (Fig. 2) to provide the following configurations (or control modes):

1. Normal parallel operation of respective visual and aural transmitters;
2. Transmitter A on-air; transmitter B, maintenance;
3. Transmitter B on-air, transmitter A on maintenance;
4. Transmitter A visual and transmitter B aural on-air.

To accomplish any desired switching, all that is required is for the operating engineer to decide which configuration he needs and to push the appropriate button. From that point on, the changeover is completely automatic. The system shuts off high voltage on both transmitters, and motor-controlled rf coax switches are actuated. When the system has completed this sequence, ready lights indicate that power can be reapplied.

When one transmitter goes out, power drops to one-quarter of normal and is brought up to one-half normal power by switching to modes 2, 3, 4 or 5. Switching to any of these modes causes the hybrid coupler to be bypassed. Transmitter output power then goes directly to the antenna through the harmonic and vestigial sideband filters, eliminating the quarter power drop in the dummy loads associated with the hybrid couplers. The entire switching sequence takes less than three seconds to complete. This gives the engineer considerable leeway in choosing an opportune time to make the changeover to half-power operation. The transmitter control and mode switching system has a built-in memory so that the switching arrangement chosen remains constant, even if power is removed and then later reapplied. When power is returned to the switching circuit, the transmitter's operating status is immediately indicated on the control panel. ●

* See ad also in BROADCAST EQUIPMENT BUYERS GUIDE

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MEMO

TO: General Manager

FROM: Director of Engineering

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2. All the peripheral equipment—machine control interfaces, video and audio switching gear, etc.—comes with it.

3. Most important—it works! It's made by Sarkes Tarzian, Inc. in Bloomington, Ind. They're the only ones I've found with actual computer experience in broadcasting—in both large and small stations. This 4th generation model of theirs has all the bugs worked out. Looks like they meet our basic criteria: they've got the experience, the equipment, and they've applied both.

What do you think?