A MACTIER PUBLICATION / DECEMBER 1967

BM/E

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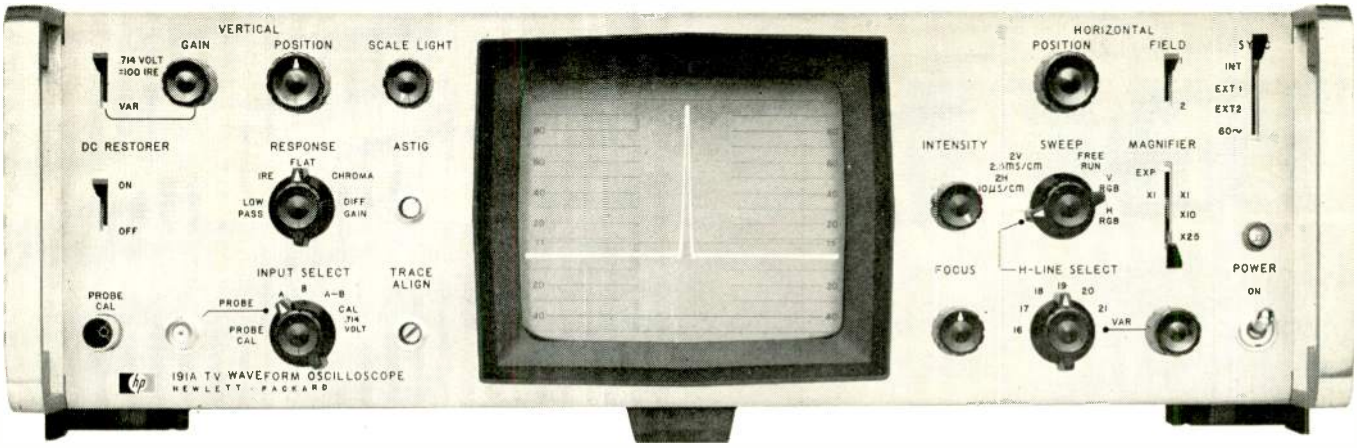
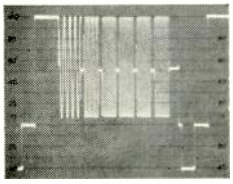
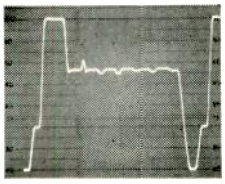


Sine-squared T/2 pulse in Flat Response position magnified X25.

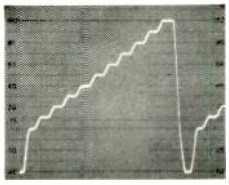
IMPROVE BROADCAST QUALITY — MAKE ACCURATE, RELIABLE VITS AND COLOR SETUP MEASUREMENTS



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.

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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 R

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DECEMBER 1967/VOLUME 3/NUMBER 12

BM/E

BROADCAST MANAGEMENT/ ENGINEERING

This month's cover: Recording and reproducing have come a long way since the days when this month's cover photos were taken (from RCA archives). However the production problems facing the first monauralists were hardly more challenging than those facing stereophonists today, as the article on page 33 indicates.

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You sure are a tough audience!

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BROADCAST INDUSTRY NEWS

Portable Color Cameras –Philips, RCA, Ampex

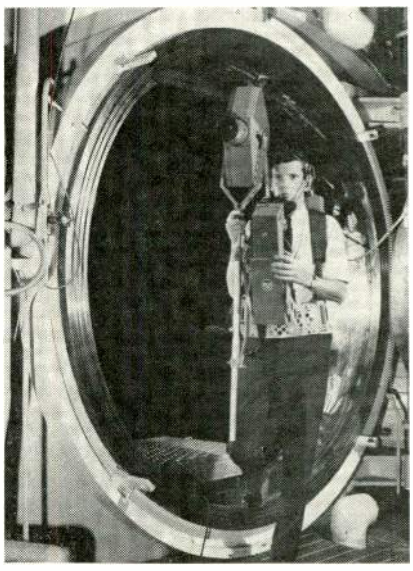
Man-pack portable color television cameras have been announced both by Philips Broadcast Equipment and RCA. Philips Broadcast's camera was privately shown in September and October, and was on display at the National Association of Educational Broadcasters Conference. Called the Norelco PCP-70, the three-tube Plumbicon color camera is essentially a repackaged but lightened (44 lb) PC-70 and connects to the standard PC-70 camera control unit. [Ampex entry on p. 62.]

The three major networks will use the new camera in covering the 1968 political conventions according to Philips. Vice president John Auld said delivery of the new cameras is scheduled to begin in early 1968.

The RCA color camera was designed primarily for astronaut use in space exploration purposes, but could be adapted to broadcast application. It produces standard NTSC color signals. The unit is heavier than the Norelco camera —56 pounds—but this weight includes a battery and transceiver. Three one-inch vidicons are used, compared to the more sensitive Plumbicons in the Norelco unit. The camera was unveiled at the American Institute of Aeronautics and Astronautics Technical Meeting, Anaheim, California, October 23.

The Norelco PCP-70, dubbed the Little Shaver by Philips, will sell for $41,000, including camera head and electronic viewfinder, lens, electronic back pack, harness and interconnecting cable. (Not included in this price is the camera control unit since such units are already available at the over 100 broadcast facilities now using the PC-70 color cameras.) The price of the RCA camera has not been revealed.

The Norelco PCP-70 does not operate remote in the sense that the RCA camera does in that it must be connected by cable to the camera control gear. Up to 3000 feet of standard color camera cable can be used between the back pack and camera control unit.



Left. Prototype version of the 44-pound Norelco PCP-70 portable color camera which produces broadcast quality signals equivalent to that of the PC-70.

Right. The RCA camera with power supply and transceiver weighs 56 pounds and was designed for space exploration by astronauts. Camera produces NTSC standard color signals.

Philips Broadcast's ability to convert the PC-70 to an equivalent man-pack PCP-70 lay in the simple design of the PC-70 optical system and the fact that only three tubes are necessary. The sealed, integral prism and dichroic layer assembly feeds directly to the pickup tubes in the camera head. The camera head contains the identical yoke and first pre-amp found in the PC-70. The second pre-amp of the PC-70 was modified to become a second module card in the yoke pre-amp assembly. The camera head weighs 23 pounds. The back pack contains the three horizontal deflection amplifers, the horizontal oscillator, dynamic focus, and blanking generator modules and interphone amplifiers now found in the PC-70. The back pack weighs 10 pounds. The viewfinder of the PCP-70 is a new separate small unit weighing 3 pounds attached to the harness pack weighing 9 pounds.

The RCA color camera is an entirely new camera which uses integrated circuits to achieve its light weight. In the fully portable model a battery capable of powering the camera for one hour is used. The camera transmits to the base station on a 13GHz fm carrier. Green signal is dc to 4 MHz with sync. Red and blue signals are 2.5 MHz on a 5.45 MHz subcarrier. The vestigial sideband contains operator audio. The base station to camera link operates on 950 MHz and carries sync, voice and remote iris signals. Signal to noise is 36 dB luminance for a 70 ft-candle scene.

NAFMB Announces Periodicals

The National Association of FM Broadcasters has launched a series of five monthly publications to members, it was announced recently by Abe Voron, NAFMB president.

"The series is a major undertaking to keep members abreast of developments in five areas of fm operations," Voron said. Including

Maybe our microwave STL system can put you in clover. Its color performance exceeds FCC, EIA, and CCIR. Its reliability can't be beat, and maintenance is negligible. The reason . . . our all-solid-state design. No tubes, no mechanical relays, no klystron.

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a "Washington Report," the series also will contain newsletters on management, engineering, promotion and programing.

Buyer's Market Now In Color Cameras?

For the first time since the color boom commenced signs are appearing in the industry indicating that it will be a buyer's market from here on in. No longer need one buy from the supplier that offers the shortest delivery time *after six months.* Nor does one have to piggy back on his camera order other items to make him an attractive customer.

One sign is advertisements and news releases indicating how fast this station or that got on the air after receipt of order. Ample evidence also was seen in October at the 17th Annual Broadcasting Symposium in Washington. Visual Electronics; salesmen and Philips Broadcasting (Norelco) spokesmen reported that from here on in it's really a competitive sale and good delivery is not the big factor. An RCA spokesman would not go as far as to indicate that cameras were actually in stock but volunteered that the availability picture had eased considerably and delivery really is no problem in closing a sale.

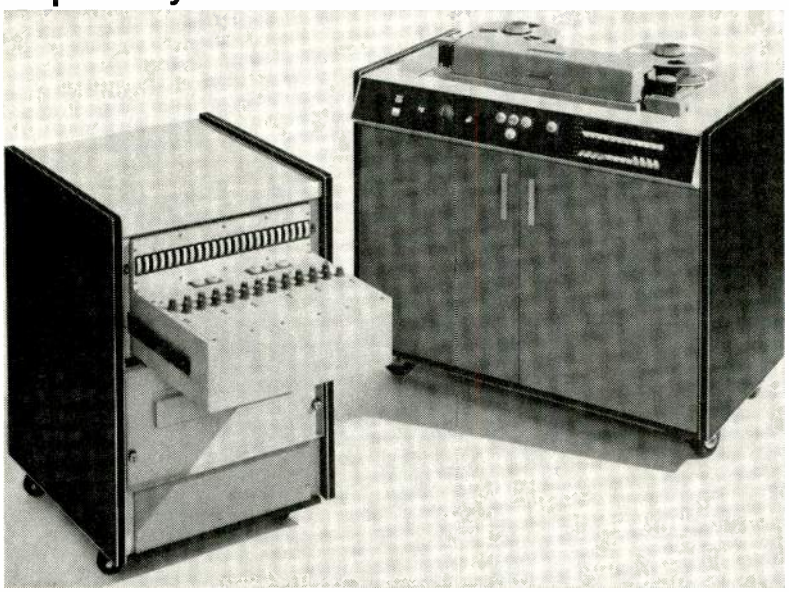
GE Marketing Manager Mat Ceterski confirmed that camera vendors were locking horns now on just about every sale. He did not envision any price cutting occurring, however, which has been occasionally rumored.

The shortened lead time is partly the result of slackened demand but does not in any way indicate that sales have reached a saturation point. It's simply that production output is now in full gear. The three big producers are capable of producing over 300 cameras each per year. Stations in the top 25 markets were the first to go color but even these stations' needs are not satiated. Initial orders of one to three cameras are being followed up by orders for two to three more. Growing emphasis on news and sports has stepped up the demand for field units.

As competition increases, speculation again arises on which make to purchase. If the buyer has a real choice he can be choosy. Is the four-tube camera better than the three-tube one? If four-tube, Plumbicon or image orthicon? Charles Spicer, engineering vp of Visual, says the color quality of all cameras is about equal. "We're selling on the basis of why buy and maintain four tubes when three will do the job." The competition says that's an obvious line to take but quality is not the same. The fact that NBC Network recently bought PC-70's for its own sports coverage helps the three-tube advocates.

The relative merits of three-tube versus four are apparently not clear on the other side of the Atlantic either. The conservative and circumspect Sir Francis McLean, director of engineering, BBC, told luncheon guests of the 17th Broadcast Symposium that the BBC is undecided as to preference for the three-tube or four-tube cameras. He said, "At the present time all our cameras are using Plumbicons. How long this will continue, however, I wouldn't like to say."

The Conductor Hears Everybody . . . Separately!



"Play it like it is, man. If the maestro doesn't like your track, you'll be in here tomorrow playing your bit over wearing headphones." That excerpt of dialogue could be one musician's sage advice to another once the recorder in our photo gets into general use. The equipment, made by Ampex, is intended for master recording studios, and permits each instrument or group of instruments to be recorded separately on two-inch-wide magnetic tape. Balancing and blending can be achieved after the musicians have left, allowing conductor and engineer to work out precisely the sound they want, and more time for musicians to perform at each recording session. If one musician makes a clinker, or if an instrument or vocalist is not present at the time of recording, that single track can be recorded at a later date. The consolette in the foreground features remote control for stop/start and fast forward/reverse, attenuators and vu meters for playback gain control to provide a post-mixing capability. Price of the 24-channel version is $32,000; 16-channel model, $24,950.

Cronkite Takes Execs To Task on Newscasts

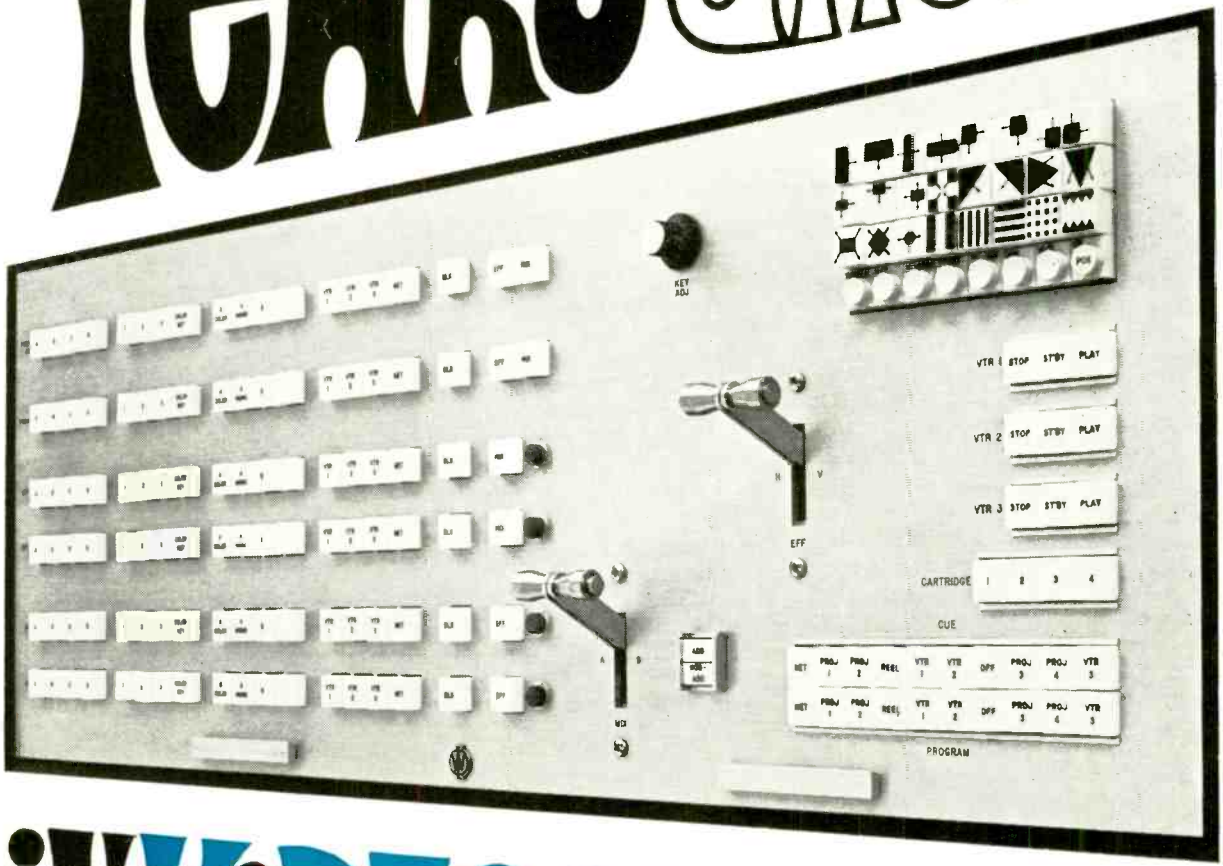
"I am a newsman first," is a quote from CBS's much-admired news maverick, Walter Cronkite. "And after that I am a television newsman. I am not a TV producer, nor can I be bought as such," he asserts.

He told an audience of representatives of hundreds of local TV stations throughout the country gathered in New York late in October that he was not much of a speaker, but he had a few questions to put to them. For instance, he wanted to know why local TV news coverage was being so woefully mishandled.

After reminding them of their responsibility to their community in giving comprehensive local coverage, Cronkite pointed an accusing finger at the local electronic news and particularly tandem telecasts where local and network news come back to back.

He emphasized the inexcusable

YEARS AHEAD



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and very familiar habit of using the same national and international news on both shows, and used newspapers to point out its shodiness.

"Does this really make sense?" he asked. "What would the reader of a newspaper think if his editions regularly covered the same stories, sometimes in identical form, on page 1 and page 12? Wouldn't he think some editor had lost his marbles?"

Cronkite also asked the gathering why so many stations simply ignored the news on weekends . . . why with all the things happening in the world some 70 to 80 stations in the CBS network alone chose to skip the Saturday and Sunday newscasts. And, he noted the same condition exists with ABC and NBC.

"Is it," he asked, "because none of these six network news broadcasts is very good or very interesting? . . . Does national and international news really take a holiday?"

Speaking about the nonapplicability of Nielsen ratings to news Cronkite states "I can double our ratings in a week, then listed the types of stories that would do it: "rape, adultery . . . and the peccadillos of cafe society."

But, he continued, television's national newscasts will not prostitute themselves on the altars of the survey services. He pointed with pride to the responsibility of network news operations and wondered if local newscasts would emulate it, or abdicate to the surveys and the salesmen.

Low Cost Color CCTV System

A new 3-vidicon color television camera, demonstrated early in October in San Francisco by International Video Corp. of Mountainview, Calif., provides color in closed-circuit applications at a cost comparable with that for monochrome. The camera was developed with the specific objective of bringing color within the economic reach of CCTV users in the medical, educational, and commercial fields. A system costing only $15,000, including the camera, can produce CCTV color pictures *subjectively* equivalent to those from a $150,000 professional system.

The advent of the new camera, it was noted by IVC President Donald F. Eldridge (a founder of Memorex Corp.), is both a technical and an economic breakthrough. It follows the introduction earlier this year by IVC of the first NTSC color recorder for closed-circuit television—the IVC-800 which is now being produced and marketed. The camera, designated the IVC-100, together with the recorder, make use of all solid-state circuitry and compact design to provide full portability. Total weight of both units together is under 100 pounds.

The camera, during the demonstration, displayed good color fidelity and provided quality pictures at light levels on the order of 250 fc. Resolution is 400 lines at center and corners. A six-to-one zoom lens is available for the camera, which is self-contained, including color encoder. The design emphasizes simplicity of operation,

with a minimum of controls and adjustments. The price is $9850; price for the color recorder is $4200.

NAB Fall Conference Fall-out

The endless succession of outside challenges facing broadcasters is a measure of their success, said NAB President Vincent T. Wasilewski at recent regional NAB fall conferences in Atlanta, Dallas, and Washington. He enumerated: interpretation of the Fairness Doctrine, requirement of free time for political candidates, performers and record manufacturers who seek unjustified payment by broadcasters, and those who seek unlimited and unrestricted CATV systems. He urged broadcasters to tackle the problems with "all the dedication and diligence of which we are capable . . . ."

At the Washington conference, Douglas Anello, general counsel of NAB, said that "a wired system is a distinct possibility and completely feasible" within the next ten to 20 years. Since broadcasting does not have to be tied to frequency, it seems logical in the future that broadcasters as well as CATVers may be feeding programs to large urban areas via cable. He added that Congress, in keeping with past policy, would be likely to demand separation of control over the distribution system and the information going over it. The audience, including other NAB officials disagreed with one another about the future role of wire and satellite broadcasting.

At the same meeting, FCC Commissioner James J. Wadsworth appeared to endorse censorship when he said it was probably wise not to send cameras to cover the recent Pentagon protest. He praised the nation's broadcasters for their coverage of recent anti-war demonstrations and cautioned against strident news reporting using such devices as echo chambers and simulated Morse code in reporting such events.

Also in Washington, William L. Walker, of the NAB, predicted a rosy future for uhf after having undergone many trials. There are now 128 uhf stations in operation, he said, and 151 construction permits for uhf pending before FCC. He pointed to the recent sale of a uhf outlet for $6,850,000 as an indication of the optimism in the industry.

The group also saw a demonstration of the NAB's new subjective loudness reference tape which provides stations with an excellent way of complying with FCC pre-screening requirements as an interim step while awaiting the development of more precise instrumentation.

During radio sessions in Atlanta, Elmo Ellis, general manager of WSB, Atlanta, said middle-of-the-road programming was more effective when it was not too middle-of-the-road and somewhat unpredictable and original.

PSA Rules Affirmed, Changes Considered

Regulations setting new requirements for standard broadcast stations operating prior to local sunrise, have been upheld by the FCC in an action ruling on 23 petitions for reconsideration. (See p. 18, Oct./67 *BM/E.*)

The Commission, in affirming the June 28 Report and Order, indicated that an effort will be made to redefine the 6:00 A.M. PSA sign-on in terms of prevailing local time rather than standard time, thereby making possible a uniform, year-around 6:00 A.M.

sign-on. The applicability of the Canadian agreement to U.S. Class II stations assigned to U.S. I-A clear channels will also be discussed with Canada. In addition, the Commission established the following guidelines for handling waiver requests accompanying PSA proposals:

a) Waiver requests for power in excess of 500 W will be considered on the basis of a showing of conventional domestic nighttime protection, in addition to the usual foreign protection showing.

b) Waiver requests for sign-on times earlier than 6:00 A.M. will be denied, since the Commission cannot unilaterally depart from the Canadian agreement.

c) Waiver requests premised on equipment considerations will be denied. Since the necessary kits have not been available from manufacturers prior to the October 28, 1967 deadline on most "permissive" operations, improvised methods of power reduction (other than that described in the PSA request) may be used on a temporary basis, if *promptly* reported to the Commission.

d) PSA proposals by the following ineligible classes of stations will be denied: Class I-B and Class IV stations, as well as Class II stations assigned to foreign I-A channels.

e) Action of PSA proposals by Class II stations will be withheld pending outcome of the Further Notice of Proposed Rule Making simultaneously adopted in Docket 17562. Radio stations WHCU, Ithaca, New York, and WHLO, Akron, Ohio, are in this category.

f) Action on PSA proposals involving U.S./Canadian co-channel separations of less than 100 miles will be withheld, pending consideration by Canada.

g) Waiver of the remote control requirement that meter readings at the transmitter be taken and logged within two hours after each pattern change, will be considered on an individual basis.

h) Waiver requests involving first class operator requirements will be denied.

In view of the stay order recently obtained by radio station WBEN, Buffalo, New York, from the U.S. Circuit Court of Appeals in New York, further action is being withheld on those PSA proposals, which would, if granted, cause interference to WBEN's licensed nighttime operation on 930 kHz, until WBEN, Inc. vs. U.S.A. & FCC (Case No. 31688) is decided on its merits. The existing "permissive" operations on this channel may, however, be continued beyond October 28, 1967, but with time and power adjusted after that date to comply with the Canadian agreement.

BUSINESS OF ETV

Raytheon Gets Contract For Tennessee ETV Microwave Link. Raytheon Company has been awarded a contract by the Tennessee State Department of Education to supply and install microwave relay equipment for the state's expanding educational television network.

The Raytheon Company equipment will link station WKNO in Memphis and station WLJT in Lexington, Tennessee—the first step in an expanding ETV network that will cover the entire state. The equipment will be similar to those supplied by the company to other state networks including those of Maine, North Carolina, New Hampshire, Vermont and New York. The company is now also fulfilling orders from Oklahoma, Alabama and Minnesota.

One-third of U.S. Colleges and Universities Receive $710.7 Million For Year Ending June 30. More than 800 colleges and universities in the United States—about one-third of the total—received Federal aid to build or remodel classrooms, laboratories, and libraries during the year that ended last June 30, Wilbur J. Cohen, Under Secretary of Health, Education, and Welfare, announced recently.

Grants and loans totaling about $710.7 million were made to 877 colleges, universities, and branch campuses under the Higher Education Facilities Act of 1963 was the first in a series of landmark educational measures enacted during the 1960's.

Maryland ETV To Be Full Color. Dr. Frederick Breitenfeld, Jr., executive director of the Maryland Educational Cultural Broadcasting Commission, was the featured speaker at the October dinner meeting of art supervisors and instructors from all Maryland counties in Hagerstown. He announced in a dinner speech the intention of the Maryland ETV network to broadcast in full color.

Alabama Educational Television Commission Requests Funds. The Alabama Television Commission has requested $3.5 million dollars, in matching funds, from the Public Television Corporation for "expansion and improvement of the Alabama ETV Network's facilities."

Plans are for the money to be used for studio equipment and construction of two transmitting stations.

The studios, included in the request program for the ETV Network, are maintained by Birmingham Area ETV, Alabama College at Montevallo, State Department of Education, Huntsville City Schools and Mobile Board of City Schools.

The new transmitting stations, which will bring the network's total to nine channels, are to be built in Barbour and Marengo Counties.

TV Program Series Available To Noncommercial Stations. *Chicago Festival*, a series of 20 television programs on the fine and performing arts, is being made available to all noncommercial (educational) television stations throughout the United States. The series focuses on the cultural life generated by groups and individuals that are part of or are on the Chicago scene and will feature such noted guests as poet and novelist Robert Graves, Pulitzer Prize-winning cartoonist Bill Mauldin, Dixieland pianist Art Hodes, and Chicago's renowned Hull House Theater.

The Educational Stations (ETS) Program Service of Bloomington, Indiana, will distribute the series.

BUSINESS OF BC

Jefferson Wire and Cable Merges With Okonite Co. Merger of Jefferson Wire and Cable Corporation, Worcester, Mass., into The Okonite Company, Passaic, N.J., subsidiary of Ling-Temco-Vought, Inc., Dallas, was completed late in October, according to a joint announcement.

Okonite shareholders approved the merger at a meeting on Oct. 9. Jefferson shareholders approved it the previous week.

Paul Dashine, Okonite president, said Jefferson's business will

Continued on page 66

INTERPRETING THE

FCC RULES & REGULATIONS

Cigarette 'AD' Ruling and Its Effect On The Fairness Doctrine

ON SEPTEMBER 8, 1967, THE COMMISSION adopted a Memorandum Opinion and Order (RM-1170, FCC 67-1029) applying the Fairness Doctrine to cigarette advertising. Initially, the Commission had issued its ruling on June 2, 1967, in a letter to WCBS-TV in New York City. It followed a complaint from Mr. John Banzhaf, III, stating that the station had not afforded him or some other responsible spokesman an opportunity to present "contrasting views" on the subject of cigarette smoking after having presented numerous cigarette commercials.

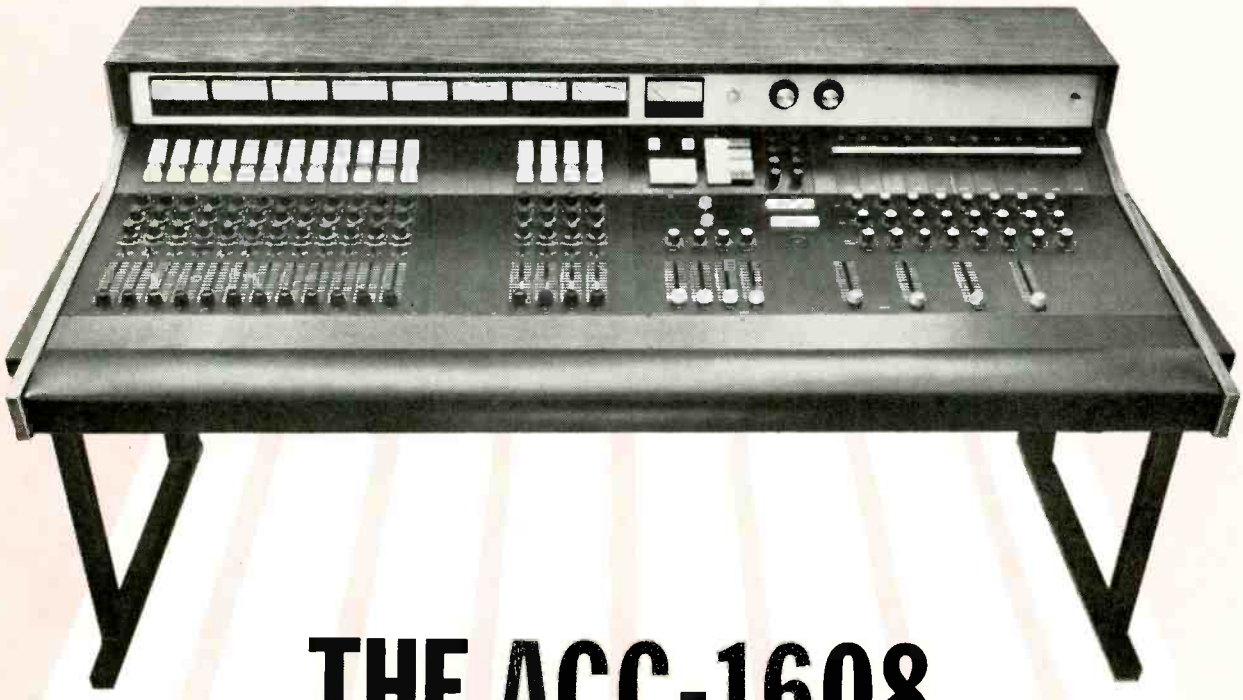
In turning down numerous requests by various parties for reconsideration, the Commission stated that the Fairness Doctrine may be appropriately applied to cigarette advertising; the ruling implements the policy of Congress as embodied in the Cigarette Labeling Act; other products are not affected by the ruling; it will not have an adverse effect on the broadcasting industry; *the ruling does not curtail cigarette advertising;* and it is the obligation of the licensee, operating in the public interest, to provide information pointing out the hazards of cigarette smoking if the station carries cigarette advertising.

WCBS-TV replied that it had presented programs providing contrasting views on smoking but maintained that the Fairness Doctrine did not apply to commercial advertising.

Arguments Against the Cigarette Ruling

The principal contentions against the merits of the ruling are: (a) that the Fairness Doctrine is itself violative of the First and Fifth Amendments to the United States Constitution and hence cannot properly serve as a basis for delineating licensee responsibilities under the Communications Act; (b) that the Fairness Doctrine, even if constitutional, applies only to programming in the nature of news, commentary on public issues or editorial opinion, and does not extend to advertising; (c) that even if the Fairness Doctrine properly applies to cigarette advertising, the Commission has invalidly made a blanket ruling that any cigarette advertisement *per se* presents a controversial issue of public importance, whereas no controversial issue of public importance can be presented where a lawful business is advertising a lawful product and, in the absence of any health claim in the commercial or affirmative discussion of the health issue, there is no viewpoint to oppose; (d) that the requirement that a significant amount of time be allocated each week to cover the viewpoint of the health hazard posed by smoking and the suggestion that a licensee might, *inter alia,* present a number of public service announcements of the American Cancer Society or the De-

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.



THE ACC-1608 "ON THE RIGHT TRACK"

DO AWAY WITH "TEMPORARY, HALF-FUNCTIONAL" SYSTEMS... THIS 8-TRACK AUDIO CONTROL CONSOLE DOES THE WHOLE JOB!

Up till now you 8-track people have had to make do with baling wire and chewing gum imitations of professional audio control console equipment. *No longer*. Electrodyne has specifically designed the ACC-1608 for your use. The same Electrodyne engineering and quality has been used in the ACC-1608 along with that *little bit more* that continually creeps into our products. For starters we designed the ACC-1608 to completely handle your 8-track recording. There are 16 microphone or line inputs, expandable to 20.

Complete 6 position equalization with echo send and cue on each channel is provided along with independent outputs for 8 channel, 2 channel and monaural. There are 2 stereo pan pots, illuminated pushbutton switches and complete monitor switching and level controls. Wrapping things up are the optional features. You name it, and you can have it! Sure, for a price you say...Try us on price, you'll find *baling wire and chewing gum* are much higher. Let the ACC-1608 get you *on the right track,* all eight of them.

Write or phone for complete literature on the ACC-1608 as well as the complete Electrodyne console and audio components line. Quotations on 12, 16 and 24 track consoles available on request.

ELECTRODYNE
10747 Chandler Blvd., North Hollywood, Calif. 91601
Telephone: area code 213/766-5602 or 213/877-3141
Cable Address: "ELECTRODYNE" North Hollywood, Calif.

Circle 9 on Reader Service Card

if CAS isn't shipping you new all-transistorized Channel Control head-end equipment you're missing a good deal

...AND HERE'S WHY

Plenty of reliability-conscious CATV operators already have discovered for themselves that the versatile new all-transistorized CAS Channel Control is their best buy in head-end equipment.

As a matter of fact, well over a hundred Channel Controls already are either in actual system operation or in various stages of installation.

The CAS Channel Control gives you 12-channel processing *without* demodulation plus duplication switching, local origination, remote emergency alert and "flash" announcement capabilities.

Multiple channel capabilities

But that's not all. The Channel Control is not limited to *just* signal sources available now because it is easily adaptable to process any number of channels or frequencies desired for future multiple channel systems.

Development and manufacture of Channel Control head-end equipment rounds out a total CAS capability to offer all-transistorized CATV equipment from head-end to subscriber TV set.

For example, CAS equipment made possible the first all-transistorized CATV system using heterodyne head-end equipment. This system, in Holdenville, Oklahoma, uses 11 CAS Channel Control head-end units including two for local origination, and other CAS transistorized equipment throughout the system.

Cost-savings and reliability, too

Here's what Mr. J. B. Krumme, (left), president of Holdenville Cable Co. has to say about all-transistorized Channel Control head-end and other CAS equipment in his system:

"We were quite pleasantly surprised that the CAS all-transistorized CATV Channel Control head-end and line equipment cost a little *less* than leading vacuum tube gear.

The increased reliability of an all-transistorized system should reduce downtime considerably and we are especially looking forward to taking advantage of the unique remote capabilities of the CAS Channel Control.

CAS's technical assistance in helping us engineer this all solid-state system was an extra benefit."

Write for technical data

If you're interested in a high reliability all-transistorized head-end capable of maintaining original sound and video quality from antenna, microwave or local origination sources, you'll want to write for pricing and full technical data on the CAS Channel Control.

You'll be glad you did.

CAS MFG CO

P. O. BOX 47066 • DALLAS, TEXAS 75247

214/BL 3-3661

Circle 11 on Reader Service Card

partment of Health, Education and Welfare, will cause a debasement of the Fairness Doctrine generally and substitute Commission fiat for licensee judgment; (e) that the ruling cannot logically be limited to cigarette advertising alone; (f) that the ruling will have an adverse financial effect upon broadcast licensees by causing the cigarette industry to turn to other advertising media and will also have an adverse effect on the sale of cigarettes; and (g) that the ruling is in any event procedurally invalid for failure to accord interested persons an opportunity to be heard prior to the issuance of a novel and unprecedented policy determination.

Those parties claiming that the Fairness Doctrine is violative of the First and Fifth Amendments to the Constitution were answered by the Commission in Docket No. 16574, *In the Matter of Amendment of Part 73 of the Rules to Provide Procedures in the Event of a Personal Attack of Where a Station Editorializes as to Political Candidates.* (See Nov. 1967 *BM/E* article "The Personal Attack Rules.") By a Memorandum Opinion and Order released on July 10, 1967, in that docket (FCC 67-795), the Commission rejected the contention as to the First Amendment. For the reasons and authorities there set forth, the Commission adhered to that determination in this proceeding. The Fifth Amendment challenge was also rejected in *Red Lion Broadcasting Co.* v. *Federal Communications Commission,* Case No. 19,938, (C.A.D.C., decided June 13, 1967).

In contending that the Fairness Doctrine does not apply to advertising, the parties argue that the doctrine had its genesis in the 1949 *Report of the Commission in the Matter of Editorializing by Broadcast Licensees* (13 FCC 1246) which was meant to apply *only to dissemination of news, commentary on public issues, and editorial opinion because it contains no reference to advertising.* It was further urged that no mention of advertising was made in the 1964 Fairness Primer (29 F.R. 10415) and that the Commission has never interpreted the doctrine as applying to advertising. In addition, it was asserted that Congress, in giving specific approval to the Fairness Doctrine as a basic delineation of a standard of public interest in broadcasting in the 1959 amendment of Section 315(a) of the Communication Act (73 Stat. 557, 47 U.S.C. 315(a)), limited the scope of the doctrine to programming of that nature since it did not amend Section 317 of the Act to incorporate a similar provision. It follows, the parties stated, that the present ruling is an unprecedented extension of the Fairness Doctrine which is beyond the Commission's discretion or statutory authority.

Dialectic of The FCC

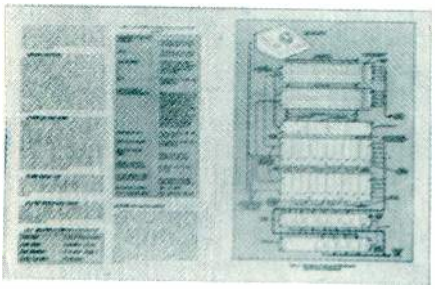
The Commission found otherwise. The Commission stated that the circumstance that Congress specifically incorporated the Fairness Doctrine into the 1959 amendment to Section 315 to make it "crystal clear" that the programming exemptions from the equal time requirement of that section did not exempt licensees "from objective presentation thereof in the public interest" does "not diminish or affect in any way Federal Communications Commission policy or existing law which holds that a licensee's statutory obligation to serve the public interest is to include the broad encompassing duty of providing a fair cross-

If you switch signals ...you need this book.

(It's FREE from DYNAIR!)

Yes, for a limited time only, you can receive a free copy of this helpful new book, with absolutely no obligation! Just mail the coupon.

Published by DYNAIR, the leading manufacturer of video distribution switching equipment, this book describes the most commonly used methods of switching video and other high-speed information.



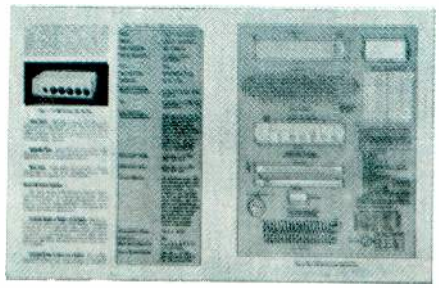
The photographs shown are sample pages reproduced directly from "Video Switching Techniques" and are typical of the material presented. Pictorial diagrams, supported by easy-to-understand text, charts and tables, make system design simple.

The book includes useful design information for a multitude of systems, both video and audio... simple and complex. (High-speed data can be switched using the same techniques.) It covers everything from a basic single-output monitor switcher to complex dial-controlled, solid-state switching systems which can control hundreds of inputs and hundreds of outputs. The problems involved in selecting the basic type of switcher for a particular application are discussed with the exact equipment detailed for many systems.

DYNAIR switching equipment is installed in numerous facilities throughout the world. We have supplied remote-controlled, solid-state systems with as many as 14,000 crosspoints. One system provided independent selection of 135 inputs by 390 separate monitor locations — probably the world's largest solid-state switching system.

The practical building-block construction techniques used in solid-state DYNAIR equipment allow systems of virtually any size to be easily assembled. Plug-in modular etched circuit boards are used throughout, assuring ease of maintenance. Custom control panels can be provided to suit almost any requirement.

DYNAIR also manufactures a variety of other television equipment,



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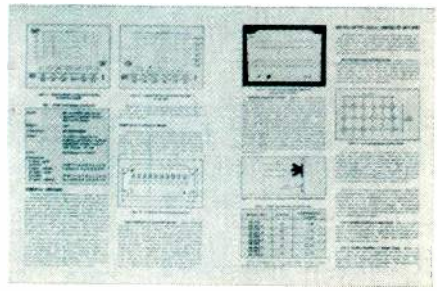


including solid-state modulators and demodulators, solid-state modular video amplifiers, and solid-state sideband analyzers.

If you use this type of equipment, you might like to receive either our complete catalog or literature on specific devices; DYNAIR product information is available upon request — just write, outlining your needs.

DYNAIR
ELECTRONICS, INC.
SAN DIEGO, CALIFORNIA

6360 FEDERAL BLVD. • SAN DIEGO, CALIF.
ZIP 92114 • PHONE (714) 582-9211

Please send me a free copy of "Video Switching Techniques"

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____

STATE_____ ZIP NO._____

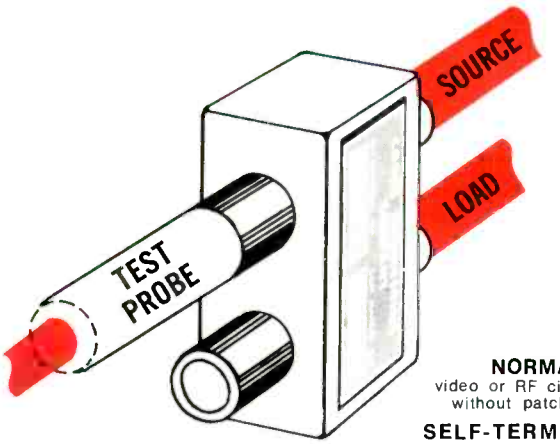
section of opinion in the station's coverage of public affairs and matters of public controversy." (S. Rept. No. 562, 86th Cong., 1st Sess., p. 13; 105 Cong. Rec. 14439.) Most important, the amendment refers to the obligation imposed upon broadcast licensees" . . . *under this Act* to operate in the public interest and to afford reasonable opportunity for the discussion of conflicting views on issues of public importance." (Emphasis supplied.)

The Commission further argued that it has always directed itself particularly to programming and advertising which bears upon public health and safety. The Federal Radio Commission denied a renewal of license to a station which broadcast a "medical question box" devoted to diagnosing and prescribing treatment of illnesses from symptoms given in letters from listeners—and from which the station received a rebate on each prescription sold. *KFKB Broadcasting Association* v. *Federal Radio Commission* (47 F. 2d 670, 671 (C.A.D.C.)). The Commission has similarly condemned advertising of alleged medical prescriptions and quack remedies which were deemed inimical to health, and granted renewal only upon assurances that such broadcasting would be discontinued. *Farmers and Bankers Life Insurance Co.* (2 FCC 455, 457-459). The Commission stated that "(a) broadcast station carrying such programs should be held to a high degree of responsibility, affecting as they may the health and welfare of the listeners, and careful investigation of such products, and of the claims made therefor, should be made before they are advertised over a broadcast station." (2 FCC at 458) See also *WSBC, Inc.*, 2 FCC 293, 294-296, and *Oak Leaves Broadcasting Station, Inc.*, 2 FCC 298 (both involving advertising of quack medicines by one not licensed to practice medicine).

In short, the Commission held that the licensee's statutory obligation to operate in the public interest includes the duty to make a fair presentation of opposing viewpoints on the controversial issue of public importance posed by cigarette advertising (i.e., the desirability of smoking), that this duty extends to cigarette advertising which encourages the public to use a product that is habit forming and, as found by the Congress and Governmental reports, may in normal use be hazardous to health, and that the licensee's compliance with this duty may be examined at license renewal time. (See 1960 Programming Policy Statement, 20 Pike and Fischer, Radio Regulation 1901, 1912-1913.) While the agency's position as to what the obligation to operate in the public interest required for cigarette advertising may have fluctuated over the years since 1929, the exercise of such authority in the present circumstances is plainly reasonable. Considering the 1964 Report of the Surgeon General's Advisory Committee, the establishment of the National Interagency Council on Smoking and Health and the enactment of Cigarette labeling and Advertising Act (Public Law 89-92, 15 U.S.C. 1331 *et seq.*) in 1965, and the recent Reports to Congress by the Federal Trade Commission and the Department of Health, Education and Welfare pursuant to that Act, it is not an abuse of discretion for the Commission to decide

Test probe permits sampling or testing of normal-through circuit without interruption of signal

The Coterm 22T accepts either standard BNC connectors or Cooke-built quick-disconnect connectors.

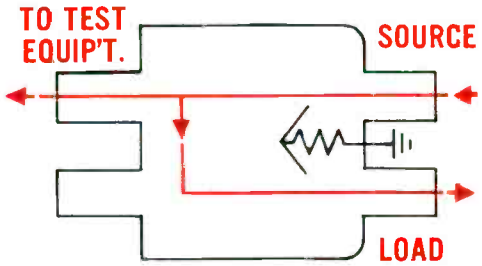


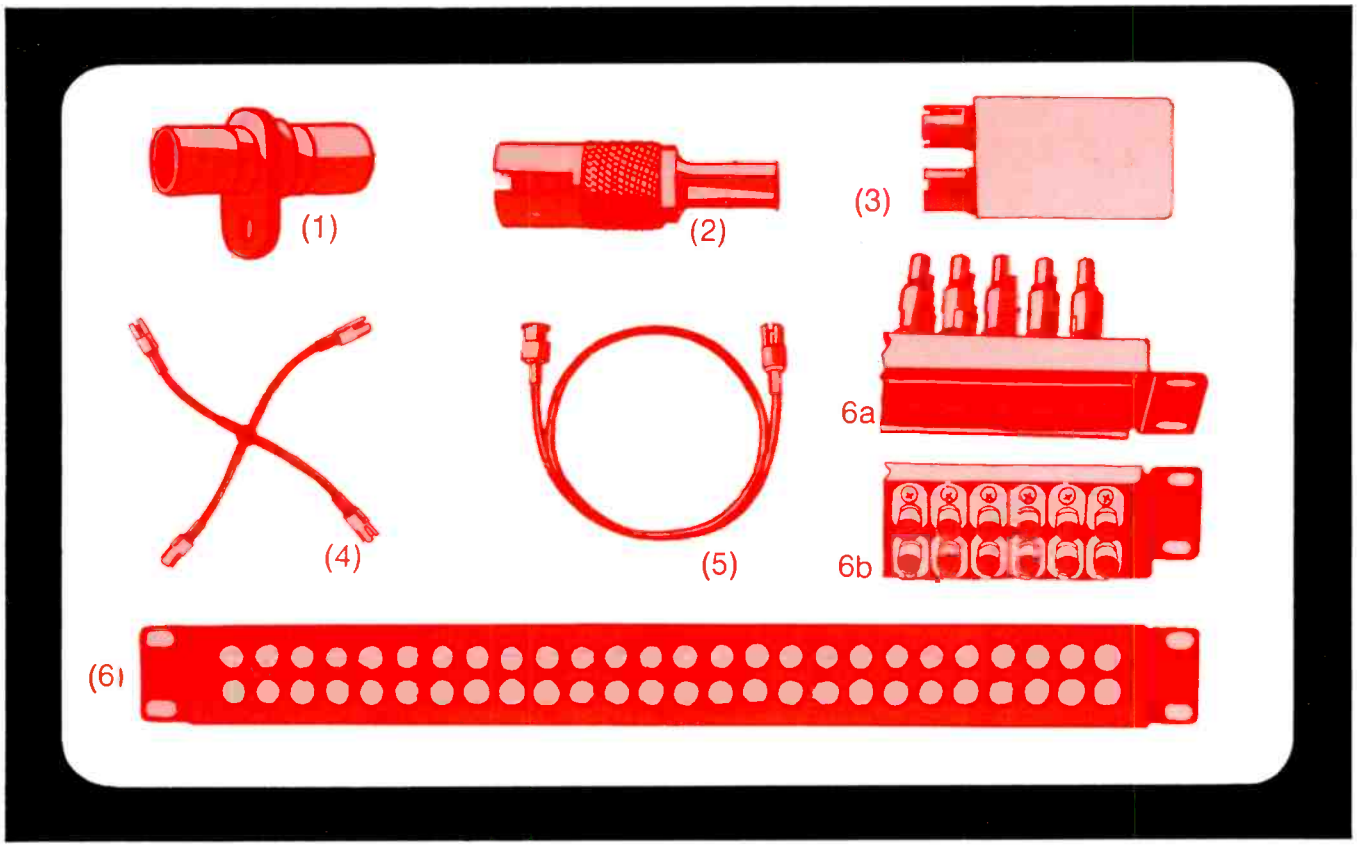
NORMAL-THROUGH video or RF circuit is provided without patch cords or plugs.

SELF-TERMINATION OF SOURCE without extra terminating plug when load side is patched. Patched in circuit feeds load.

TOTALLY FLEXIBLE PATCH FACILITY of extremely high density possible when patch cords are inserted on both sides.

COJAX® Model 22B. This normal-through coaxial switching jack is built to the same dimensions and standards as the Coterm Model 22T. It performs all functions except self-termination. It accepts the same equipment as the Coterm so can provide a mixed patch field.





Other Cooke Coaxial Switching Equipment Available

(1) Coaxial Patching Jacks. (2) Quick-Disconnect Snap-Lock Connectors*. (3) Quick-Disconnect Normaling Plugs. (4) Bridging Networks, four and five way (four way shown). (5) Test and Patch Cords. (6) Panels . . . 6a showing permanent cabling, 6b showing Coaxial Patching Jacks, (1) above installed.

For further information write . . .

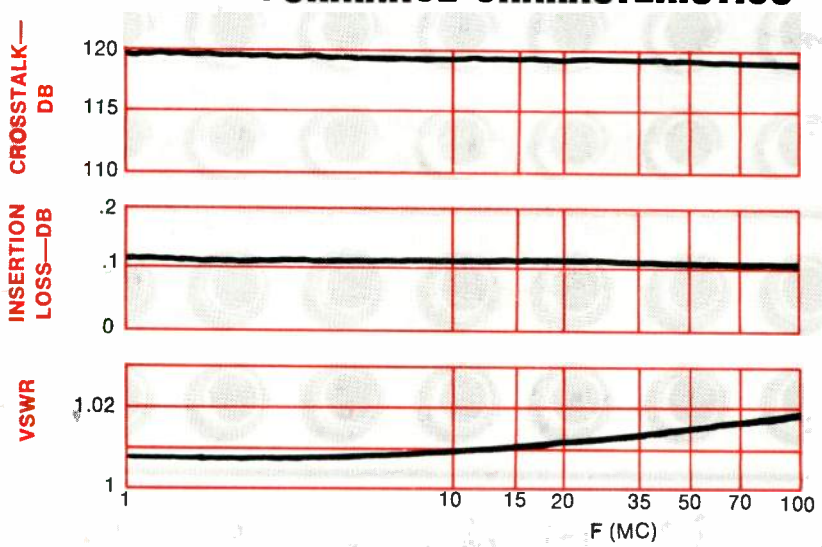
* Patented

COOKE
ENGINEERING COMPANY
735 N. SAINT ASAPH STREET
ALEXANDRIA, VIRGINIA 22314

Printed in the U.S.A.

a new concept & performance in coaxial switching

TYPICAL PERFORMANCE CHARACTERISTICS



ONLY FROM COOKE Coterm 22T a normal-through coaxial* switching and terminating jack.

* Patented

Complete compatibility and Cooke quality combine to make this coaxial switching equipment first choice for TV, radar, communication patching, data handling, etc. Advanced in concept, engineered for the utmost in reliability, it will provide years of dependable, economical service.

COOKE
ENGINEERING COMPANY
735 N. SAINT ASAPH STREET
ALEXANDRIA, VIRGINIA 22314

now that a licensee who presents programming and advertising which encourages the public to form this habit potentially hazardous to health has, at the very least, an obligation adequately to inform the public as to the possible hazard.

Summary

The Commission has ruled that (1) *the Fairness Doctrine applies to cigarette advertisements,* (2) *the ruling applies only to cigarette advertising,* and (3) *stations,* while not obligated to provide equal time for response, *must provide a "significant amount of time"* on a regular basis. The Commission stressed that implementation of its ruling would be consistent with the policy of the Cigarette Labeling Act, and that, as in other areas, the manner of compliance is left to the *good faith, reasonable judgment of the licensee.*

Violations Will Be Considered at Renewal Time

In denying the petitions for reconsideration, the Commission emphasized, " . . . we believe that the licensee's statutory obligations to operate in the public interest includes the duty to make a fair presentation of opposing viewpoints . . . posed by cigarette advertising (i.e., the desirability of smoking), that this duty extends to cigarette advertising which encourages the public to use a product that is habit forming and may in normal use be hazardous to health and that *the licensee's compliance with this duty may be examined at license renewal time* . . . It is our belief that the public interest standard and Fairness Doctrine have been embodied in this principle from their inception." (Emphasis supplied.)

Discussing the effect of the ruling on the advertising of other products, the Commission emphasizes that cigarette advertising presents a unique situation. "As to whether there are other comparable products whose normal use has been found by Congressional and other Government action to pose such a serious threat to general public health that advertising promoting such use would raise a substantial controversial issue of public importance, bringing into play the Fairness Doctrine, we can only state that we do not find such circumstances present in petitioners' contentions about the advertised products upon which they rely." The ruling, the Commission stressed, *imposes no Fairness Doctrine obligation with respect to other product advertising.*

Additionally, the Order stated that the Commission does not consider itself to be "the proper arbiter of the scientific and medical issue here involved . . . has not sought to resolve that issue." It makes the point that there is an issue of substantial public importance involved and it must be presented fairly to the American people.

The remaining (and still unanswered) question in the minds of many broadcasters relates to the Commission's intentions in this area. Will it gradually extend the "Fairness Doctrine" to other advertisements? The FCC says, "No" but history would indicate to the contrary.

In any event, broadcasters (that carry cigarette advertisements) would be well advised to provide some public service announcements daily to set forth the hazards of smoking. The quantity of same should be determined with the assistance of your legal counsel. •

Okay.
So you talked to the competition.

And they probably told you that we had a delivery problem. Because we did.

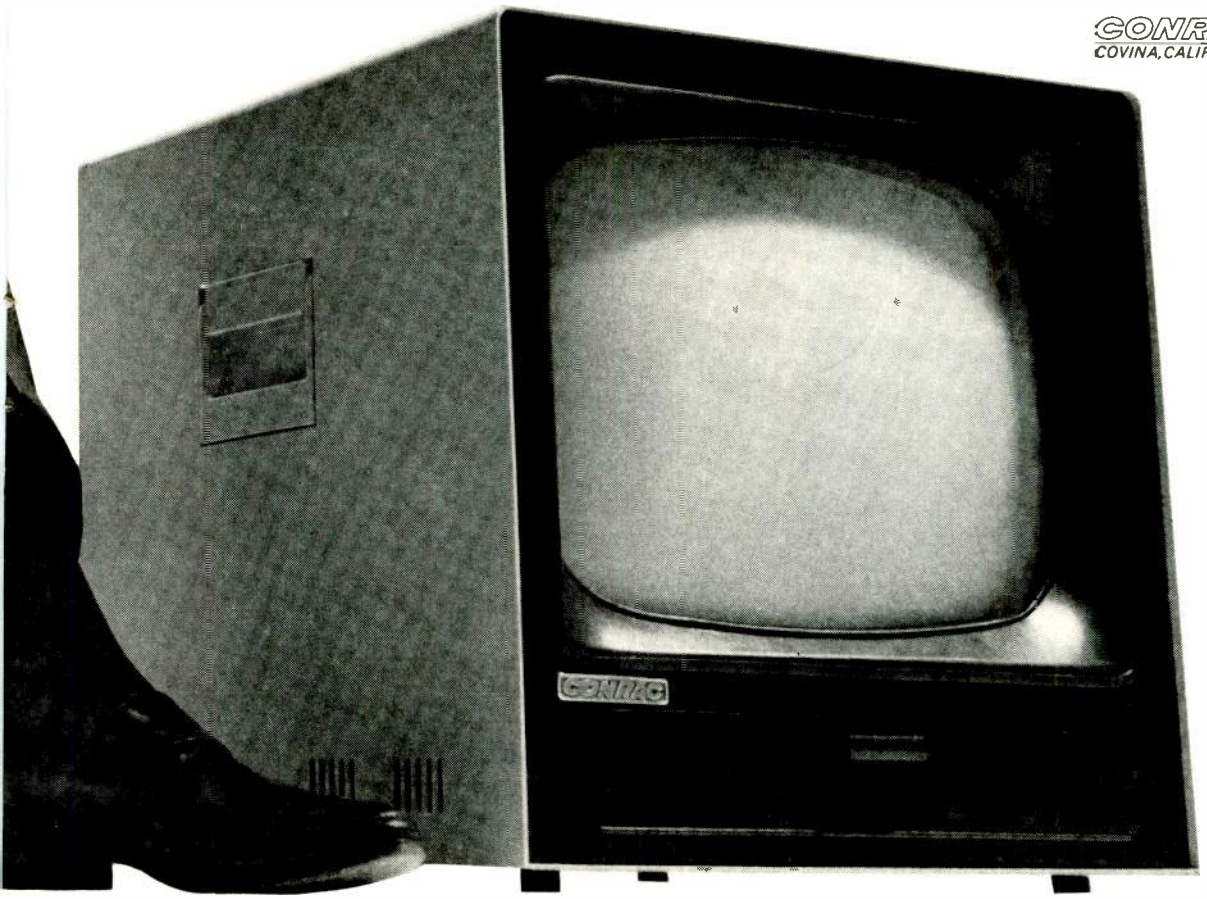
Have they told you that we don't have a delivery problem any more? Because we don't.

Anyway, now we can get back to basics. Like Conrac is the fastest selling monitor in the world.

Which is why we had the delivery problem.

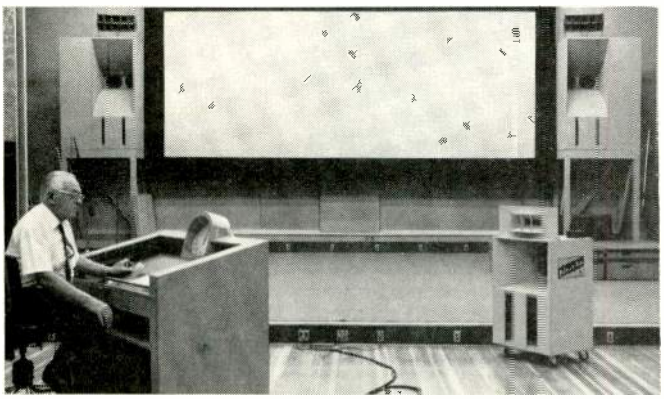
Did the competition tell you that?

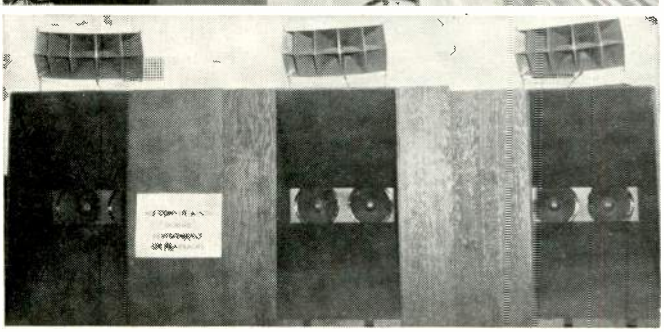
CONRAC
COVINA, CALIFORNIA



Circle 18 on Reader Service Card

Disney's Magic World of Sound... from Altec.





The magic that is Disney is not just a pat formula. It is a form of perfectionism that pervades everything which carries the Disney name. Certainly, there's a Disney look. But just as certainly there's a Disney sound. And that's where we come in.

For example, the new control console at the Disney Studio's orchestra stage is made up of 29 Altec slide-wire attenuators, 7 rotaries, and one 4-gang master. The works are powered by rack-mounted banks of Altec amplifiers. Monitoring in the control room is done in a big way—with three giant Altec A4 "Voice of the Theatre"® systems butted together in a single plane of the most powerful, pure sound you can get.

The stage itself uses three more A4's for monitoring, re-recording, and playback. (That's one good way to keep the musicians happy.) Eight caster-mounted A7 "Voice of the Theatre"® systems are mobile, may be moved where and as needed.

And that's not all. On the back lot Altec PA equipment provides the paging. Dialog stages at the Studios also use A4's, with Altec's space-saving 844A Monitor Speaker Systems in the compact transfer room. The list could go on, but the point is made.

So who listens when Altec Lansing sounds off at Disney? Everybody, that's who. And if you understand the remarkable expertise of Disney sound engineers, perhaps you should listen too. Let's hear from you.

ALTEC LANSING, A Division of LTV Ling Altec, Inc., Anaheim, California 92803 BM/E-12

ALTEC LANSING®

Circle 19 on Reader Service Card

Video Switching

By I. Moskovitz

THE PRIMARY PURPOSE of a video switcher is to route signals from various sources to receivers. These sources may be cameras, film chains, tape recorders, network feeds, etc. Receivers may include tape recorders, network feeds, other studios and the transmitter.

Signal routing may be performed by many types of switches or patches. Some methods are more acceptable than others with respect to ultimate performance required. Quality standards are only part of the requirement. Ultimate performance also encompasses auxiliary functions; mixing special effects, inserts, etc.

Several generic switcher types have been developed with respect to these functions. Various switching techniques are used. This article will review the technical aspect of switching and cover some of the variety of types and their uses.

The Gap Switch

The 2 × 1 switch shown in Fig. 1 is adequate for connecting the signals at A or B to C. During

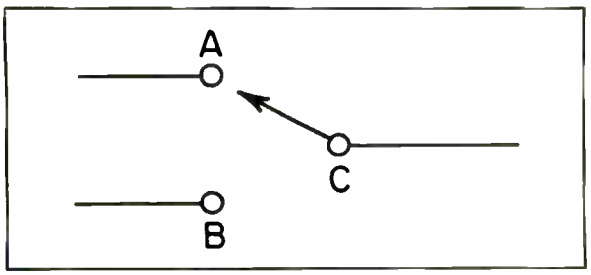


Fig. 1. A 2 × 1 gap switch.

the period when the switch is in motion or when the contacts bounce, there is no signal at B or C. TV signals as well as others would be discontinuous during that period. Aesthetically, the viewed scene would be unusable. What is worse, however, is that in a composite or color signal, sync or burst would be missing, causing tape recorders, receivers, monitors and processing amplifiers to respond violently. Thus during any period in which the video is transferred, no loss of signal should occur. Gap switching is used in routing monitor signals.

The Lap Switch

The make before break system, sometimes referred to as a "Lap Switch", overcomes the disadvantage of introducing signal loss. Fig. 2 de-

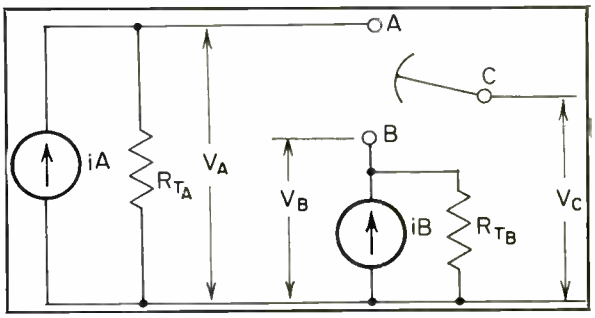


Fig. 2. A make-before-break lap switch.

picts a typical system. V_A is the terminated output of a video source whose Norton equivalent current is i_A. V_B is likewise related to i_B. The voltage at C, V_C when A and B are connected together is

$$V_C = (i_A + i_B)(R_{TA} R_{TB}).$$

But in all studio applications the terminating resistors are always equal and the input current relative to sync and burst are constant irrespective of source. The current i_A or any other such source current can then be viewed as a general

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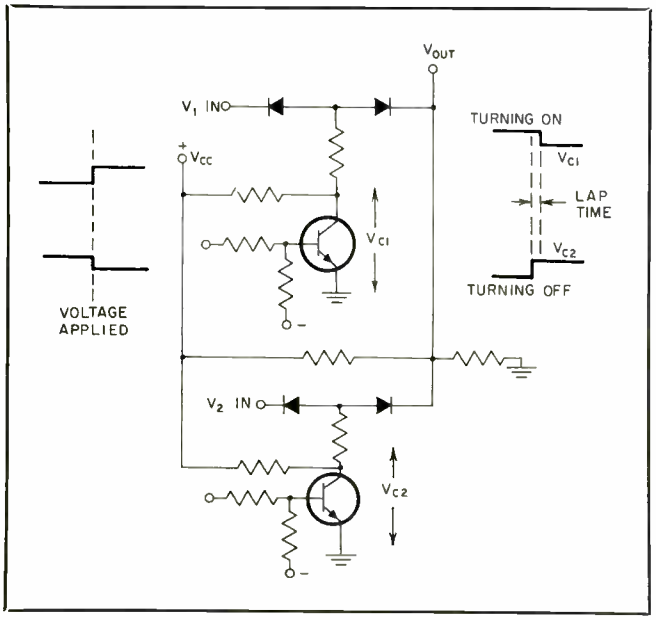
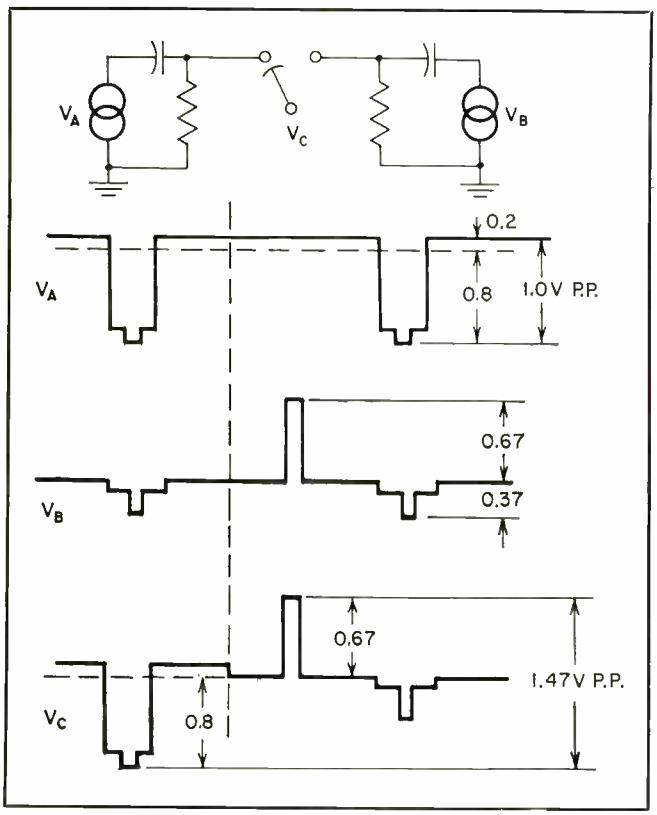
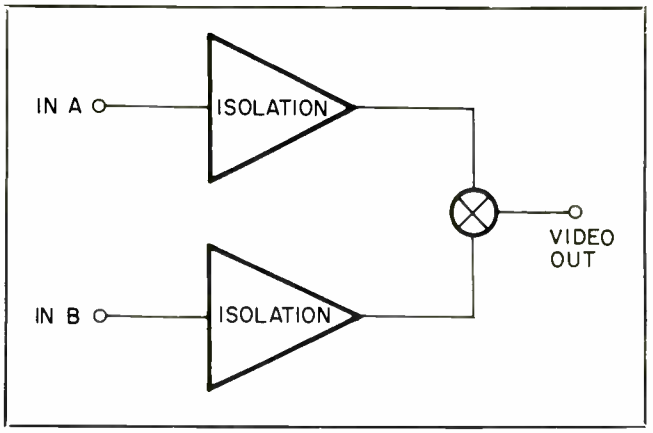
Mr. Moskovitz is director of research and development at Riker Video Industries.

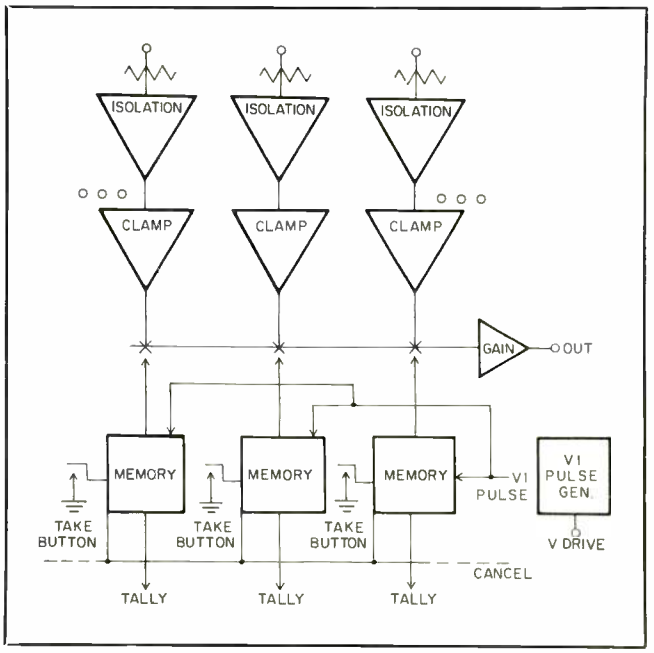
Fig. 3 (Top). Solid-state switches markedly decrease lap time.

Fig. 4 (Bottom). Combination lap and clamp switching.









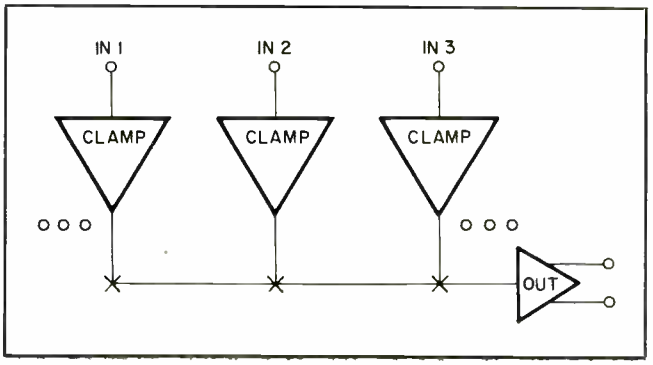


Fig. 5 (Top). Isolation required to keep signals from A out of the path of B is provided by this circuit.

Fig. 6 (Center). Line or master switcher integrates concepts previously discussed.

Fig. 7 (Bottom). Switching function (crosspoint) associated with respective memories, tallys and vertical interval pulses.

is and the voltage at C becomes

$$V_C = i_S R_T.$$

In other words, the output voltage will not change when the input source voltages are equal even when both inputs are connected together. This holds true for sync, burst, video or any other signals which may be applied.

If switching is of the lap form, then the sync and burst levels will remain constant and, if the same video signal also appears at A and B, then there will be no indication that the switch has changed positions.

The lap may be performed with relays or other mechanical devices. We will, however, show only the electronic means using diodes and transistors.

In Fig. 3, the transistors biasing the diodes are driven into heavy saturation when turned on. When turned off by a negative voltage applied to the base, delay in dispersing the carriers within the transistor causes the on diodes to stay on for a short period after the others have turned on. The electronic form of lap is relatively fast, completing the switch in less than several hundred ns to one or two μs compared to the fastest relay switch—about two ms.

Although relay circuits are simpler, relay contacts bounce. Electronic circuits need intermediary devices and are more complex. Circuit selection must therefore be made with respect to required speed.

Clamping

Fig. 4 shows two signals at the input to the switcher. Note the relative position of the sync tips and blanking levels. The dashed line in V_A is the zero level line. V_B is adjusted so that sync and setup fall below the zero level and the white pulse is above the zero level. The zero level in V_B is black. When a switch is performed between sync pulses, the zero level remains constant. The video at C then will take the form shown as V_C. Thus a signal of 1.47 V peak-to-peak will occur within that field.

To maintain the sync tips at a constant level, it is necessary to clamp the video at least at the output of the switcher. Because clamping currents may run very high when two sync pulses are displaced by a large voltage, it is preferable that the inputs be clamped to the same dc level and avoid the problem.

The isolation required to keep signals from A out of the B path may, therefore, be clamps. (Fig. 5).

Memory

The ability to recall or hold an event may be programmed into the switcher so that when a specific signal is addressed it is routed to the output and remains there until the next one is called up. This may be accomplished with mechanically interlocked buttons, toggle switches, mechanical or electrically interlocked relays, magnetic cores, or bistable multivibrators. When each new signal is called up, the old memory is cancelled.

Beside maintaining or holding the addressed signal, the memory provides information to activate tallys so that when camera one signal appears at the output, it is notified that it is "on the air."

The Switching Period

When the switching actually occurs depends on the method by which the switcher operates:

1. Random—the instant the button is depressed, switching occurs.

2. Vertical interval—switching occurs during the next blanked vertical interval following the contact of the button.

Random switching has the advantage of requiring little in the way of circuitry; hence it is simple. A scene switched midfield, however, may give a momentary subliminal appearance of a headless body or a bodyless head, or worse, the body of a man with the head of a woman or vice versa. If information transients such as this are to be avoided, then the switching must occur during the blanked vertical interval. The usable period of this interval occurs just after sync is completed, and has a duration of less than one ms. Electronic devices have no problem switching in less than one ms. Relay devices do not operate in less than one and one-half ms at best. A vertical interval switcher, therefore, generally takes the electronic form, while a random switcher might easily be of the relay form.

A device switching during the vertical interval must of necessity be told when it occurs. The most obvious indicator is the vertical drive signal which begins at about the start of vertical blanking and ends after vertical sync. The trailing edge of this pulse appears, therefore, approximately at the time to perform the switching function.

Switchers and Their Functions

All of the elements of the basic switcher have been described briefly and are shown in Fig. 6. These components are utilized to form a line or master control switcher. Each cross represents a switching junction; often called a crosspoint, which must be associated with its respective memories, tallys and vertical interval pulses. Schematically it is generally represented in a more simplified manner (Fig. 7).

Crosspoints noted horizontally are called banks; the verticals are called columns. When activated by an addressed memory, the signal is routed from an input to the output via a path through the crosspoint. When a crosspoint in a bank is active, all others in that bank are cancelled or inactive. Only one crosspoint in a bank can be activated at a time. Any number in a column can be activated at a time.

The master control switcher has one major function: to route all of the studio signals to the transmitter. It therefore can also be referred to as an NX1 switcher, where N refers to the numbers of inputs.

In many cases the master control switcher

will contain a second bank of crosspoints; these are connected to a monitor allowing the operator to view each input. This is called the preview bank, Fig. 8.

The Transitional Switcher

The addition of a pair of special effects banks and/or mix banks changes the master control switcher to a transitional switcher (shaded area, Fig. 8).

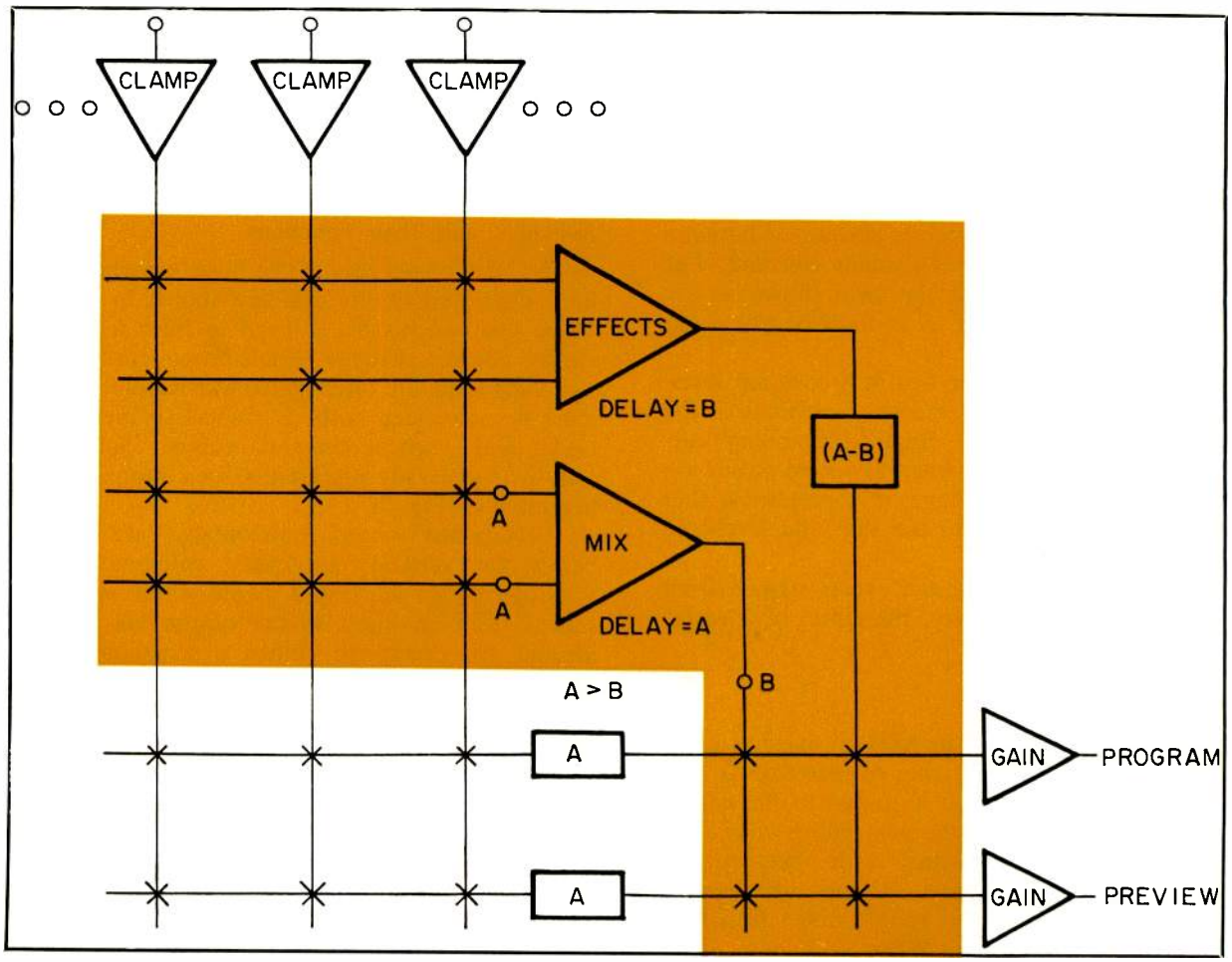
Methods of fading (lap-dissolving) or wiping from one bank to another through linear mixing and special effects are well known and will not be discussed here except as they affect the color TV signal. One of these is the introduction of delays into certain switching paths.

A constant delay must be presented by the switcher regardless of which crosspoint is active. Delay lines must be inserted into the paths of least delay to match the path of greatest delay. In Fig. 8, delay line A has a delay equal to that of the mix system; A-B causes the effects bank, which has an intrinsic delay of B, also to match the delay of the mix bank, assuming the mix bank has a greater internal delay than effects. Thus, the delay through the switcher is made constant irrespective of the crosspoint taken.

Operators of monochrome, noncomposite switchers have learned to use individual gain controls to control signal amplitude in each mix bank to perform a fade to black and back to the other bank. They were knobs originally and later took the form of handles so that a fade from one channel to the other could be performed directly by tying the two handles together. The advent of composite switching and color operation obsoleted this type of fade except under special conditions. When both arms are split and the gain of each bank turned to zero, sync and burst are eliminated. Color and composite mixers must, therefore, include protection circuits as the one pictured in Fig. 9.

The mix potentiometers have associated limit switches which are activated when the pot is turned to minimum. The limit switches are in turn connected to a memory device which drives Sw_1 to a position to couple with the signal associated with the last limit contacted. The output of Sw_1 is delayed so that its signal is timed with the mixed signal. A blanking generator drives Sw_2 so that the signal at the output (B) of the device is that associated with Sw_1 (C) during the blanking period and with the mixer (D) at all other times. The mixed signal never appears at the output during blanking; therefore, this signal may even be zero.

Fig. 8. Master control switcher contains second pair of crosspoints. Addition of special effect banks (shaded area) makes a transitional switcher.



All composite switchers are rapidly gaining popularity. This switcher type is usually equipped to receive both synchronous and nonsynchronous signals. A fade or wipe performed between two nonsynchronous composite signals causes spurious operation where sync components from both banks appear at the output. Automatic inhibition of this erroneous operation is also shown in Fig. 9. The sync comparators in the mixer banks and effects banks continually monitor the incoming signals for synchronism. When nonsynchronism is detected, the wipe or fade is inhibited. Instead the signals of each bank of the mixer or the effects is switched to its respective output when the control arms activate the limit switches toward which they are moved. Nothing happens when the limit switches are left or deactivated. When the operator sees that no fade or wipe is taking place, he is flagged that he is in error. He may at his discretion continue the action until the opposite limits are activated; the signal will then switch.

The Production Switcher

One of the most common switchers in use today is the double re-entry switcher, Fig. 10. It combines the mix and effects functions for maximum flexibility and versatility. In doing so a complex delay line switching arrangement must be introduced to keep input to output delay constant regardless of which crosspoint is addressed. Effects and mix delays are noted here as X and Y. In this switcher it is possible to enter the output of the mix amplifier into the effects input and vice versa and thus introduce an overall system delay of X+Y which must be matched in the direct path. When either the effects or mix function is taken separately, proper delay must be introduced in series to keep the overall delay (X+Y).

The delay logic can be defined as follows:

1) An X+Y delay is inserted in the direct path,

2) A Y delay is inserted with each bank of the effects taken directly and an X delay is inserted with each bank of the mix taken directly,

3) Delays are removed when functions are re-entered.

The circled crosspoints shown in Fig. 10 re-enter functions as follows:

Input 1 is entered into effects A.

Input 2 is entered into effects B.

Input 3 is entered into mix A.

Effects output is re-entered into mix B.

When the re-entry crosspoint is taken, all delays associated with it are switched out: effects, Y_A, Y_B, X_B mix direct. The others are left in: effects direct and X_A. Effects can now be taken in either the program or preview row directly or through mix with no difference in time delay through the system.

In this example the effects system was re-entered through the mix path. Re-entry can also be performed in the other direction: mix through the effects path.

Preset Master Control Switcher

The introduction of the "cut bar" introduces simplicity and ease of operation to the control panel of most switchers. In Fig. 11 the program and preview banks are controlled by one set of buttons and a cut bar. Any crosspoint may be taken in either bank, but activating any button affects only the preset bank crosspoints. Activating the cut bar causes the banks to interchange functions, i.e., the preset bank becomes the program bank and the program bank becomes the preview bank. The operator thus presets a scene and cuts to it; he no longer is faced with hunting and hoping at a critical moment.

Preset Transitional Switcher

Fading or wiping between banks is performed in the same manner as the standard transitional switcher with the following exceptions (Fig. 12):

1) Leaving a limit automatically takes the mix or effects crosspoint.

2) Whichever limit is left first (mix or effects) activates that function and inhibits the other.

3) Engaging a limit automatically transfers the crosspoint to the program bank.

In the preset transitional switcher, therefore, only one row of buttons and a cut bar are needed to perform all of the functions where six rows were required in the standard transitional switcher.

Preset Production Switcher

This switcher, shown in Fig. 13, is similar to the standard production switcher with several exceptions:

1) If mix or effects are taken directly, then one bank of each is the program bank and the other is the preset bank. Whenever the control is in a limit it is in the program bank.

2) In the re-entry mode, the entering device has as one of its banks, program; the other is independent. The entered device has as one of its banks the output of the entering device; the other of its banks is preset.

3) Leaving a limit with the entering control causes the program crosspoint to be dropped and the re-entry crosspoints to be activated.

Fig. 9. Elimination of sync and burst requires inclusion of protection circuits.

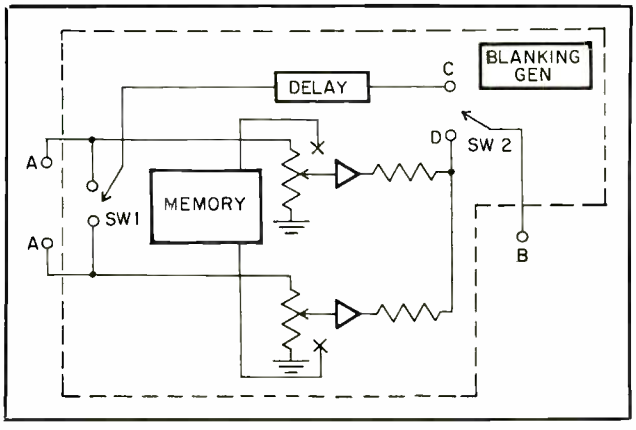
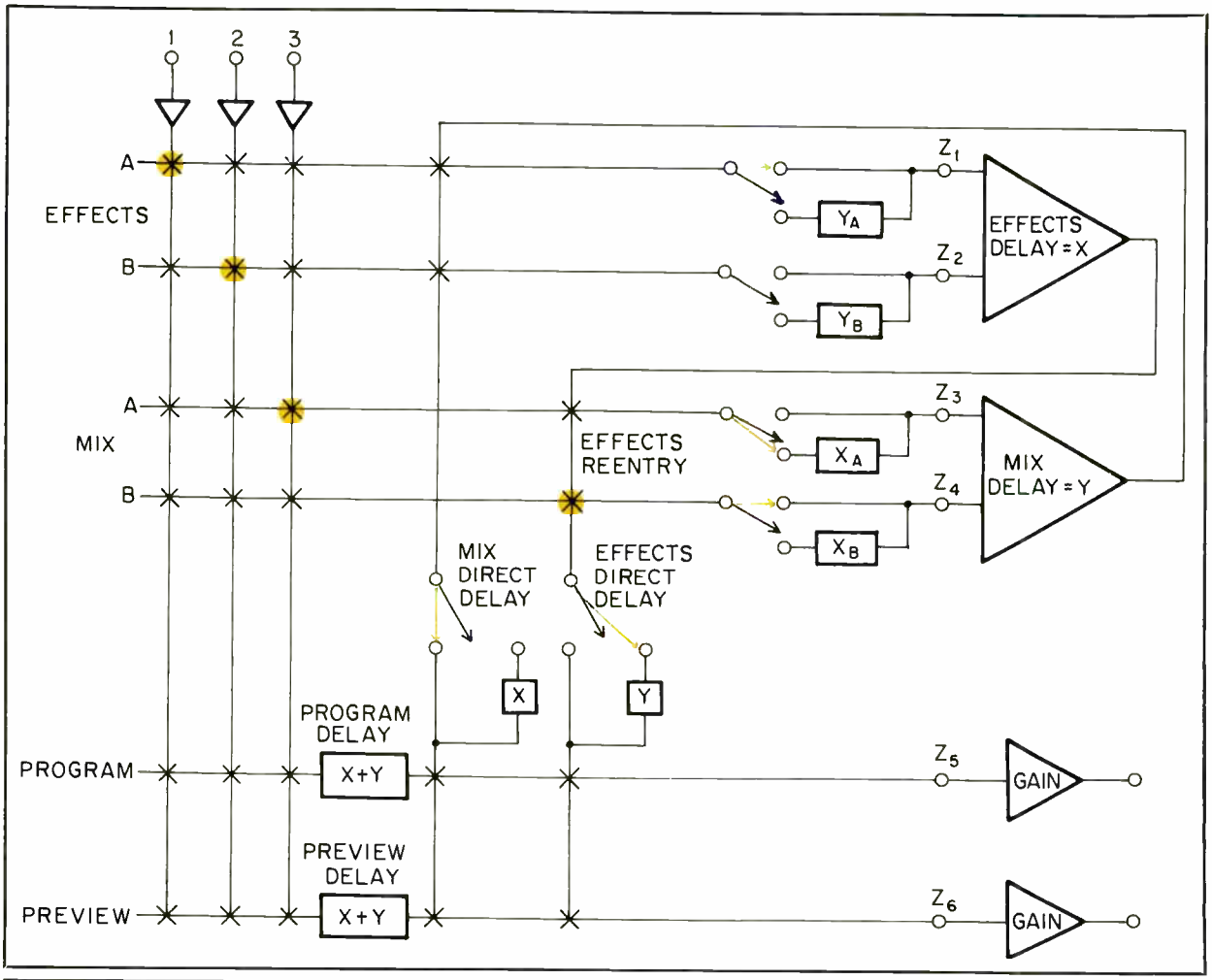


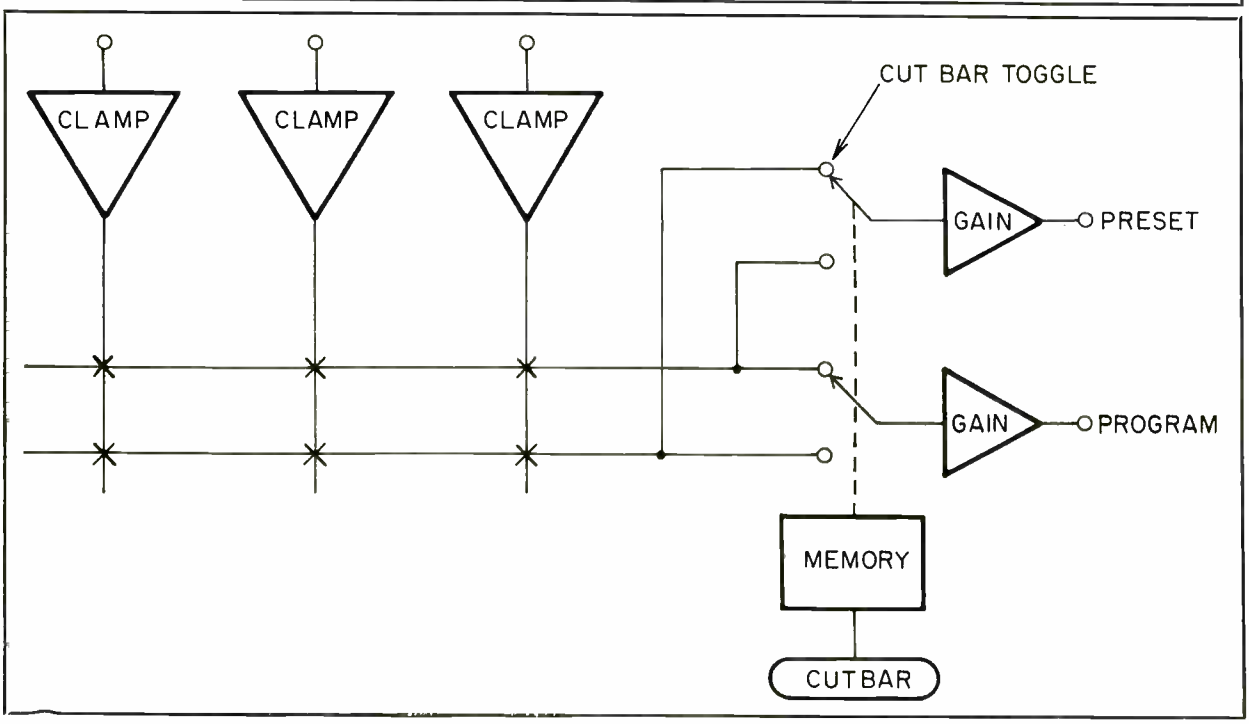
Fig. 10 (Top). Double re-entry switcher which combines mix and effects functions requires delays. Color overlay shows how delays are removed when functions are re-entered.

Fig. 11 (Bottom). Preset master control switcher incorporates control of program and preview banks by one set of buttons and a cut bar.

Fig. 12 (Bottom, p. 31). Preset transitional switcher differs from standard transitional switcher, allowing it to fade or wipe between banks.

Fig. 13 (Top right, p. 31). Preset production switcher is similar to standard production switcher (left portion of Fig. 10) with three exceptions explained in text. Circuit differences are shown in diagram.





Reaching a limit with the entered control causes the program crosspoint to be taken and the re-entry crosspoints dropped after the program and preset banks are interchanged.

It must be stated and emphasized that production switchers, both standard and preset, are individual devices, usually specified in great detail by the user. The example given here is one of many possibilities and is ample reason for maintaining as flexible design as possible.

All switchers containing a special effects system must somewhere derive a keying signal. Sometimes this is an extra bank, sometimes one of the other banks is used. This is usually determined by the user requirements.

Automation and Audio

Other devices which depend on the memory functions can easily be interconnected with the existing memory system. An automation device addresses a memory system; an audio switch control is addressed by the memory.

There are two approaches to the interconnection to memory.

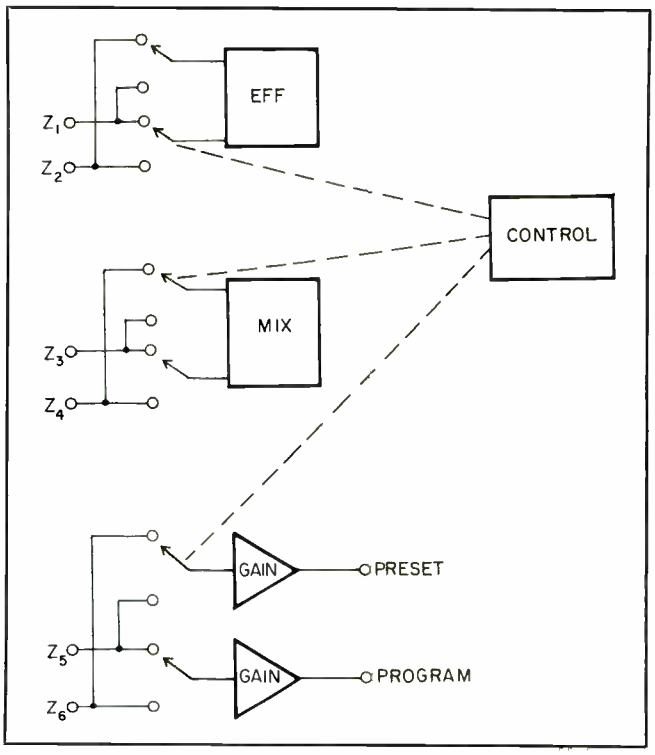
1) The single unit concept: the automation, audio or whatever system is built as an integral part of the switcher and its memory.
2) The separate unit concept: the switcher is designed with the memory inputs and outputs brought out to a plug. This allows the switcher to remain versatile and does not hamper the user's choice of the best possible auxiliary systems.

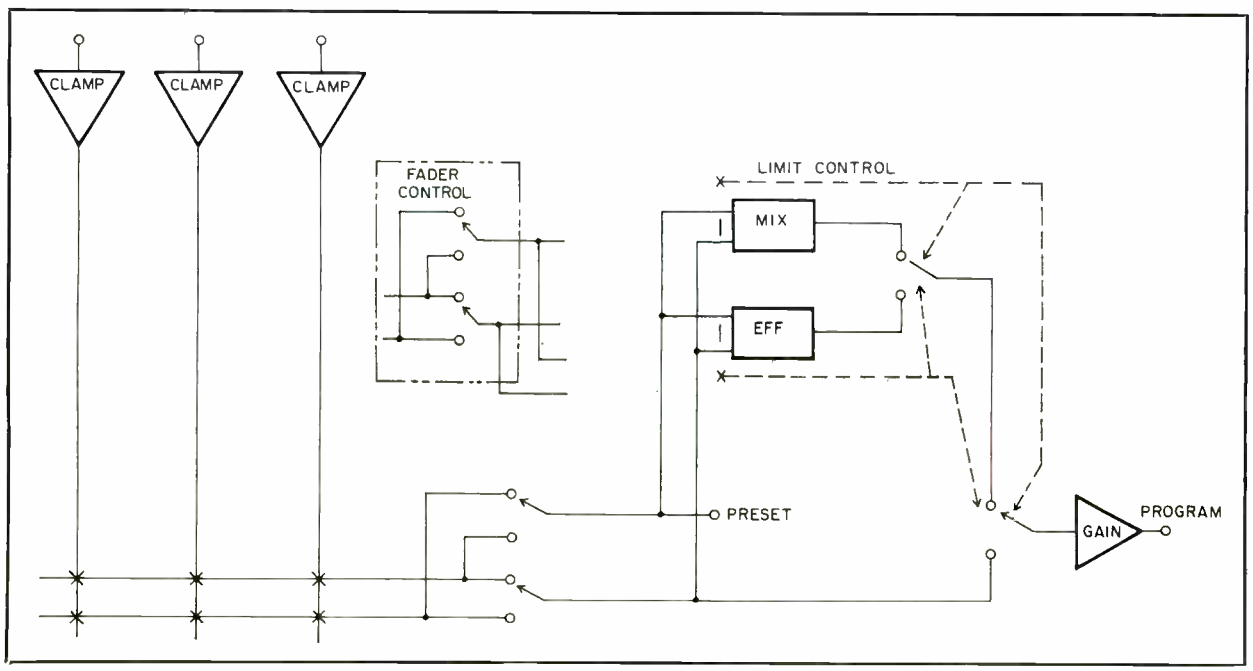
Conclusion

It has been shown here that adequate protection must be given the burst component of a color signal during the performance of the switching function. All of the switcher concepts developed here utilized that protection in the mix and effects functions.

Although it has not been stated explicitly, the memory of the switcher, i.e., the switcher logic, is really the switcher control whether it is addressed by the push of a button or the movement of a control arm. The output of the memory operates the video switch and tallys. This output can also be used to operate auxiliary equipment such as audio control while the input can be operated by an automation device such as a computer.

A switcher that is basically versatile, due to the flexibility of its design, can be made even more so by the imagination of the user. ●





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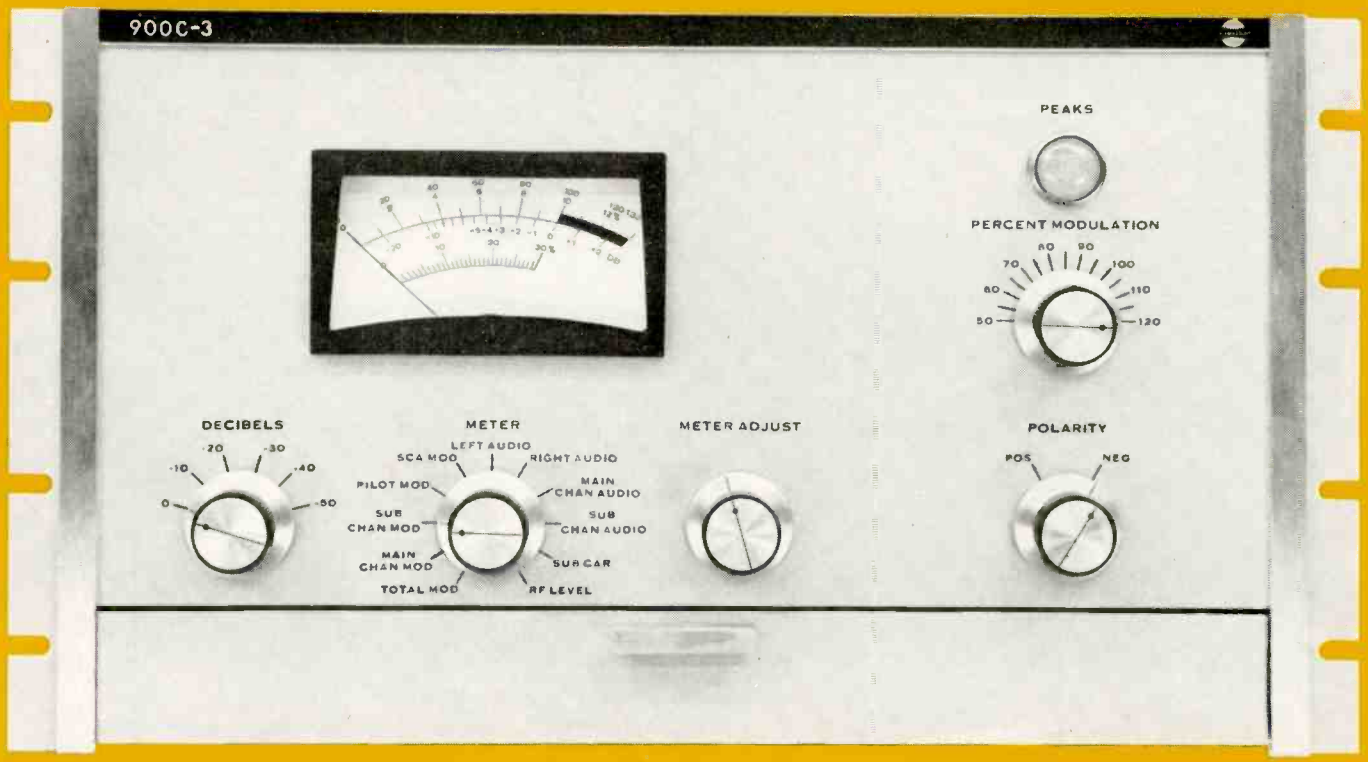

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Circle 20 on Reader Service Card

Here's how to produce spots and promos in stereo.

Production Techniques for Stereo Spots

By Arthur C. Matthews

WITH THE STATE OF FM STEREO becoming more secure in the mass communications media, the question arises: "What do I do with it?" As revenues from fm increase and as competition becomes greater, how can fm stereo offer a "unique" service to attract advertisers? One thing that could help win friends and revenue for your station is to use the "stereo" part of fm-stereo in an imaginative way for promo and local spot production. But let's face it, most of us were brought up on standard a-m, and our knowledge of stereo programming and techniques has its limits.

Is it worth all the trouble to make stereo materials, especially since most of us are on mono-phonic cartridge machines or Ampex mats? I believe so, because if your station *starts* stereo production you may have a competitive advantage in your market. And you, as the engineer, need to know things to begin the process. Don't wait until production gets on your back. Most of the fm stereo I've heard has been very unimaginative. This is partly an engineering problem and partly a sales and continuity problem. There are difficulties also in finding material. While there may be one, I don't know of a stereo production music series. The mono items I've heard don't have the right acoustic ambience to be effective in the new medium. But just listen to some of the beautiful sound available on modern LPs and you'll be converted.

Above The author (1) adjusts an AKG C-12 mic for the actress. Actor is using a Syncron Au7a mic. Patterns are perpendicular.

Below The use of a 2-area mic pattern gives greater separation. The mics shown here are perpendicular to each other.

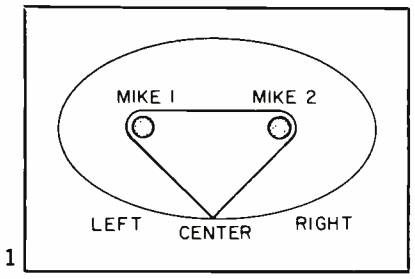
Many stations have limited themselves to a single studio mic, switchable so that the signal feeds left, right, or combines to make a center fill. Not very exciting, and probably just as well, because the studio is too small for real effective stereo sound anyhow. Let me hasten to add that the idea of setting up a ping-pong table between the two speakers and bouncing the announcer back and forth between the speakers is rather out now, too. Placement of instruments and voices is not as important as "ambience"—that is, the feeling of being in a room. In fact, I imagine that most of the "broom closets" that pass for studios are entirely too boxy for good stereo. While the idea 30 years ago was deadness, the ideal today is a little more liveness, and I don't mean artificial liveness supplied by a reverberation unit of some kind.

Basic Mic Setups

I've experimented with 5 basic mic setups:

1. Omnidirectional fusion (curtain of sound)

Mr. Matthews is assistant professor, Speech and Drama, Bemidji State College, Bemidji, Minn.



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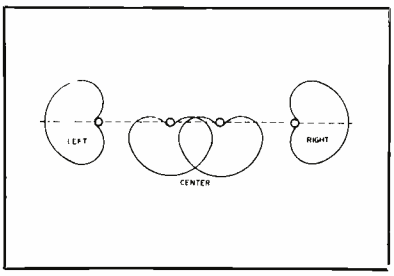

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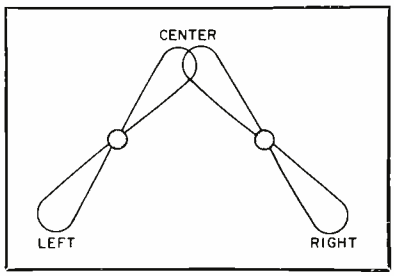

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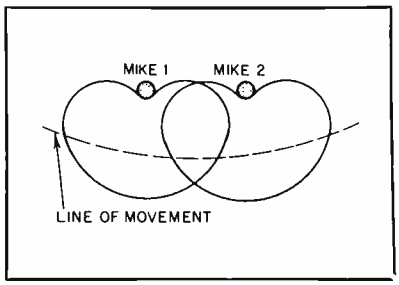

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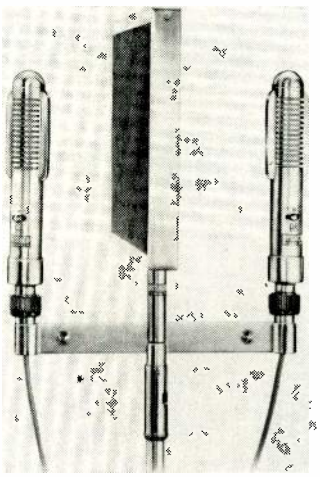

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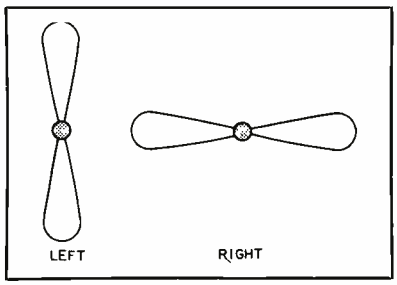

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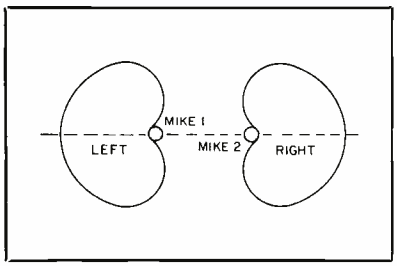

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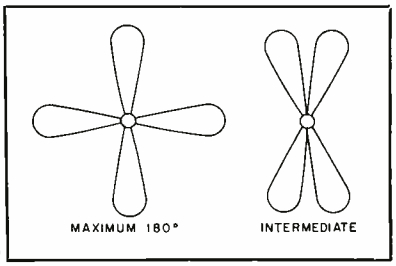

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1. Omindirection fusion pattern.
2. Cardioid fusion pattern.
3. Cardioid separation pattern.

4. A 3-area cardioid fusion pattern.
5. B&O Dynaco mics and separator.

6. Bidirectional separation pattern.
7. Pattern of bidirectional mics set up at a 180° relationship.
8. Bidirectional fusion pattern.

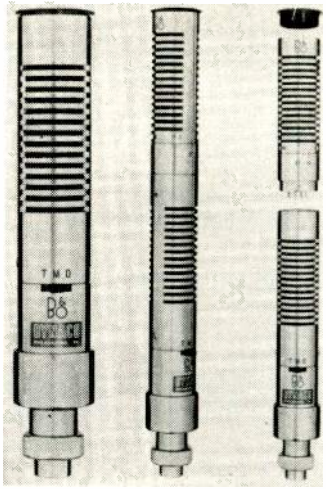
2. Cardioid fusion
3. Cardioid separation (2 area, 3 area)
4. Bidirectional separation (2 area, 3 area)
5. Bidirectional fusion (variable)

By "separation" I mean a more or less ping-pong effect in which the talent appears to be widely separated near the outsides of the listening room. By "fusion" I mean a blending with a true feeling for room acoustics . . . a curtain of sound, if you will. It's difficult to achieve complete separation with omnidirectional mics unless they are widely separated. Let's look at the mic setups individually:

1. Omnidirectional fusion is the most dangerous unless you have an excellent room as described below. Reflections can play absolute havoc with the sound and make listeners wonder just what's going on. You can use two mics or four mics for this curtain of sound and have the talent move across, around, and between the mics for interesting effects. If you have a big studio with lots of air, this kind of sound is quite appealing. I don't like this kind of spread for close talk; it seems more appropriate for "drama of every day life" material. But it has a wonderful openness and sparkle that no other technique can achieve.

First of all, decide on the average distance that the actor must be from the mic. Place the mics that far apart. Use the two mic stands as the foci of an ellipse to assure that, as the actors move across, they maintain their acoustic distance from the mic. To lay out the ellipse, take a piece of string 3 times the distance between the mics (as an experimental starting point anyhow), tie a knot in the end of the string and place the string around the mic stands. Put a piece of chalk inside the loop, pull the string taut and draw an ellipse around the mics (See Fig. 1). A semicircle will be fairly accurate, too. Anyone standing at any point around the ellipse should be just about right for the mics. By following the line, you can create a curtain of sound along which the actor may move with approximately the same perspective. If you have a really big production, use four mics instead of two with the two left and two right mics having interlocking ellipses.

2. The cardioid fusion technique may be used if your room is less than ideal; set up as in Fig. 2 the sound will be picked up only *on* pattern. You may have to do a little adjusting here, too. Is it



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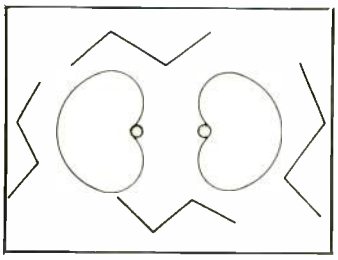

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9. Dynaco ribbon mic.

10. Folding screens used for acoustic effect.

Although author Matthews is a bit skeptical over stereo cartridge machines, current commercial models, Gates unit shown, can often be used effectively. For example, a voice commercial which comes in mono can be made to switch back and forth by panning its separate balance knobs. This technique cannot be used indiscriminately but often it works wonders. A Ford commercial on used cars has a fast talking used car salesman who at one time says ". . . you can't go wrong, right? Right!" Splitting the two rights is very effective. (The unit on top, incidentally, is a timer with a Veeder Root counter which indicates cartridge tape used up in seconds. This permits several commercials to be stacked on same cartridge.)

necessary to warn you about phase at this point? I had a pair of AKG G-12 variable-pattern mics with which a great deal of my work was done. Somehow the shop technician didn't observe polarity or color code and a red and yellow wire got switched. It took me some time to figure out why my center channel never worked properly, but seemed mushy and slushy. So, it's ideal to check phase before you really run into trouble. A sound wave striking the mic faces should cause them to move electrically in the same direction, not one positive as the other swings negative. I know we always try to maintain phase relationships, but it's especially important for stereo.

3. Cardioid separation (2 and 3 area) requires that you move the mics so that the patterns are back to back on the *same* line, as shown in Fig. 3, rather than perpendicular to it. You also can move the mics farther apart for maximum separation. It's possible to create some rather wierd effects by putting the mics in different rooms—one area may be rather live and one rather dead. It results in quite a startling effect.

I've used University mics and some EV 676 mics with a switch for a reduction of bass frequencies, 5 dB down or 10 dB down at 100 Hz. They work fine in boomy surroundings. With this setup you create a 2-area acoustic pattern—left and right. Using four mics (Fig. 4) you can get 3 acoustic areas— left, right, and center. Using a 2- or 3-area setup, you can have static commercials (no motion) but lots of separation. A little experimentation pays off here. You don't have to keep the talent on the same mics all the time either. If you move them, however, move them *between* lines, because if you move them during a line you'll lose them as they move out of one pattern and into the next.

4. Bidirectional separation. Because the bidirectional mic has a narrow figure-eight pattern, it lends itself rather beautifully to the 2- and 3-area technique. I've used B&O Fentone (Dynaco) ribbon mics with a separator. You can make a separator of your own, but the Dynaco separator maintains proper relationship and provides two mic mounts for one stand (Fig. 5). The only thing you have to be careful about is that you get the *front* of the mics pointing in the same direction, otherwise, you'll have phasing problems again. You can usually tell if phasing is correct

Basic Mic Setups
Sample Stereo Spots

Here are three scripts with indications of setup, types of mics, and stereo effects to give you an idea of what happens. (We used the Audio Fidelity series of sound effects.) The first two are spots written for "Harvey" when we did the play at the college, and the third is a promo for our planned station, WBSC, (as soon as someone will donate a transmitter).

Mic setup: Curtain of sound (fusion)
Mics: 4 Syncron Au7a mics, cardioid.
Sound: Lion roaring.
Ambience: Very live, like in a lion house.
Old lady: (left mic, slowly walking across to right) That's right Ollie, we're going to a play tonight. "Harvey," it's called. Hmmmm . . . it's about this invisible rabbit. You see he's got a friend, Elwood P. Dowd. (Sound about half way across, slight growl in background.) Keep away from them lions . . . (with determination). Ollie, I **want** to see that play tonight. We haven't been anyplace in weeks. At the college theatre . . . only $1.25. I know things haven't been too good this year with the crops and all but (at left mic) Ollie . . . (sound of footsteps on right mic) Ollie? . . . (moving away) I'm going to the play anyhow . . . Harvey, tonight, 8 P.M., college theatre.
(Sound: lion licking chops and belching in right mic.)

Mic setup: 3 area — left, right, center
Mics: 2 Dynaco Model 53 mics with separator
Sound: Cards, center shuffled, then dealt, left, right, center
First Lady: My, there's nothing to do in this town. Just watch the snow.
Second: I need one more. I hear there's a play up at the college, Harvey . . . about a white rabbit.
Third: I saw that on TV once.
Second: It's better as a play . . . real live actors you know.
First: When is that?
Second: All this week, up at the college. Ollie and I are going. You ought to get out a little more.
Third: I bet it's expensive.
Second: Dollar and a quarter.
First: Is it funny or what?
Second: Very comical. My niece saw it last night. She just laughed and laughed.
Third: Up at the college? (card dealing has stopped).
First: Hmmmm. I might get Arthur to go out. 8 P.M. at the college theatre . . . and only a dollar and a quarter?
Second: I'll raise you one (sound of chips, center).

by putting three people around the mic array and recording some talk. If the center drops in a mono playback, you're out of phase.

The bidirectional mic setup offers a choice of 2- or 3-area pickup pattern. With the setup shown in Fig. 6, you have to be careful that actors don't move very much, especially the center actor. It doesn't take much (a turn of the head) to have him zinging across between the speakers. You get excellent separation and good sound. Watch playing actors close to the ribbon mic, too. They're very sensitive to popping (p, b) and overloads from fricative (s, f) and dental (d, t) sounds. The Model 50 has a T/M (talk-music) switch which might be worth trying. The T position reduces the amount of bass in the output so people don't sound quite so boomy. If you need more separation than the above setup, place the mics on separate stands with the patterns at 180° to each other as shown in Fig. 7.

5. Bidirectional fusion technique. Here you use two mics as shown in Fig. 8, one directly above the other—perhaps one on a floor stand and the other on a boom. Turn the patterns, using 90° as the basic arc around which the actors move. Dynaco has a Model 200 which combines two ribbon mics on one axis (Fig. 9). Mount the mic on a stand and then rotate the upper mic for the kind of separation that sounds best for the recording. Here, of course, use a circle for the pickup area, since the two mics are one above the other. Some people feel you don't get "separation" this way. In a sense they're right, but you do get a lovely picture of the room ambience.

What technique do you use where? That depends on how the material is written by the continuity department; in fact, you probably can let them know what they can do with the equipment you have. The choice will depend also on the room used for recording. That brings us to a major problem—finding a room. I've had to do quite a bit of production "on location." Most studios aren't set up for stereo production anyhow, so I've had to scratch for recording space. If you're using the curtain-of-sound approach, you'll need a big room. And not one with walls, ceiling, *and* floor covered with acoustic material. I've mainly tried stages, gymnasiums, and lounges. A stage draped but open to a large volume of air in the auditorium is a good place for me—handy, too, since I split my time between radio and drama work. I like the stage, too, because by pulling curtains it is possible to expose more or less wall area for more or less reverberation. Gymnasiums are always big, but often too live. For this problem, I've made folding screens covered with acoustic material to make sort of a tent around the performers (Fig. 10). By moving the screens back and forth and opening them, I can get the air needed for the particular recording. Large rooms of any kind are good to experiment in. Sometimes your TV affiliate might have a studio big enough to be worth a try. You'll have to develop your ear for this kind of thing.

Some tests might be worth the effort. I like to set up equipment and make test tapes before deciding. You can tell a little by clapping your hands and listening for slap-backs. But usually

Mic setup: 2-area cardioid
Mics: 2 Shure 565
Music: Happy beat, Duane Eddy (music up and out)
Man: (groans left) Ooooooohhh.
Announcer: (right) What's the matter man? Homework got you down? The cares and troubles of college too much for you?
Man: (Groans, yes)
Announcer: Then take a study break and listen to the live sound of WBSC, your campus radio station. Where everything that's happening . . . happens. Not only the now sound but yesterday.
Music: Quartet
Announcer: And tomorrow
Music: Electronic music
Announcer: So get with it, buddy
Man: (heavy breathing, close to mic)
Announcer: WBSC, Bemidji State College on the air with a variety of music and the latest campus news.
Man: (Breathes, then stops)
Voice: (Close to right) No use, nothing will revive him now.

an hour or so "playing" will give you a good idea of how the room might work out. Look around your building or nearby buildings and see what's available. If you're in a noisy area, you may have to settle for a studio, but keep looking. Remember, Les Paul and Mary Ford started out in their bathroom. For the 2- or 3-area sound, the studio isn't quite so critical; still it doesn't hurt to experiment a little.

Since most stations are not now set up for stereo production, you'll have to improvise. I've been using a Crown 822 solid-state portable recorder and four Syncron Au7a condenser mics for my most recent experiments. I try to find a big room which adjoins a medium sized room (9 × 12 or larger). The big room becomes the studio and the small room the listening room. I take along a pair of AR2ax speakers and an amplifier for monitoring purposes. Some engineers try to monitor with headphones, but that's dangerous. Using headphones, the idea you get of stereo separation is entirely erroneous. The reason I try to find a medium sized listening room is that I like to approximate a living room. I take along an intercom so I can talk to the talent and a turntable so music or sound effects that must be part of the recording can be added. Music that fades in and out, without voice over it, I put on the tape back at the studio. I record at 7½ in./s, edit, then make the final dub for playback on a studio 2-track recorder. Perhaps you can modify cartridge machines for this use, but audio quality too often deteriorates on these machines, so I prefer to make up a "tape for the day." Not quite so convenient though. •

Cartridge Care

By Herbert Greenberg, WINS, New York, N.Y.

Dropped cartridges, thrown ones, or those which have had fingers pushed into the head openings are prone to jam unless examined before airing, and the trouble remedied. A quick visual check from the rear of pads, tape, and the round white corner plastic guide, as well as glance through the plastic top to check if the wire bar is in place takes but a moment and prevents dead air and loss of material as well as preventing damage to the tape in the cartridge.

If the cover is removed, don't overtighten the screw on the top or the plastic will develop cracks. A cartridge which is mechanically noisy can be quieted by a drop of oil on the center shaft or some graphite on the washer under the disc on which the tape is stored. A soft lead pencil can be the source of the graphite. Clean the area first while disassembled.

Long play cartridges, over two minutes or so, tend to pack if unused and should be run to loosen the tape before a recording is made. Otherwise, the speed may be off on playback.

If possible, listen to the output while recording. If a poor splice is heard, stop the tape at once, erase and rerecord. The bad spot will now be in the silent run-out portion and not noticeable. This can also be done on a playback check.

Prepare a couple of test cartridges, one with tone at reference level, and another with no audio, but with stops every five seconds. These will be handy for checks and tests, and with the "stops" cartridge sensitivity can be adjusted without taking the unit out of service.

A continuous running cartridge can be prepared by disabling the stop cue head or relay, by pulling out the plug to the head or removing the relay or circuit board temporarily while recording. It is advisable first to time the cartridge tape exactly, and not record over more than a fraction to avoid a dead spot.

To remove old tape from cartridges quickly, remove the cover, loosen from guide, remove bar, and turn upside down over a wastebasket.

Take care of cartridges and avoid wear and tear on yourself while on the air. It pays off.

Twenty Years Of Magnetic Recording

Adapted from a recent Ampex report

To the much-heralded under-25 generation, a world without tape recording would be hard to visualize. Hi-fi music, school language laboratories, television's familiar "instant replay," the clicking reels of computer transports, the recorded heartbeat of an astronaut and weather reports from Venus are a few of the commonplaces of 1967 made possible by magnetic recording. They were the stuff of science fiction 20 years ago when the first practical tape recorder was born.

On October 1, 1947, engineers of a 14-man company called Ampex pushed the "play" button on a cabinet size recorder they called the Model 200 before an audience of broadcasters in Hollywood, California. The result was the purest recorded sound the audience had ever heard. It was the sound of a multibillion dollar industry being born.

Sales of magnetic recording equipment and tape in 1947 were virtually nonexistent. This year worldwide sales of tape recorders and tapes of all varieties, makes and models will exceed an estimated $2.1 billion.

Magnetic Recording History

The technique of magnetic recording is much older than 1947. It was discovered by Danish scientist Valdemar Poulsen in the 1890's. Lack of electronic developments for amplifying recorded sound kept it in the laboratory for decades thereafter.

Accelerating developments in magnetic recording took place in the 1930's and early 1940's, particularly in Germany where a handful of engineering models were successfully used for propaganda broadcasting by the Nazi government.

It remained for Ampex to produce the first machine with the necessary reliability and performance for serious regular use.

It didn't take long for the Model 200 to find serious regular use. Seven months after its unveiling, American Broadcasting Company radio stations across the nation put the machines into daily use for time delay of network programming. The muffled sound of the old "electrically transcribed" radio program soon was replaced by the live quality of tape.

Rapidly, phonograph record companies discarded their wax mastering machines for Ampex tape recorders. Coupled with development of the microgroove record, this gave birth to the high fidelity era in home entertainment.

Before the Model 200, many industrialists doubted that magnetic recording would ever be more than an interesting toy. Such doubts were rapidly dispelled by the Model 200. Approximately 90 percent of the recorders bearing that historic number are still in regular use 20 years later.

One key figure who did not doubt the future of magnetic recording was Alexander M. Poniatoff, a Russian-born engineer who in 1944 formed a small company in San Carlos, California, to produce electric motors and generators for airborne radar systems. The company name was composed of his initials, AMP, plus EX for excellence. Ampex.

In 1946, Ampex contracts for airborne radar components came to an end. Mr. Poniatoff set about looking for a postwar product to use the considerable talents of his team of skilled engineers and technicians. Witnessing a demonstration of one of the German prototypes, he concluded that magnetic recording represented the future for Ampex and set to work on the Model 200.

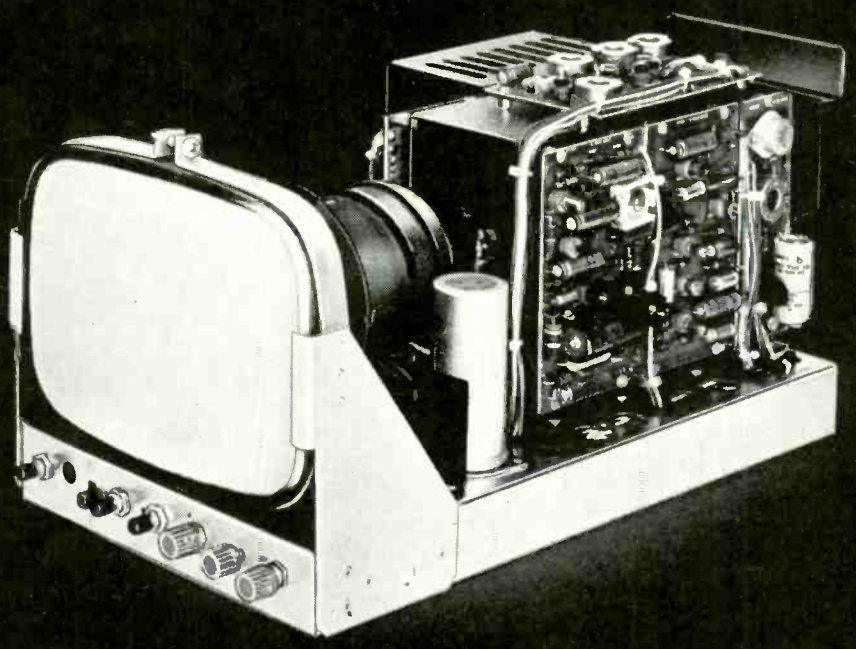
Bing Crosby also played a key role in the launching of magnetic recording. In 1947, Bing was at the zenith of his radio career. He badly needed a way to record his weekly coast-to-coast radio show with sound comparable to that of a live broadcast. He not only purchased the first Model 200 but the first 20 and sold them in turn to ABC. Bing Crosby Enterprises subsequently sold hundreds of Ampex recorders as the company's first distributor.

The professional audio recording field to which magnetic tape recording was first applied today represents one of the smaller segments of the total industry. Consumer recorders, videotape recording equipment, computer tape systems and instrumentation recording apparatus all outstrip professional audio recorders in annual sales.

All things in our photo are as they were on October 1, 1947, except the faces are older and a tape recorder no longer is a curiosity: Alexander M. Poniatoff, founder and chairman of the board of Ampex Corporation, and Harold Lindsay, now manager of the company's Audio Engineering Department, pose with the Ampex Model 200 recorder on the twentieth anniversary of the machine's introduction. Appearance of the machine heralded today's multibillion-dollar magnetic tape recording industry.

BBRC/Miratel's *TU Monitor*

SOLID-STATE–AND PROVEN



This is a TU Series eight-inch b/w utility monitor from Ball Brothers Research Corporation's Miratel Division. Miratel makes the TU with transistors for added reliability, and reduced heating. No big array of vacuum tubes. No heating problem. TU monitors have regulated power supplies, and are available with display tube sizes from eight through 27 inches. They are NASA proven and competitively priced. We could go on and on about solid state quality and performance, but our monitors can say it better than we can. Contact us for data sheets and an evaluation of the TU in your operation.

Ball MIRATEL

MIRATEL DIVISION • BALL BROTHERS RESEARCH CORPORATION • 3600 RICHARDSON STREET • NEW BRIGHTON • ST. PAUL, MINNESOTA 55112

Circle 21 on Reader Service Card

When equipment is permitted to move into obsolescence neither the most seasoned air man nor Sarah Bernhardt can turn out professional productions!

Photo courtesy RCA.

Production Practices Good & Bad

By Hal Fisher

Does your on-air production lack sparkle? Here are nine ways to improve it.

WHAT ARE THE CAUSES of bad production? Or more positively, what constitutes good production? As is the case with any serious venture, good production demands preparation and planning—lots of it! Obviously, programs, announcements, etc., can be "thrown" together or just allowed to happen (as they do every day in some operations), but you can bet that that's the way they sound. Production control in broadcasting can be compared with quality control in manufacturing—laxity in either case must result in an inferior product. How can you inject new life—production—into your sound, if yours is a small market station? Here are nine ways:

Preparation

The lack of adequate preparation will ruin any production—and ultimately drive listeners to turn their dials in disgust. This common fault is not a malady of the neophyte; it often accompanies disinterest and overconfidence in seasoned veterans. Lack of preparation often is evidenced by poor cues, stretched themes (open and close), stepped-on or delayed intros and tags or segues, long unscheduled pauses, etc. Of course, each of these bugaboos can occur at times in any station, regardless of the amount of preparation. But when they are common practice, it's glaringly obvious that something is wrong. The only cure is for the program department to encourage and emphasize good broadcast habits such as getting to work on time to prepare for the day's assignments, becoming familiar with any new programming, pulling music in advance of air time, etc., so that the announcer has a chance to "catch his breath" before beginning his trick.

A certain cause of poor production is a lack of reliable communication between the air staff and the program department. Where person-to-person messages are relied upon, the proverbial "weak link" all too often results in a broken chain. Each staff member should have an assignment box where he'll find memos with special instructions, program and production changes, etc. That way, no one can forget to "tell him something." Also, when remotes or taped programs are scheduled, a warning should be typed on the log—in red capitals—well ahead of air time to alert the announcer. These positive methods of communication never leave the individual in doubt, a disconcerting feeling for anyone.

Long unscheduled pauses are often caused by the lack of appropriate material to fill several seconds or more prior to a network join or to round out a program segment. The solution to this problem is to formulate a folder containing a series of cellophane jackets or pockets in which a variety of material is kept within easy reach—emergency announcements, a variety of station breaks, promos, intros, anything to keep announcers from getting out on that limb. Some stations use large easy-to-read wall posters to provide the filler material to maintain continuity and avoid awkward situations.

Distraction

Any factor that tends to divert attention should be strongly discouraged. Visitors, without realizing, can destroy the effectiveness of an entire program. Off-duty staff members should be discouraged from loitering in the studio because they surely will distract the man on duty. Telephone calls should not be forwarded to a man while he is on the air, unless it is a true emergency. A conscientious producer (which is what every announcer is) will not encourage calls not connected directly with his program. Distraction in any form will reflect unfavorably upon production. Encourage concentration by discouraging distraction.

Technical Problems

One of the most distracting and irritating elements with which a broadcaster must contend is equipment in need of attention—an obvious contributor to poor production. Most stations, particularly progressive stations, strive to maintain their equipment. But there are cases where equipment is permitted to remain defective in one degree or another—sluggish turntables, intermittent switches, offspeed tape machines, etc. When such conditions are tolerated or ignored, even the most seasoned air man cannot turn out professional production.

It must be emphasized that equipment mal-

Mr. Fisher is a noted broadcaster and consultant. Material is from his forthcoming book, "The Program Director's Ideabook" (TAB Books, Blue Ridge Summit, Pa.).

Simplify Equipment Setups

To avoid confusion it is a good practice to identify all controls, switches, etc., in the control room and production studio. This is most easily and simply accomplished by typing the function on an adhesive tab which is attached above or below each control. "Mixer 1, 2, and 3, Mic 1, 2, 3," etc., means little to nontechnical people, but "Turntable 1, Turntable 2, Tape 1, Tape 2" doesn't leave any doubt as to the purpose of each control. By identifying the control and switching for each piece of equipment, even the least technically inclined individual is less apt to commit errors.

Frequently quite confusing, particularly to those with little engineering inclination, is the typical audio patch panel. Those "neat little rows of holes" are bewildering, and unless each pair is clearly identified (by labeling and an accompanying diagram) there are numerous chances for error. Each operator should have at least a rudimentary understanding of the basic functions and purposes of the patch panel, and those often-used arrangements should be diagrammed so that laymen can quickly set up for the operation. Also, detailed instructions for specialized patching needs should be prepared by the engineering department. Complicated patching for dubbing and other routine functions should be avoided by "wiring through" or by the use of switching. It's virtually impossible to get things too simple for some; engineering personnel should keep in mind the confusion caused by what seems simple to them.

Clean Environment Helps Clean Production

An untidy control room or studio often results in similar production. The psychological effect of clutter—unused equipment scattered around the control room, wires and cables draped over and around the control room, wires and cables draped over and around the desk and racks—takes its toll in reduced efficiency and enthusiasm. Haphazard equipment installation reflects a disorganized attitude and may cause some individuals to believe that management doesn't really care about its on-air sound—"just as long as it gets on."

Carelessness with used coffee and soft drink containers, sandwich wrappings, paper, tobacco ashes, etc., detracts from a tidy appearance and should not be tolerated. Litter surely results in frustration and is certain to have a negative effect on attitude. Without developing fetishes, management should institute and enforce reasonably strict rules regarding the appearance of the control room, studios, record room, transmitter room, in fact, the entire plant. It will pay off in improved overall performance.

functions can't always be laid at the door of the engineering department. Sometimes announcers are lax in reporting trouble, and unless the engineering department is aware of trouble it surely can't repair it. Policy should dictate that faulty equipment performance be reported *in writing* as soon as detected. In this way technical problems can be corrected before they reach severe proportions. Also, every staff member should be acquainted with emergency operation procedure so that he will know precisely what to do when the occasion arises.

Inadequate Equipment

Don't expect the ultimate in production unless your staff has adequate equipment with which to work. Unfortunately, some owners choose to economize in the area of equipment, and in so doing they hamstring their operation. If elaborate dj production is desired, a man cannot work with a tape recorder and two turntables; he cannot achieve that snappy production requiring a series of short inserts with a single tape cartridge machine; errors are bound to occur if he has to work with only two turntables on which he must play both music and e.t. spots. There is a limit to what reasonably can be expected from any given control room setup, and if your production demands exceed the technical capabilities, how can you hope to avoid poor production? There is much to be said, also, for the frustrating effect inadequate equipment has on the air man's morale. The very fact that he is expected to produce beyond the capability of the equipment saps his enthusiasm. A teletypewriter, a phone, and a typewriter, for example, is hardly adequate equipment for a news-conscious station. A beeper phone, portable tape equipment, a variety of mics for special circumstances, mobile gear—all are necessary for efficient operation. Certainly it is possible to overestimate equipment needs, but there seems to be a greater tendency to underestimate. The important point is that the control room should not be the first place to cut in an austerity drive—that is, unless production means nothing.

Programming

Stagnant, stale formats and hackneyed productions are powerful audience chasers, not to mention what they do to announcer morale. A sweep of the radio dial in almost any area will reveal bored announcers rattling off intros, etc., with an ill-concealed lack of enthusiasm. If such is the case, you can imagine the effect such programming has on the listener. One way to overcome stagnation is to *personalize* your programming. Give your air staff a chance to produce, let them use their ingenuity; provide them with an incentive. Call a staff meeting to discuss program problems and watch the ideas pour out. Ask for suggestions. You'll get plenty. Weed out the deadwood and put a refreshing new sound on the air. Work for originality. Any man (or woman) worth his keep is waiting for the opportunity to show what he can do. Encourage him!

Tapes and Recordings

Another negative factor that makes for poor production concerns worn-out, brittle tapes and damaged records. Tapes wear and become brittle with use and age; therefore, they should be inspected regularly so as to sort out and replace defective reels and cartridges. Announcers should be required to report damaged records and to mark an X on defective sides or cuts with a marking crayon. That way, the record or album can be returned to the library for use until a replacement is obtained.

Care should be exercised in splicing tapes, using only the type splicing tape recommended for the purpose, and in cleaning parts of tape machines that come into contact with tapes. Heads, pinch rollers, etc., should be cleaned regularly with denatured alcohol to remove the emulsion residue that accumulates from continued use. Magnetic buildup in tape heads will cause crackling noises. Unless your machines have built-in head demagnetizers, a manual demagnetizer should be used periodically to remove the accumulated charge. Also, attach leaders to all reel-to-reel tapes to facilitate threading. To improve production and reduce errors, paste small labels on reels or cartridges to identify them by advertiser or program. It's a good idea, too, to identify clearly commercials or programs recorded on reel-to-reel tapes.

Recordings should be handled very carefully. Fingers smudge the delicate surfaces, and hurried cueing and backtracking can cause untold damage. Fingers should never come into contact with the grooved surface on a record. It's easy to remove a record from its jacket by grasping the uncut edge, then letting the disc slide out in your hand, and support it by the edge and the label (center). A piece of cloth and a cleaning fluid should be available in the control room.

Damaged playback heads certainly do not contribute to good production, therefore, they should be handled very carefully when placing them on or removing them from a record. To protect playback heads and records, it's a good idea to discourage backtracking as a cueing method. This can be done by starting the record at a specific spot (marked with an arrow on the label) and counting the number of dead grooves to the beginning of the recording. To eliminate the necessity of counting each time the record is used, jot the number of dead grooves on the label. Then it is necessary to run the record in a half or quarter turn less than the number on the label.

Poor Timing

In this category we find the overtimed show and the undertimed production, the bad practice of running into a time beep, the extremely fast speaker who is difficult to understand, the annoying opening theme music that stretches out and says, "Sorry, there's no one in this control room." Then there's the dull and monotonous theme filler at the end of a show and, of course, that amateurish giveaway, "Sorry, we're late." There are produced announcements that show an obvious lack of timing, both from the standpoint of content and production.

Unless you have time to rehearse completely an entire show, it is a good idea to allow for fill of some type, but plan it that way. Instead of filling with theme, run down a few program highlights, read a public service announcement, etc. Another trick is to backtime the theme and start it (with closed fader) so that it will run out at precisely the right time. Then it can be brought in under. Another way to allow for short timing is to make the last record an instrumental. Then you can fade, talk over the music and crossfade to the theme. If a show or segment turns out to be overtimed, the next to last record can be deleted and the instrumental substituted. These techniques work well for the dj who has a show several hours long. He must go into and out of each hour on the button, if he is to sound professional.

Produced spots with a music background sound produced if the music ends just after the conclusion of the announcement instead of being faded. There are several ways to do this; of course, the easiest is to use a one-minute cut on special albums which are available. Another method is to tape the music, then edit the tape to the desired length. Extra trouble? Sure, but it sounds professional. Some announcers with years of experience never seem to learn to time their speech. They can talk at but a single pace. Others have the ability to speak slow or fast without losing effectiveness or falling into poor diction and enunciation. Practice is required to develop the ability to time your speech, but it's surprising what 15 minutes practice a day will do.

Poor Copy

Announcers can speak only as effectively as the words put into their mouths by your copy; in fact, even the most experienced announcer will sound amateurish if he is given poor copy. To sound believable, an announcer must feel poised and at ease, but how can he feel poised when his copy is written in an unnatural manner, carelessly phrased, poorly constructed? An announcer is a living producer, and if he must force himself to speak in an affected, assumed manner he will sound artificial.

The highly desired quality of believability, when developed in a broadcaster, attracts listeners and steadily builds audience rating. Here are a few of the elements that should be considered in copywriting to create believability:

- Stick to informal phraseology
- Employ a conversational manner of expression
- Develop the person-to-person approach
- Use simple sentence construction and an everyday vocabulary
- Avoid affectation and flowery terms

Copy should be prepared on a large-character typewriter especially designed for the purpose so that the announcer can read it without eyestrain or error! Sales points and special descriptive words and phrases should be underlined to aid in proper interpretation. Pauses should be written-in to encourage free flowing delivery—some copy writers use a series of three dots instead of a comma.

The copy file should be inspected regularly to weed out stale, outdated continuity. It's surprising how the mere substitution of a new opening line or reversing sentence structure will keep copy fresh and alive, giving old copy a new sound. The announcer must be furnished with copy that he can deliver conversationally, sincerely, and informally. On the other hand, an announcer must be capable of talking a commercial, not merely reading it. After all, it doesn't take much experience or know-how to *read* a commercial. Yes, copy is a very important part of good production, much more so than many realize.

One-Man Operation

Obviously, small-market stations must operate with a smaller staff than those employed in stations in larger markets. But that's no reason why small stations can't produce, no reason why they have to sound small. There are several tricks—in most cases quite simple—which will create the illusion of a larger staff.

Of course, the most obvious way to alleviate the announcer shortage is to hire part-time local talent and train them. In most areas there is talent waiting for such an opportunity—students, newspaper people (might help local news, too), salesmen, who knows? Part-timers can be used to break up those long weekend shifts, a time when most small stations sound their worst.

The advantages of a large staff can be simulated by recording intros, promos, special features, etc. Obviously, this inserts an array of voices into each program segment. Have your morning man record afternoon and evening material, the afternoon man record morning inserts, etc. Cross promotionals are good as audience builders, too, because they give exposure to the morning man in the afternoon, the afternoon man in the morning, etc. Public service announcements can be taped for spotting throughout the day, as well as commercials which do not have a special production. By using these simple devices, your station will sound as though it has a much larger staff than it actually does.

Another good idea is to have chairmen of fund raising campaigns, club officials, etc., record promotionals for their activities. In addition to the voice change, they provide local voices and increase listener interest. The same can be done with commercial accounts. It's often surprising the number of advertisers who like to do their own announcements, and this method is especially useful where an account wants frequent copy changes. Have him record a week's supply at a time and simplify your traffic and production. With all the possibilities, there is no reason why a single announcer's voice should be the only one heard for hours on end. Such refinements as these do not require hours of daily work; an occasional recording session will keep the material sounding fresh.

As is surely obvious to thinking radio people, production is more than a meld of several basic elements into what is called a program. For every basic ingredient there are small details that cement the raw material together. For example, a production might include music and an announcer—the raw ingredients—but to make a real production out of them, good equipment, fresh, lively continuity, and thorough planning are absolutely necessary. To fail in adding the ingredients that bond the entire effort together is to seal the fate of the production—even if it is "just a spot." "Production" doesn't just happen in any station—big or little. It takes planning and effort to get the wheels rolling, but as soon as the staff is caught up in the electrifying results, they'll help in putting the polish on your overall sound. ●

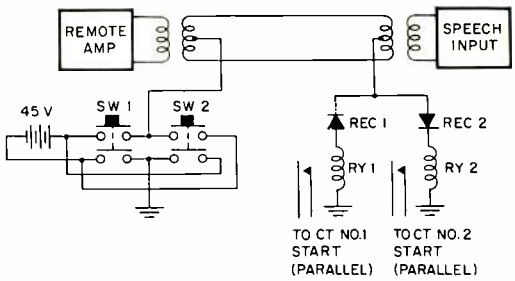
Remote Cartridge Setup
By Nelson Rupard, KIND, Independence, Kan.

Smoother production of cartridge tape recorded commercials in local remote broadcasts (sports, etc.) can be achieved when the remote operator starts each commercial through use of the circuit shown below. Push-button switches Sw-1 or Sw-2, operated from the point of origin, will activate either one of two studio cartridge tapes.

This procedure eliminates obvious (annoying) word cues or less obvious (confusing) cues and makes for tighter production. In addition, the studio operator is freed from the board for more productive work.

Maximum benefit can be achieved if a series of commercials is recorded on long-play cartridges. One cartridge can be used for one-minute announcements and another for shorter announcements, suitable for various length breaks in the event being broadcast.

The same results can be achieved, at greater construction cost, with low frequency tones and filters that will work equally well on long line remotes that require repeaters.



SW 1, 2 DOUBLE POLE, NORMALLY OPEN

RY 1, 2 TELEPHONE TYPE RELAY, 5000 TO 10,000 OHMS

REC 1, 2 ANY SUITABLE RECTIFIER

Harvey's is selling stuff you may not know exists.

There's an information gap in the broadcast and recording fields today. Sometimes we find ourselves distributing an exciting new product that many professionals don't even know exists.

For example, did you know that there's a new boom headset with built-in microphone that's so light you can actually forget you're wearing it? It can pick up two different signals at once. It's interchangeable with any standard boom headset. And if you want one now, Harvey's is the only place you can get it.

Also, there's now a complete console mike channel so small, you can hold it in your hand. Yet it includes a fader, program equalizer, line-mike switch with input pad, reverb-send channel and pre- and post-echo switch. With a few of them you can put together a complete console in a couple of days instead of months. It's revolutionary—yet, just about the only people who know of it are Harvey customers. Because just about the only place you can get it is Harvey's.

There's much more that's new. We have several new low-cost microphones that sound just as good as the most expensive mikes of a few years ago.

And so on. And so on.

Harvey's is in the habit of finding new equipment and distributing it before anyone else does. Often before anyone else knows about it, in fact. That's why almost every major sound studio and radio station already deals with Harvey's.

Help us close the information gap in the broadcast and recording fields. Call or write Harvey's regularly.

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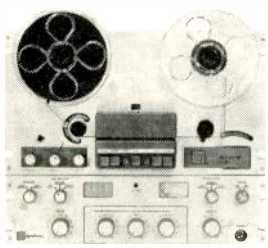

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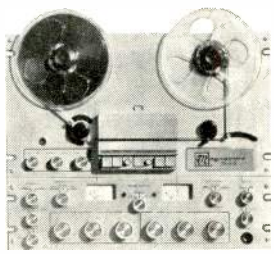

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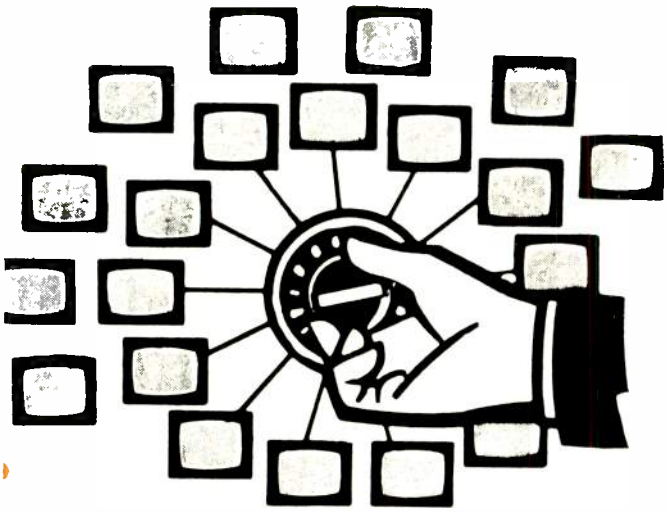


Twenty Channels, But How?

Q. What chance is there for CATV in a metropolitan area that now gets 12 channels satisfactorily?
A. Provide 20 channels.
Q. How?
A. That's a good question.

The answers suggested at the Annual Meeting of the Pennsylvania and New Jersey CATV associations were several, but each expert hedged. "We don't know what system will prove best by the time the final bell rings," said Kaywood Cooley of Jerrold. At the national NCTA meeting last June, AEL spokesmen Dr. Leon Riebman and Walt Wydro urged NCTA to take the lead in recommending which approach to a twenty channel system should be recommended to CATV owners. At the Philadelphia meeting, Wydro was plumping pretty hard for the expanded band system. Three speakers appeared on the panel and three different approaches were described. From the floor came a fourth.

1. Wide-band system: Uses the spectrum above channel 13 between 220 and 270 MHz for extra channels. Chief advocate was AEL, who said their amplifier extended that far.

2. Mid-band approach: Uses the spectrum between channel 6 and 7, generally the band from 108 MHz to 174 MHz. Kaiser CATV currently uses the mid-band approach in an operating system using frequencies from 121.25 to 157.25 MHz.

3. Octave band approach: Uses 20 channels between 120 and 240 MHz. This is the approach most favored by Jerrold at this time.

4. Dual coaxial cable approach: Uses two coaxial cables, each carrying 12 channels. Some operators are favoring this approach in view of problems that can be encountered with the other methods.

The biggest unknown that might affect the mid-band or expanded band is the second order harmonic problem. These are sum and difference frequencies of all input signals caused by any nonlinearity in the amplifier. Second harmonics are not a problem in the octave band method, since beats fall outside the band. A principal drawback of the octave band is that low band signals have to be converted, thus giving up direct selection and tuning of channels 2 to 6. A converter at every customer's set is necessary even for 12 channel reception. Also, there is no guard band between channels. The dual cable approach bypasses these difficulties (only a switch, and not a converter, is needed), but the cost of two sets of cables, amplifiers, taps, etc. should make it the most expensive approach.

Wydro of AEL claimed the expanded bandwidth approach was logical since 300 MHz cable is available and the state of the art of transistor amplifiers make amplification no problem. Key to wide bandwidth amplifiers is improved distortion characteristics. If there is no distortion, second order harmonics are no problem, Wydro said. The current good performance now achieved for

12 channels can be provided for 20 channels, he claimed. (AEL introduced at the 1967 NCTA Convention a 270 MHz trunk extender amplifier.) To assure the operator of getting the best in amplifiers, Wydro proposed that NCTA adopt a signal-to-distortion ratio which would measure second and third order harmonic content. Amplifiers need to be free from distortion or problems of color subcarriers beating with the video carrier of another channel will be encountered. There should be no differential phase shift introduced by amplifiers.

Sum and difference second order interference of good amplifiers is near the noise figure or noise level of amplifiers. Very "clean" test equipment, having no second order harmonic content of its own, should be used in running tests, Wydro advised.

In commenting on other systems, Wydro said little about the mid-band approach, although an NCTA paper by AEL raised the possible problem of radiation interfering with air navigation and air communication service in the 108-136 MHz band. Wydro opined that the converter required by all 20 channel systems (unless set manufacturers build in converters) is the weak link now and that the one octave method was most dependent on the converter (since the low band channels have to be converted too). "But," he concluded, "I don't think anyone can show that any one system has it over any other system."

Gay C. Kleykamp of Kaiser CATV was the only panelist able to speak from real experience. Kaiser CATV has its Phoenician series line amplifiers operating mid-band in a system operating at Merced, Calif. (owned by General Electric Cablevision). Kleykamp was a paragon of circumspection. The fact that the Merced system operates with 14 channels and 42 amplifier cascades without noticeable degradation is not proof that all similar systems would operate satisfactorily, Kleykamp said. Kaiser has also run simulated tests in the lab of a 19-channel system without degradation, but Kleykamp said this didn't mean all 19-channel, 42-amplifier systems would work.

Addition of mid-band channels depends on the individual amplifier's output primarily, Kleykamp said. Amplifier noise determines the minimum amplifier input signal level. Factors to be evaluated, according to Kleykamp, include:

1. Amplifier output must be sufficiently high to permit deration. In addition, the amplifier must have linear output level vs cross-modulation characteristics.

Cross-modulation products increase by 6 dB each time the number of cascaded amplifiers is doubled, based upon voltage addition factor, 20 log N. However, for each dB reduction in output level, the cross-modulation decreases by two dB. Therefore, with a simultaneous system output level reduction of 10 dB per octave with increasing number of amplifiers in cascade, the required 20 dB per octave reduction in cross-modulation is accomplished to result in no overall increase in the cross-modulation by cascading. If, for example, one amplifier is operated at +50 dBmV and cross-modulation down 57 dB is maintained, then, if that amplifier were operated at a +47 dBmV output level, the cross-modulation would be down 63 dB, and two of these identical amplifiers in cascade would result in 6 dB worse cross-modulation, or, at the +47 dBmV output level, the cross-modulation would be down 57 dB on the output of the *second* amplifier.

2. Deration for additional television channels is assumed to be on a voltage basis (20 log N). This is in accordance with accepted theory and may be mathematically proven.

3. Conversion and mixing methods must result in clean head-end output with all spurious frequencies down at least 50 dB.

4. Pilot carrier signals must be protected for adjacent channel interference on the system by adequate "guard band" separation.

5. If normal amplifier spacing is retained, the amplifier noise figure must be sufficiently low as to permit the use of lower input levels without noise degradation.

6. The television channel converter must be designed so as to provide adequate adjacent channel rejection, switching isolation, and add insignificant noise and cross-modulation products. It should also be easily tuned.

7. One should guard against mid-band conversions that will produce second order harmonic distortion problems, although no second harmonics are observed in test or actual use.

Kleykamp said he agreed with Wydro that no one method is necessarily better than another.

Kaywood Cooley of Jerrold, backing the single octave approach, declared that he was not yet convinced that second harmonics would not be a problem. The band Jerrold has selected is the 120 to 240 MHz which includes part of the mid-band area.

Cooley's concern over second harmonics includes:

1. Second order beats do not behave predictably, nor do they have a set mathematical progression from amplifier to amplifier. (Beats may be objectionable at one location, better at another.)

2. Differential group delay is also not predictable.

3. Local oscillators cause a problem. For example, if one set is tuned to channel 5, 77.25 MHz, the local oscillator output is 45 MHz above this or 123 MHz. This frequency leaking out of one set could cause a 1.75 MHz beat on another set that has a converter tuned to channel A (121.25 MHz).

4. Second order beats or harmonics can cause interference on many channels. For example, channel 7 minus channel A is a 54-MHz signal—only 1.25 MHz below channel 2; channel 8 minus A interferes with channel 3; channel C (133.25 MHz) minus channel 2 causes interference on

channel 5. Channel C minus channel 3 causes interference on 4 and so on. Channel A plus 2 causes interference on 7, A plus 3 on 8 etc.

Cooley said he would be quick to try the mid-band approach as a means of expanding an existing system, but if he were building more than 12 channel systems in a metropolitan area, he would stay with the single octave system.

Although there is no guard band in the single octave system, this is no limitation on operation and is not a problem with converters, Cooley said. It's easier to equalize a single octave system than wide band types, Cooley added.

Operators attending the session were a bit skeptical. Henry Kamikowski wanted to know why extension of the low band wasn't considered. Others, including Lou Seltzer expressed doubts in customers being able to use converters properly. (They can't even use the fine tuning now on a TV set after 20 years of TV.) All thought it would be desirable if set manufacturers would have converters built in, but that would require some agreement on standards, and that day doesn't appear very near as yet. [*Ed. note*: The NCTA standards committee has discussed the problem but with different manufacturers advocating different answers, agreement will be hard to reach. The operators on the committee may find it difficult to analyze the problem objectively without appearing to take sides.]

Converters for CATV

The converter is necessary—a necessary evil, in the minds of some—if you want to distribute more than 12 channels. International Telemeter Corp. sells two models for this purpose: the Channel Expander, $38.15, for adding up to 13 new channels to a system (9 mid-band, 4 interspersed in the 216 to 240 MHz band), and the 25 Channel Converter illustrated, $46.50, for furnishing 25 channels (all converted from 55 to 88 MHz and 120 to 240 MHz to channel 2 or 3). Other manufacturers are Standard-Kollsman and Hamlin, although ITC claims their sets infringe patents assigned to ITC.

What Other Manufacturers Think

BM/E asked for the opinions of other CATV line amplifier manufacturers on the subject. We asked if manufacturers were producing equipment for use in higher than 12 channel systems; the practicality of 20 channel systems at this time, the need for standards and requirements of converters (built-in or not) etc. Answers received at press time follow.

John J. Meny, CAS Mfg. Co.

Before we offer our thoughts, we wish to emphasize one point. Since there is certainly nothing magic about the number 20, or any other number for that matter, when considering additional channel capability for a cable system, we definitely prefer not to speak in terms of specific numbers but rather in terms of additional capability through an "expanded channel" system.

Our thinking in this regard has been based on two premises. The first and most important is that the investment already made in CATV physical plants must not be depreciated through undue obsolescence. The second is that any proposed solution must follow good engineering practice and be economically feasible. Applying the first premise has led us to favor a system which preserves the existing channels where they are and add additional channels in available space over the present all-band amplifier range of 30-220 MHz. We are somewhat opposed to the concept of the 120-240 MHz system since it not only introduces the highest obsolescence factor yet proposed, but uses the part of the present spectrum where losses are highest.

Since any expansion beyond the 12-channel capability of existing receivers demands a converter, we would further lean toward a plan that relates the converter to the additional channels and allows standard sets to receive standard channel signals. In fact, it is quite conceivable that this technical approach could also lead to additional controllable revenue through off-band channels and system supplied converters.

At the present time we are producing new head-end equipment which is readily adaptable to any expanded channel concept proposed. Our existing line equipment is completely usable in its present form for expanded channel coverage in the 30-220 MHz range.

We do not think any expanded channel coverage will be practical until some industry standard has been established. We would further recommend that no operator buy any equipment that will commit him irrecoverably until a standard has been set.

Naturally the ideal converter would be somewhat difficult to describe until its exact functions are defined. In general, however, it should provide switch selectability with fine tuning rather than continuous tuning. In this regard, detent positions on a continuous tuner could be accept-

able. Another possible alternative would be to convert the entire band to uhf and use the existing uhf set tuner. In any case, the converter stability must be equivalent or better than that of the associated receiver. While the price of the converter will depend on the technical requirements, we do feel it should be low enough to permit either direct purchase or to be supplied as part of the cable service.

We don't feel it would be feasible to attempt to get set manufacturers to design in converters until some standards have been established.

Robert A. Brooks, Spencer-Kennedy Labs., Inc.

There is no doubt in our minds that the most serious problem with 20 or more channel systems operations is the fact that there are presently no industry standards for this operation and apparently no active effort to create any. Here at SKL we have considered all the four approaches you mention and, after careful consideration of the advantages and disadvantages from a technical, practical, and economic point of view, we feel that the split-band amplifier technique is the soundest method of operation of 20-channel systems at the present time.

We propose the splitting of the 54-216 MHz band into two. (This technique has been used in the past and in fact, is currently being used in many distribution amplifiers.) Each station, therefore, will have two amplifier sections; one section could be the existing amplifier in presently built systems, the additional amplifier section would contain directional filters to separate the two bands for recombination after amplification. One section would carry six channels and the other fourteen. These may be grouped so that some of them could be converted as a group, giving the opportunity of offering two types of service on the same system, 12 channels (without converter) and 20 channel. Conversion can be incorporated in the distribution amplifier so that the additional channels will be distributed in uhf band taking advantage of present television sets' built in capability to accept uhf.

Considering that this approach does not change present amplifier spacings or passive line equipment (permitting simple conversion of existing systems) and that 12 of the channels are standard frequency, we are convinced that the split-band technique is the answer for 20-channel systems. Also, with the lack of industry standards, CATV operators are not being asked to build in early obsolescence.

Michael J. Rodriguez, Vikoa, Inc.

There exists many contradicting views amon gthe manufacturers as to which approach is best to 20 or more channels. However, based on my own personal exposure and conversations with system owners and/or operators, it would seem that they prefer the use of the mid-band particularly during the "transition" period between normal 12 channel to service to expanded channel use.

Vikoa's approach in providing expanded channel service is to use the frequency range between 120 MHz and 174 MHz for the allocation of 9 additional 6-MHz-wide channels. At this time however, it is not certain that all 9 will be utilized since a 6 MHz "guard" band may be necessary between 168 MHz and 174 MHz. The frequency range between 88 MHz and 108 MHz will be left undisturbed for fm use, while that between 108 MHz and 120 MHz is to be avoided as a precaution against possible interference with aircraft navigation and communication. The interference problem, within the system, resulting from second-order distortion products (e.g. second harmonics of low band carriers interfering with mid-band channels) will be solved by proper design of the equipment itself. It is Vikoa's philosophy in taking this approach, to allow the system owner/operator as "painless" a transition as possible. This is possible for several reasons.

1. Vikoa's present 12-channel equipment (i.e. Futura series of amplifiers) is completely modular, and whatever new equipment is developed for expanded channel use will be in modular form and interchangeable. (E.g., to convert a 12-channel amplifier to a 20-channel device it is only necessary to exchange modules without necessitating the changing of the case or respacing the system.)

2. The use of the mid-band offers the owner/operator the option of building a 12-channel system today which he can expand to 20 channels tomorrow without worrying about respacing or excessive modification costs.

3. Restricting the total frequency spectrum to two octaves (54-216 MHz) simplifies the equalization problem and the necessary corrections and compensation for temperature vairation

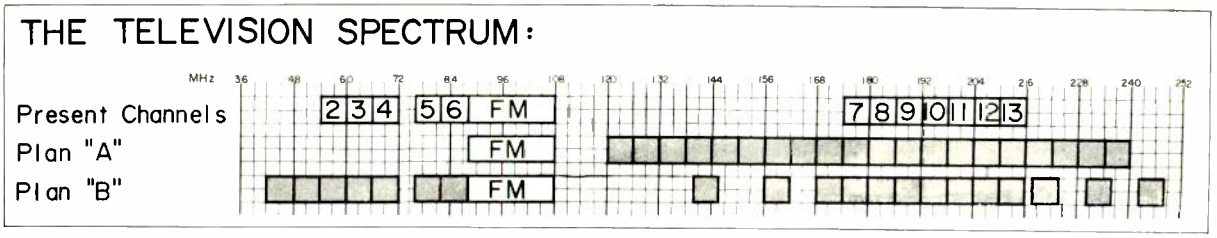
4. A system owner/operator once having installed 20-channel equipment can offer both 12- and 20-channel service simultaneously. Those customers interested in only 12 channels would receive signals in their homes utilizing their regular TV receiver. However, those willing to pay a premium for the 20-channel service would be provided with a converting device which would then allow them to receive all 20 channels.

It is Vikoa's plan to provide complete 20-channel systems. This means that all the equipment from head end to TV converter will be made available.

Regarding standardization, I can only say that it is quite doubtful that the industry will succeed in generating the necessary standards prior to the sale of equipment.

H. James Carter, Entron, Inc.

Yes, we are quite convinced that systems carrying *at least* 20 channels are practical. Our present thinking is the expanded band approach. Some of our present equipment has been made with this in mind, although the complete line is not yet available. There are a number of converters already available which could be used in the subscriber's home, and at least one of these is outstanding. Certainly it is not nec-



essary to get set manufacturers to design in converters, although it would be to everyone's advantage if this were done. Such an instrument would undoubtedly include a coaxial cable connection directly at the front-end of the set. The advantage of this, together with the valuable asset (to the customer) of ready access to the channel selector, is obvious.

If we are to avoid confusion for the operators, it is essential that industry standards be set as soon as possible. It is my opinion that very few operators will go to 20 channels until they have reasonable assurance that their investment will not be obsolescent the day equipment is installed.

Don Steele, Cascade Electronics, Ltd.

We now have workable 20-channel equipment in an evaluation program, and are moving it toward production. We don't, however, know all the answers and don't feel that anyone *will* until 20-channel systems are in day-to-day operation.

Certainly, the need for more channels is just around the corner. The logical first step from 12 channels is to 13 channels—then 14, 15, etc. Only by putting systems into operation and adding channels as program material becomes available can the attendant problems be identified and dealt with.

Our "20-channel" prototypes operate over a bandwidth of 40-250 MHz, and are not limited to any one frequency plan. Many frequency usage schemes can be employed with the same Cascade equipment. The choice is made by the operator, himself, according to the needs of his own system and subscribers.

Because of our modular construction, existing amplifiers are readily converted to 20-channel operation by replacing only one circuit module. Thus, new technology can always be applied to existing equipment.

Converters, of course, will continue to improve along with everything else. Our experience with them is limited, but most of the current offerings seem adequate. By using "Plan B" (in the accompanying illustration above), the operator can leave his present 12 channels as-is, and provide additional programming only to those subscribers who have the necessary converter.

Ours is not a wait-and-see attitude: we are going ahead full-bore on wideband amplifiers. We expect to continue to provide equipment to suit the requirements of the system operator, and not to require him to adjust his needs according to the equipment available.

J. Earl Hickman, Ameco Engineering Corp.

Several interesting possibilities are open to the prospective twenty-channel operator. If his amplifiers have a frequency response characteristic suitable for transmission of additional channels between channel 6 and channel 7, he may wish to use these frequencies. His agc system must also be compatible with this method of operation. In this way he can retain his twelve standard channels and continue to deliver them to subscribers without converters. Due to intermodulation distortion, some system quality degradation will be experienced unless two separate amplifiers are used in parallel, each amplifying only half of the band. This method keeps the frequencies passed by either amplifier from being harmonically related.

Converters at each TV set will be necessary to receive the extra channels between channels 6 and 7.

Now, if an operator is building a new system or if his tapoff devices and amplifiers are good out to 240 MHz, he may elect to use a band of frequencies from 120 to 240 MHz or any other band such that the frequencies within the band do not have harmonic relationship. The lowest frequency band having twenty-channel capability without harmonic relationship is 120 to 240 MHz. Note that the lower standard vhf channels are not available without conversion. In this system all cable, trunk amplifiers, bridging amplifiers, distribution amplifiers, line extenders, line splitters, and tapoff devices must be capable of proper operation through 240 MHz.

Of course, the band of frequencies below 54 MHz may be used to carry additional channels. The same precautions regarding harmonic relationship apply, however, and are more difficult to handle. Again, the frequencies must be converted to make them compatible with TV sets.

In any event twenty-channel operation is difficult, economically and technically. Several workable options are open to the operator. A study of his particular problems is necessary. At this time Ameco recommends no single approach, but is willing to assist the operator in studying his problems.

Isaac S. Blonder, Blonder-Tongue Labs, Inc.

Any discussion of systems carrying more than 12 channels simultaneously requires a systems outlook including the receiver, the distribution system, and the head end. Let's look at the receiver first.

The U.S. TV set is designed to receive vhf-TV stations and every sixth uhf station, according to the FCC radiation standards for TV transmission and reception. Thus, the maximum channels carried by FCC standards would be 7 vhf and 12 uhf or 19 channels in all. Such a CATV system would have the advantage of simplicity, high tolerance for TV set defects and freedom from spurious signals. Its drawbacks are: difficulty in distributing signals at uhf (470-890 MHz), lack of a uhf click tuner and local pickup due to poorly shielded sets (300-ohm input) and the fact that not all receivers are all-channel TV sets.

If adjacent channel CATV systems are used, the technical performance of the TV receiver should be markedly superior to the receiver designed to FCC requirements. Adjacent channel sound and

picture traps are mandatory, as well as good image rejection, oscillator stability and low radiation—both from the TV set and the CATV system. Temperature or crystal stabilized converters at the head end are also necessary. The average TV receiver sold today does not have adjacent picture and color subcarrier traps. The sound trap is a cancellation type with 60-dB attenuation, but extremely narrow, so that fine tuning out the sound bars is a precise task. Adjacent visual carrier rejection is only based on the i-f selectivity and runs 30-35 dB. Solid-state tuners and i-f's are now appearing. I-f selectivity and trapping reportedly is at least 6-dB poorer. The solid-state vhf tuner will cross modulate sooner than tube versions, probably requiring closer control of the input levels than is now the practice.

In considering channels available in the spectrum, we must assume fm carriage and protect the band from 88 to 108 MHz, except that to protect channel 5, one might better transmit fm from 90-108.

The region between 108-136 should also be avoided since radiation from a system into the aircraft communication and guidance frequencies will be impossible to control. The CATV operator may believe he can monitor the cable systems to prevent radiation, but the same cannot be said of the home environment.

Most present CATV amplifiers cover 54-216 MHz. If frequencies outside this band width are to be considered, we should consider tailoring the bands to cover one octave, thereby avoiding the 2nd and 3rd harmonic problems found in the present two octave amplifiers. Admittedly, it is now feasible to construct 10-1000 MHz amplifiers, but we will assume that octave amplifiers, combined by cross over filters, give better performance for less money.

Assuming that 6 MHz is adequate for combining filters, a suitable frequency range for a subchannel octave amplifier would be 24-48 MHz, allowing 4 channels to be carried. Economically, this band is a poor choice since we get only 4 channels for the cost of octave amplifiers, combining filters and a set converter.

Probably the most likely area for extra channels is 138-174 MHz. Six channels can be dropped in if we disregard the second harmonics from the low band—a dangerous practice in my opinion. Some respacing may be needed on present amplifiers if they have to operate at low output levels to compensate for the additional channels to be amplified and the need for reduced second harmonics distortion.

Depending on the state of the art, high band octave amplifiers could cover either from 138-276 or 174-348 MHz. Again the question of interference with vital services due to accidental radiation must be settled, preferably at FCC level, before a decision to use these frequencies is warranted.

If the technology now used for long lines were feasible for CATV systems, we could obtain 70 channels without going beyond TV's assigned frequency spectrum for uhf of 470 to 890 MHz. It is now possible to build MATV systems carrying uhf signals directly on the cable, but this is not practical now for longer mileage CATV systems.

One expensive possibility is the multicable system. Although installation cost may appear to be less than the same multiple of the original plant, this is probably illusionary because of the added technical competence that will be required. No leakage is permissible: otherwise, the shield becomes energized and the adjacent cables will pick up each other's signals. However, the major problem is the customer tap. RG59 could not be used for adjacent cables because of the cross coupling (two cables in open air ungrounded would only have an isolation of 40 dB.) and aluminum shielded cable would be awkward to use. Copper foils, etc. still have leakage. Therefore, a cable-powered, strand-mounted coaxial switch of high isolation (50 dB+) would have to be used. (Currently such switches cost $35.) No pressure taps would be advisable because of the leakage; and the tap plus switch, even if lowered in cost by production economies, would undoubtedly rival the set converter in cost and maintenance problems.

Microwave carriers are only suitable for trunk substitutes, and would probably exceed conventional trunks in cost except for metropolitan areas. After the microwaves are detected, the problem still remains on the carriage of more than 12 channels to the subscriber.

The technical problems in carrying more than 12 channels on the trunkline are minor compared to the problem of the receiver. Even where the converter is promoted as a remote control, it only serves the function of channel switching and is distinctly a handicap with a remote control set. Maintenance is the major issue since an active device is now placed in the hands of the nontechnical customer. The faults of the TV set will become faults of the system operator when the converter is a functional part of the TV receiver.

From a standpoint of earliest feasibility, the approach most meritorious to me would be to send all signals over a coaxial trunk adding the extra channels above channel 13 using amplifiers that will pass the higher frequencies. A bulk converter located in a box outside of the house can convert the extra channels into the uhf spectrum for direct tuning on the set's uhf tuner.

James R. Palmer, C-COR Electronics

I haven't been able to find time to respond properly to your questions . . . but record me as opposed to the direction the industry seems to be taking. If the industry is going to permit the use of nonstandard TV frequencies, I feel the entire distribution system should be analyzed. Expanded channel distribution is a completely new ballgame including frequency assignments, cable, amplifiers and the TV receiver. Since the CATV industry is not in the business of manufacturing television sets, it behooves the industry to come up with enough logical standardization so that display device manufacturers will be interested in manufacturing these units for CATV areas.

It would appear very unwise to attempt to design such a new system considering only past components and amplifier spacings. It is utter folly to compromise the design of such a potentially wonderful system with any of these mundane considerations . . . more dialogue is necessary.

[*Ed. Note.* Archer Taylor, NCTA Engineering Subcommittee, writing in *TV Communications,* says converters are a backward step and TV set manufacturers should have a say in any new frequency allocation plan.]

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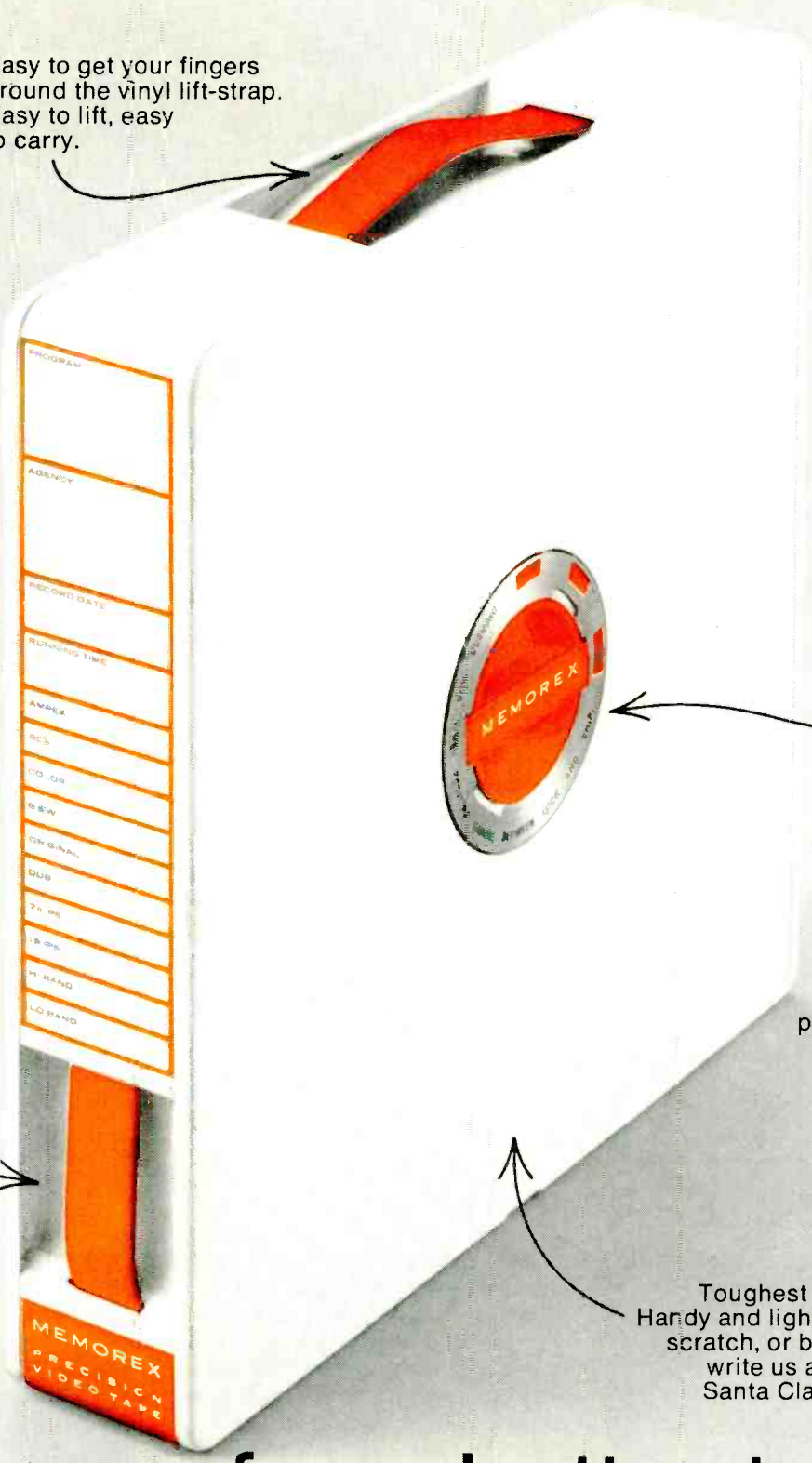

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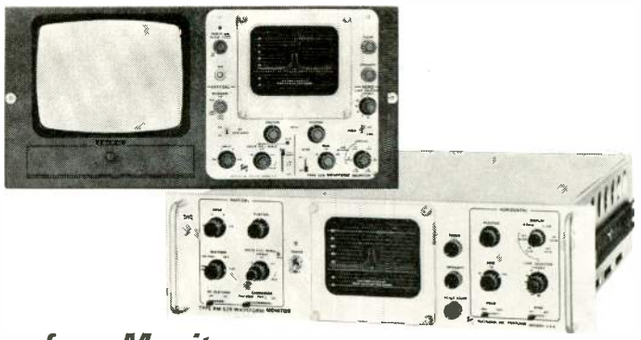


. . . with a Tektronix Type 529 or RM529 Waveform Monitor

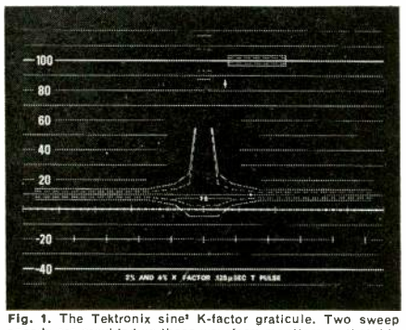


Fig. 1. The Tektronix sine² K-factor graticule. Two sweep speeds are provided on these waveform monitors so that this graticule can be used for 0.125 μs T-pulse testing on such applications as studio and network transmission lines, and for 0.250 μs 2T-pulse testing on such applications as video tape recorders and transmitters.

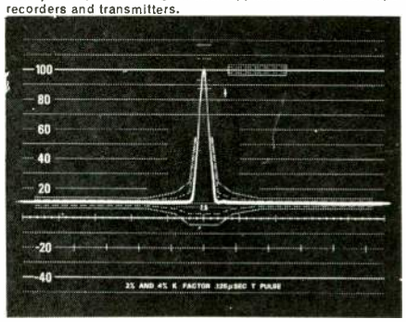


Fig. 3. Display of an undistorted 0.125 μs sine² pulse at 0.125 H/cm magnified 25X. A T-pulse with its base on the ┴ 10 IEEE unit line will reach the ┼ 100 IEEE unit line if the video system has 6.7 MHz equivalent bandwidth. At 4 MHz, pulse height will be reduced by 18%.

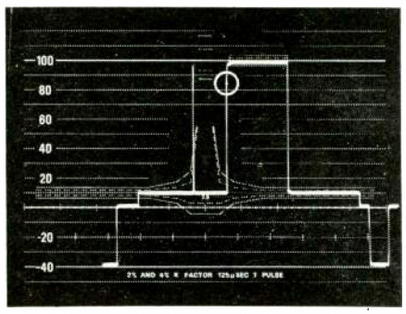


Fig. 5. Display of a bar signal at 0.125 H/cm with the base on the ┤ 10 IEEE unit line and the rising edge aligned with the arrow (encircled). The top of the bar signal should be at the ┤ 100 IEEE unit line. The inner and outer lines of the box at this point show the 2% and 4% K-factor limits.

Measurements of TV picture quality in terms of K-factor can be made simply and precisely using the sine² graticule of a Tektronix Waveform Monitor. These measurements can be made when a sine² pulse and bar is transmitted during the vertical blanking interval of normal broadcast operation.

Figure 1 shows the sine² graticule — marked in percent of K-factor for signal-distortion measurements when using a sine² pulse and bar and also marked in standard IEEE units for normal signal-level measurements. Figure 2 shows an undistorted sine² pulse and bar.

T-pulse measurements. The phase response of a video system can be determined by observing the leading and trailing edges of the sine² pulse. Figure 3 shows an undistorted pulse. Phase distortion causes asymmetrical aberrations, such as shown in Figure 4. Any display of symmetrical ringing on both the leading and trailing edges of the pulse indicates bandpass degradation without phase distortion.

Bar Measurements. The critical mid-band frequency and phase response of a video system can be determined by observing the amount of tilt in the flat-topped portion of the bar. If the video system has ideal response, the bar will be transmitted as shown in Figure 5. Impaired response in the system will cause tilt or sag, such as that shown in Figure 6, with streaking or smear in the picture.

Type 529 Waveform Monitor $1085
(8¼" high, 8½" wide, 19" deep, weighs 24 lb.)
Rack Mount Type RM529 . . . . . $1135
(5¼" high, 19" wide, 20" deep, weighs 27 lb.)
Power consumption of each model is ~80 watts — no fan used.

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

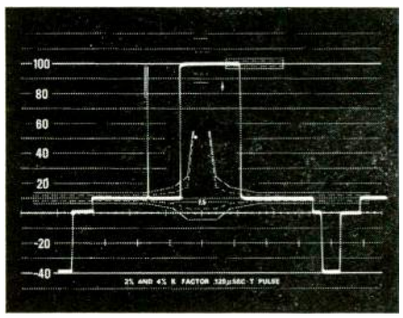


Fig. 2. Display of a sine² T-pulse and bar. Waveform shows the following: the horizontal sync pulse on the —40 IEEE unit line, the backporch on the 0-level line, the 10% offset or base for the pulse and bar, and the sine² or T-pulse on the ┤ 10 IEEE unit line, and the bar on the ┼ 100 IEEE unit line.

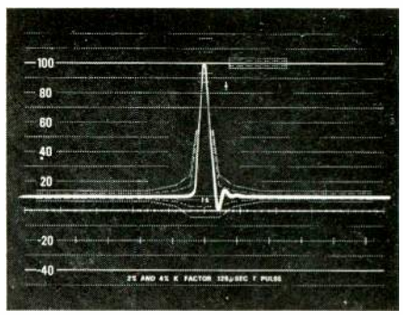


Fig. 4. Display of a sine² T-pulse showing some phase distortion. Phase distortion will appear as aberrations on the leading or trailing edges of the T or 2T-pulse. The K-factor system relates the amplitude of ringing vs the displacement of the ring from the transient in terms of picture degradation.

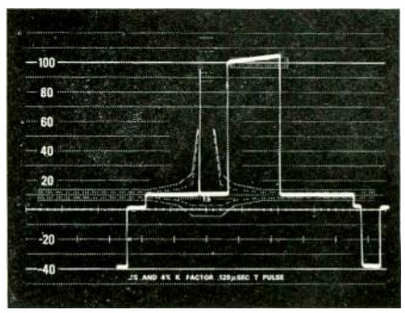


Fig. 6. Display of a bar signal at 0.125 H/cm, showing tilt which exceeds the 2% to 4% K-factor tilt limits.

For a demonstration, contact your nearby Tektronix field engineer or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

Exacting standards of component manufacture

. . . part of the Tektronix commitment to technical excellence

Circle 25 on Reader Service Card

BROADCAST EQUIPMENT

Tape Search System

A low cost automatic time coding and tape search system from Electronic Engineering Co., Santa Ana, Calif. provides a means of radically reducing the time required to locate and investigate any specific section of tape-recorded communications. The Eeco system—called the 920/921—is compatible with present recording equipment in most installations. The system consists of an Eeco 920 time code generator and an Eeco 921 tape reader/search and control unit. The time code output of the Eeco 920 is recorded on one tape track while communication recordings are made. Communications information on the magnetic tape may then be located by using the Eeco 921 to search for the desired time periods automatically at high speeds. The 920 time code generator produces a 2 pulse/s serial pulse width time-of-day code (hours and minutes) with a sequential day-of-the-year option. The 921 unit reads time at any playback speed in forward or reverse, from 0.5 in./s to 300 in./s. Normal tape remote

controls—PLAY, FAST FORWARD, REWIND, AND STOP—are included on the front panel. Both units are built for standard rack mounting. The 920 generator measures 19 × 5¼ × 10 in., weighs 18 lb, and sells for $1500. The 921 tape reader/search and control unit is 2 in. larger in depth, 2 lb heavier, and costs $2500.

Circle 100 on Reader Service Card

Exposure Meter Has Power-Driven Scales

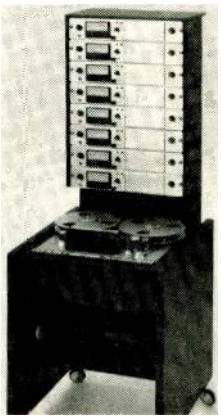
The Minolta Corporation of New York, N.Y. has announced a new cadmium sulphide spot meter equipped with electrically powered, illuminated scales and is pushbutton-activated for automatic response to light changes. Other innovations in the meter, called the Minolta Auto-Spot 1°, include through-the-lens

viewing, focusing and scale-reading, full-focusing as close as 3.3 ft and a light measuring angle of 1° in a total viewing field of 8°. Said to be the "only spot meter with an IRE scale," the Auto-Spot 1° TV model facilitates the reproduction of skin tones in proper ratio to the brightest area of the subject. A footlambert scale ranging from 0.32 to 5000 and a special exposure compensation indicator are also included. TV version of Auto-Spot 1° meter is priced at $250.

Circle 101 on Reader Service Card

Eight-Channel Tape Recorder

An eight-channel version of the AG-440 series of professional audio recorder/reproducers for use by master recording studios has been placed on the market by Ampex Corporation of Redwood City, Calif. The AG-440-8 uses 1-in.-wide magnetic tape compared with ¼-in. and ½-in.-wide tape used by present

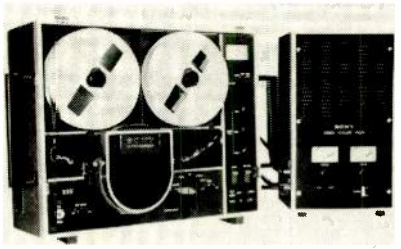


AG-440 series recorders, permitting the new recorder to accommodate eight channels of sound with the frequency response and crosstalk rejection required in master recording. Electronic and mechanical features of AG-440-8 are similar to those of other recorders in the series. Electronic circuitry is designed so that modules plug into front of chassis for easy accessibility. Playback, record and bias amplifier boards have all setup adjustments accessible from the front. AG-440-8 is priced at $12,500.

Circle 102 on Reader Service Card

NTSC VTR and Color Pack Weigh 108 lb

A 20-lb color pack adaptor, Model CLP-1, for Model EV-200 VTR, weighing 88 lb or the PV-120 VTR has been announced by Sony Corp., Inglewood, Calif. System assures complete compatibility between color recorded tapes and monochrome recorded tapes. No special monitor is required to accept the color signal; any receiver that ac-

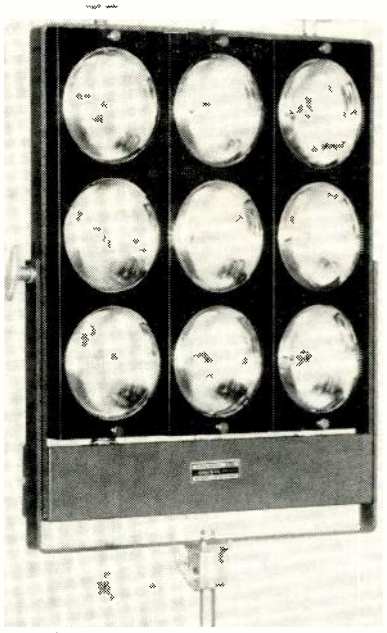


cepts NTSC standard signals can be used. Tapes made on any CLP-1 system can be played back on any other (EV or PV) monochrome system. The system is capable of both slow motion and stop field. Playback speed can be continuously varied electronically for slow motion between one-third normal speed and complete stop. Reel size is 8 × 1 in. EV-200 and CLP-1 package is priced at $4750.

Circle 103 on Reader Service Card

Fill Lights

Berkey-ColorTran, Inc., Burbank, Calif, (A division of Berkey Photo Inc.), announces the availability of the Mini-Brute 5-, 6-, and 9-in. high

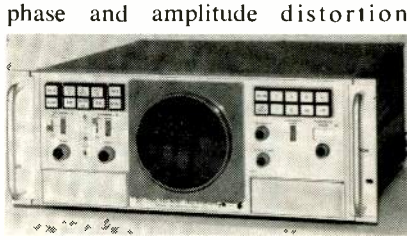


intensity fill lights. Operating directly from 120 V ac or dc, the Mini-Brutes accept 650-W, tungsten-halogen "quartz" (5000° K) Par 36 lamps with dichroic coated lenses. With all nine dichroic coated Par 36 lamps burning, the Mini-Brute 9 (LQD9) produces approximately 3000 fc at 10 ft and draws less than 50 A. Par 36 lamps are also available without dichroic coated lenses at 3400° K and 3200° K color temperature. A choice of models is available with different lamp switch arrangements that provide for various levels of intensity without changing color temperature. The Mini-Brute 6 and 9 have movable (vertical) lamp banks that permit varied beam coverage.

Write directly on company letterhead stationery

NTSC Vectorscope

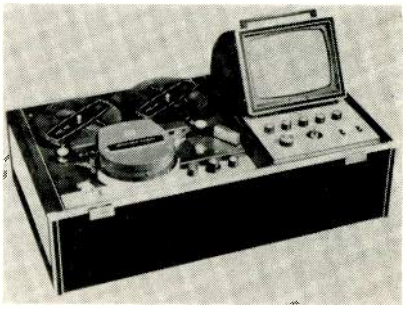
Tektronix, Inc. of Beaverton, Ore. introduces Type 520 NTSC solid-state Vectorscope, designed to measure luminence, hue and saturation of the NTSC color television signal. Pushbutton controls provide operating convenience and permit rapid selection of displays for rapid analysis of television color signal characteristics. Two 0° to 360° phase-shifters provide independent phase control of channel A and B. Phase shifts caused by unequal signal paths are easily canceled, leaving only phase and amplitude distortion caused by equipment deficiencies. A precision calibrated phase shifter with a range of 30°, spread over 30 in. of dial length provides good resolution for making small phase measurements. Differential and differential phase measurement capabilities are provided with accuracies with 1 percent for gain and 0.2° for phase. A parallax-free vector graticule, or IEEE graticule, is automatically selected and edge-lighted concurrent with operating mode selection. The Type 520 NTSC Vectorscope is available in electrically identical cabinet or rackmount models. Price of either is $1850.



Circle 104 on Reader Service Card

Moderately-Priced CCTV VTR

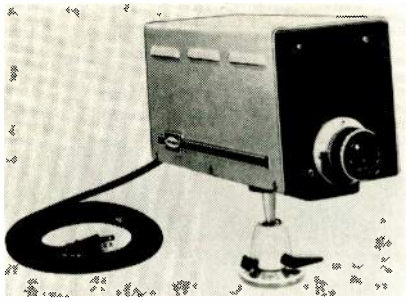
Production of a self-contained, high-resolution, moderately-priced videotape recorder, Model SV-800U, has been announced by Shibaden Corporation of America, Woodside, N.Y. VTR employs two rotary heads of specially developed metal which operate on helican scan principle and provide response of more than 3.5 MHz, more than 300 lines resolution, and 42 dB in signal-to-noise ratio. Additional advanced features include audio "add-on" after video recording; stop-motion viewing of single frame; head override switch; and simplified operation. VTR uses ½-in.-wide videotape, permitting up to 60 min of continuous recording on a 7-in. reel at 7.5 in./s. VTR records live action using CCTV camera, or directly off the air using its built-in receiver/monitor. Conventional TV receivers may be used as monitors. SV-800U measures 30 × 11 × 17½ in. and is priced at $1695.



Circle 105 on Reader Service Card

High Resolution CCTV Camera

A high resolution TV camera introduced by Raytheon Learning Systems Co., Englewood, N.J., has resolution exceeding 800 lines at pic-

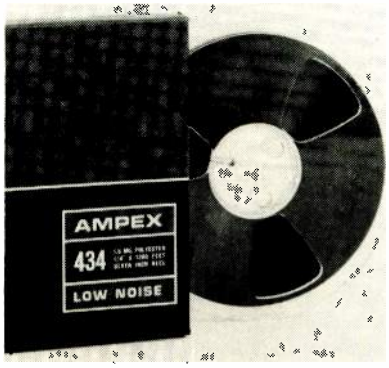


ture center with a 4×3 aspect ratio or 1000 lines with 1×1 aspect ratio. It is appropriate for standard 8½ × 11-in. documents and A and B size drawings. The XRS-11's high resolution is also relatively immune to temperature or line voltage variations. Resolution is within 50 lines of standard over the entire ambient operating temperature range of 5 to 115°F. Similar tolerance is observed despite line voltage fluctuations between 105 and 130 V ac. Single-case camera depicts 10 specific shades of gray; and picture fidelity is assured in cable systems up to 600 ft long. Automatic light range is 4000:1. The XRS-11 is priced at $2460.

Circle 106 on Reader Service Card

Low Noise Audio Tape

A new low noise mastering audio tape for use with professional and consumer recorders has been placed on the market by Ampex Corporation of Redwood City, Calif. The new

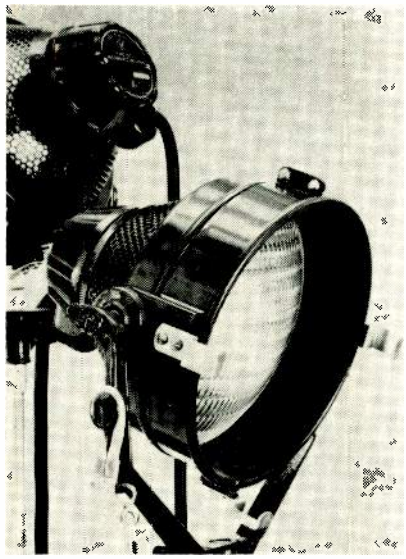


404 Series tape is designed for use by master recording studios, broadcast stations, schools, hospitals, industry, hi-fi fans and in all applications where high quality recording and playback performance is sought.

Circle 107 on Reader Service Card

Sealed Beam Light Fixture

The new Molequartz Molepar Type 2271 lamp was designed by Mole-Richardson Co., Hollywood, Calif. for high intensity illumination, accepting any one of eight 1000-W oval beam, quartz tungsten-halogen Par-



64 globes. A unique feature permits 360° rotation of the globe for beam orientation while diffuser clips remain stationary, securely holding accessories such as light shields, Macbeth blue glass and dichroic filters, spun glass, scrims and special Molepar Intensifier reflectors. With Intensifier, Molepar produces up to 39,000 fc at 3 ft.

Circle 108 on Reader Service Card

High-Power Uhf TV Translator

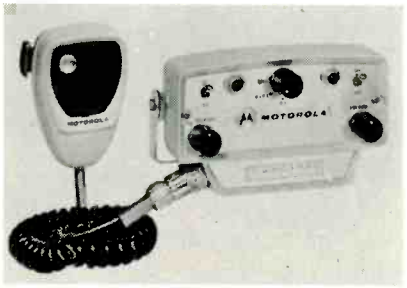
Emcee Broadcast Products of Bloomfield, N.J. announces an innovation in the uhf TV translator field—a 1 kW translator. Rf output is 10 kW erp when used with an antenna, providing a gain of 10 to substantially increase a TV broadcaster's coverage. The 1-kW translator is completely self-contained and has all the necessary control circuitry for automatic unattended operation. It functions by receiving an off-the-air television signal, converting it to a uhf-TV channel and retransmitting it at 1 kW visual and 100 W aural. Two models of the 1 kW translator and a 1 kW add-on amplifier are available.

Circle 111 on Reader Service Card

Mobile Radio Transceiver

Standard mobile transceivers are now available from Motorola Communications and Electronics, Chicago, Ill., with wide-spaced transmitting capability for high band applications. These units come with two, three or four transmit frequencies; two frequencies or two groups of frequencies may be separated as much as 10 MHz. The unit is contained in a

standard mobile radio housing and requires only one antenna. New standard models are also available for system applications requiring the monitoring of two channels simul-



taneously. All new Motrac radio lines include such options as Private-Line squelch and multiple-frequency companion transmitters or receivers.

Circle 109 on Reader Service Card

Miniature Sync Generator

A miniature monochrome or color EIA sync generator, the Porta-Sync, featuring all-digital circuitry, is now available from TeleMation, Inc., Salt Lake City, Utah. The Porta-Sync, Model TSG-1000M/C is a broadcast synchronizing generator electrically identical to TeleMation's TSG-2000 series, but about half the

size. Ultra-compact, it is ideal for remote field applications or as a system spare. The digital design approach and fast-rise circuitry of the unit provide the industry's best time-base stability performance. The new design technique also gives the TSG-1000C sync generator far better phase stability of the color subcarrier than can be obtained with conventional designs. Phase jitter is less than 0.5 ns. Both monochrome and color units are guaranteed for one year.

Circle 110 on Reader Service Card

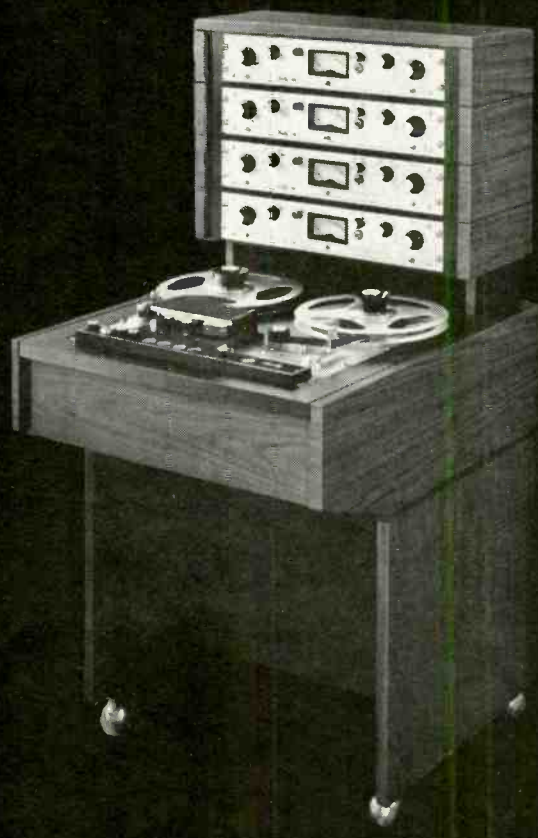
Electronic Tool Kit

Model K-600 20-piece precision tool kit from Precision Tools Division, Bronx, N.Y. includes major tools essential for production, service and repair of electronic and electrical equipment. Leather zippered case measures 11 × 6 in. and weights 2 lb. Kit is priced at $29.90.

Circle 116 on Reader Service Card

CHECK THESE ADVANCED FEATURES!

ON THE GREAT NEW Scully 280



NEW "ADD-ON" MODULAR DESIGN CONSOLE . . . accommodates one, two or four amplifiers. Handsome cast metal covers on operations panel and head assembly give the 280 an entirely new look.

NEW BRAKING SYSTEM WITH EXCLUSIVE MOTION SENSING! Available previously only on the Scully one-inch tape transport, this unique system permits tape handling in any operation sequence without breaking worries. Optional on the Model 280.

NEW AUTOMATIC TAPE LIFTERS! This is an added bonus with the new motion sensing braking system. The automatic tape lifter keeps the tape off heads until tape transport has come to full stop.

SCULLY'S NEW SYNC/MASTER! Remote control your sync-sessions with Scully's exclusive Sync/Master control panel. Ask your Scully distributor about this new optional accessory for our 8-track units.

Scully engineering pioneered the plug-in head assemblies, plug-in amplifier cards, plug-in relays and solid-state electronics.

Now, once again, Scully sets the pace in great new features for the all-new 1968 model 280!

Scully

RECORDING INSTRUMENTS COMPANY

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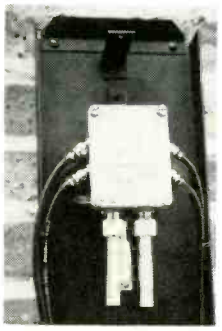
Bridgeport, Conn. 06607
(203) 335-5146

Makers of the renowned Scully lathe, since 1919
Symbol of Precision in the Recording Industry.

Circle 29 on Reader Service Card

Four-Way Directional Coupler

Type C multiple taps are 4-way directional couplers from Reliable Electric Company, Franklin Park, Ill., with the capability of providing service to four subscribers from a buried distribution system. They are furnished in six specific values of coupling from 10 to 35 dB. Return



loss at input is 20 dB minimum, 16 dB minimum at each tap. Tap to tap isolation is 20 dB minimum and tap to output isolation ranges from 26 to 35 dB depending on choice of coupling value. Coupling value also determines insertion loss, ranging from 3.5 to 0.2 maximum. Frequency range is 50 through 220 MHz. Nominal impedance is 75 Ohms.

Circle 112 on Reader Service Card

Trunk Amplifier

The Novacor 34-dB gain trunk amplifier has application in rebuilding 12-channel vacuum tube systems, according to C-Cor Electronics, Inc., State College, Pa. Novacor Model TA-34, designed for 34 dB spacing, has a recommended operating output level of 43 dBmV at −87 dB maxi-

mum cross-modulation (NCTA standard distortion specifications), a noise figure of 8 dB maximum at channel 13 (under any operating conditions), making it suitable for cascading up to 32 units (1090 dB trunk length). Unit has automatic level control with automatic tilt operating from either channel 13 picture carrier or a 220 MHz pilot signal. Price is $585.

Circle 114 on Reader Service Card

For the Best Color from Your RCA TK-42 and TK-43 Cameras

USE THE RCA-4536 IMAGE ORTHICON

The RCA-4536 Image Orthicon in the luminance channel of your TK-42 and TK-43 color cameras is the perfect companion tube for the RCA-4493, -4494 and -4495 Vidicons... designed specifically for RCA cameras and carefully quality-tested in the actual camera components.

The RCA-4536 gives a signal-to-noise-ratio 25% greater than the previous standard, 4492 Image Orthicon. The electronically-conducting glass target assures non-stick and anti-burn operation over a long operating life.

Improved over the 4492, the RCA-4536 Image Orthicon assures the best color... the best in-studio service. Ask your RCA Broadcast Tube Representative for full details about the RCA 4½" Image Orthicon that's "tailored" for your TK-42 and TK-43 cameras. *Available from your RCA Broadcast Tube Distributor*

RCA ELECTRONIC COMPONENTS AND DEVICES

The Most Trusted Name in Electronics

Broadcast Industry News
continued from page 6

Ampex Color Portable Used by ABC

Last out of the starting gate but first to go on the air with a one-man color broadcast camera was the Ampex Corp. (See p. 6 for Philips and RCA entries.)

Ampex's Model BC-100 was the first truly hand-held color camera ever to be used on the air. Football fans watching the UCLA-USC college football game at Los Angeles saw the 35-lb unit in action on November 18.

The camera head weighs less than 20 lb and is mounted on a shoulder harness. Associated camera electronics are contained in an attache-type carrying case on the cameraman's back, which weighs 15 lb including the cable drag. The camera can operate on a microwave link mode. Addition of microwave transmitter and battery increases the back pack to 30 lb.

Developed at the request of ABC Television, the triple Plumbicon camera operates in light levels down to 150 foot candles. The optics include a compact prism but Ampex would not reveal the camera details pending patent filings. Signal-to-noise ratio is 42 dB; bandwidth, 4 MHz. Equipment includes a 1-in. electronic viewfinder, built-in filters, and measures 18⅝ × 13 × 7½ in. (with viewfinder). Other features include 6:1 zoom lens, intercom, and tally light. The back pack size is 23 x 13¾ x 6 in.

Completely equipped with 6:1 zoom, electronic viewfinder, tally light and intercom, the Ampex BC-100 can go anywhere the cameraman can. Camera operates on cable or on microwave relay (microwave dish in background). Either way, combination of camera and back pack weighs less than 50 lb.

Need quality tubes with greater stability, longer life? Call your Sylvania Distributor.

He'll advise you on which tube types can best meet the critical requirements of broadcast equipment. And supply you with the finest—Sylvania tubes tailored to your need for greater stability, longer life, less down time.

Case in point: hum and noise were objectionable in the 12AX7 prototype used in audio frequency amplifiers as the high gain input. So Sylvania developed an improved retrofit. Result: the Type 7025 with hum and noise level cut to only a few micro-volts.

Or take the 6U8, when used as a pulse amplifier in sync generator equipment. Stability was a problem. Sylvania did a thorough field analysis, imposed its famous Gold Brand specifications, tightened tolerances for plate current and transconductance, and added a special emission test. Result: Sylvania's GB-1252/6U8A, with assured stability in pulse service.

Your Sylvania Distributor has the high-quality products you want. Call him for fast delivery and technical service.

Sylvania Electronic Tube Division, Electronic Components Group, Seneca Falls, New York 13148.

SYLVANIA

SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS GT&E

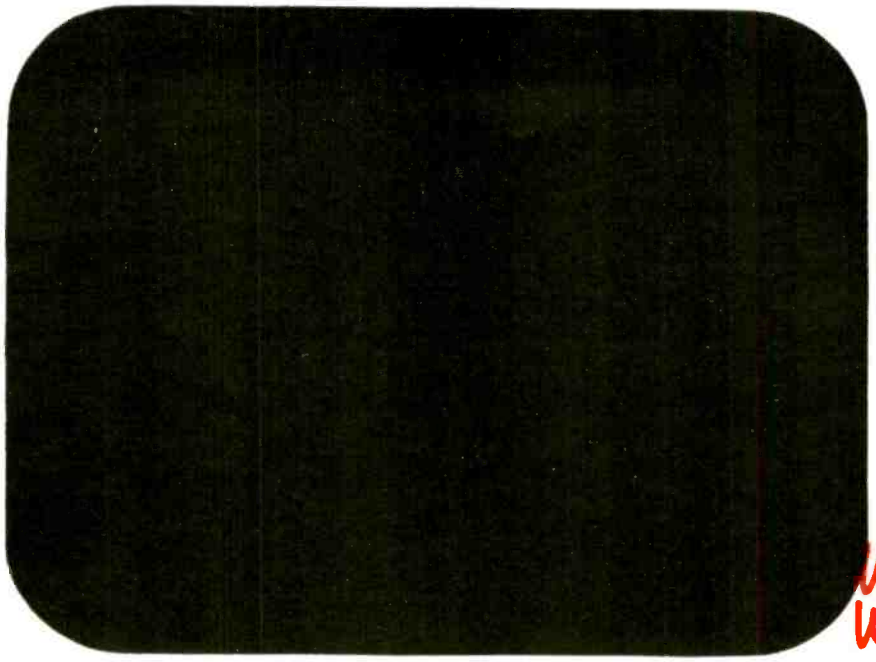
The compactness and light weight is achieved partially as a result of using integrated circuits.

Thomas E. Davis, Ampex vice president, in making the announcement of the camera early in November, revealed that the camera is always locked to the studio's sync, whether used with microwave or line, permitting the use of special effects, fades, supers and other production techniques without picture disturbance.

A limited number of BC-100's are expected to be available in the Spring of next year. The complete system sells for $175,000.

The performance of the camera at the UCLA-USC game was evaluated as "perfect." Bugs had developed during the camera's "premier" which was to have been the Army-Air Force game on November 4. Monitoring personnel at Los Angeles, however, could spot no difference in quality between the BC-100 and regular cameras.

Those closeup shots of the sidelines and bench activity were some scenes taken with the BC-100. The new camera offered armchair quarterbacks the opportunity to participate in coach-quarterback conferences.



Cold camera

WE TOLD WBAL-TV 30 SECONDS— THEY NOW TELL US 3 SECONDS IS PLENTY!

on the air in 30 seconds at WBAL-TV.

3

The MTI Image Orth is a problem solver at WBAL-TV in Baltimore. Crash news programs can be on camera in seconds with a flick of the switch. No need to interrupt camera crews who might be in the middle of a taping session. Operational set-up is minimal too. Here's how WBAL-TV makes use of the MTI Image Orth.

Camera is aligned and locked in fixed position in a small announce booth studio. Few lights are used due to the excellent low-light capabilities of the camera. And as a result, no additional air conditioning facilities are required. While desk and chair are fixed furnishings, backdrop can be quickly changed to fit any presentation situation.

WBAL-TV engineers claim camera needs little maintenance, has good depth of focus and needs trimming only once per week. Low light levels do not affect picture quality.

You might have other uses for a camera of this size and quality. If so, give us a call. We'll have a sales engineer to see you quickly—but not as quickly as the MTI Image Orth warm-up period.

mti MARYLAND TELECOMMUNICATIONS, INC.

York & Video Roads, Cockeysville, Md. / 301-666-2727 / World's largest manufacturer of low light level television cameras.

Circle 36 on Reader Service Card

be continued with the same name and operating personnel as a wholly owned subsidiary of Okonite.

ITT and Sheraton Agree to Merge. Ernest Henderson, III, president of Sheraton Corporation of America, and Harold S. Geneen, chairman and president of International Telephone and Telegraph Corporation, announced recently that agreement in principle had been reached under which Sheraton would become a part of the ITT System.

The agreement is subject to approval of the boards of directors of both companies, and the shareholders of Sheraton, the receipt of a favorable tax ruling and certain other conditions.

Cox To Acquire Crosby Productions. J. Leonard Reinsch, president of Cox Broadcasting Corporation, and Bing Crosby late in September announced jointly that agreement has been reached in principle whereby Cox will acquire 100 percent ownership of Bing Crosby Productions, Inc., in exchange for 36,500 shares of CBS common stock. Mr. Crosby is chairman of the board and the principal stockholder of Bing Crosby Productions, Inc.

FOCUS ON
CATV

CATV Goes to Supreme Court

At the request of the FCC, U.S. Supreme Court will review the Ninth Circuit Court of Appeals Decision that FCC was exceeding its authority in prohibiting expansion of three San Diego, California, CATV systems, pending hearing on their economic effect on free television in the area. (The hearing subsequently resulted in lifting of the prohibition.) FCC claims decision casts serious doubt on its authority over CATV generally. Although the case may be reviewed on the narrow legal issues, should the court elect to consider the broad question of FCC jurisdiction, a landmark decision could result. FCC CATV Task Force Chief Sol Schildhause feels Court will uphold FCC's power to regulate CATV.

The Supreme Court of Maine has ruled that the operator of a

CATV system does not require approval of a municipality if a telephone company supplies the cables on which the television signals are carried. The decision is first in the nation to be made by the highest court of a state. The City of Waterville, Maine, had brought suit to bar New England Telephone & Telegraph Co. and the Bartel Telephone TV Systems from stringing wires for a CATV system. Maine law required operators to obtain CATV franchises from municipalities.

Microwave Extended in Texas

Cablevision, Inc.'s application for CARS to serve CATV systems in Freer, Hebbronville, San Diego, and Benavides, Texas, granted by FCC. Initial objection filed by KSIX Television, but no further objection was made since Cablevision's application placed on public notice.

Commissioners, Congressman Sound Off

In a friendly talk to NCTA regional meeting in Philadelphia, FCC Commissioner Nicholas Johnson touched on most of the major issues and problems facing the cable industry and the FCC—copyrights, diversity of programming, future technological developments, and government regulation of CATV. His prime point was that the rapid growth of CATV and its vast technological possibilities and the complicated situations the growth had created had left the FCC behind as well as the cable industry itself. He said the FCC and the cable industry must undertake immediately an intensified effort to comprehend the present facts and future potential of cable. He also suggested:

- Experiments designed and carried out to test the economic impact of cable television on local broadcasting stations, especially uhf.
- Research and development program in cable and alternative technologies to assure the installation of cable systems with capabilities and costs best servicing the public interest.
- FCC should do everything in its power to encourage cable industry's interest in program origination, particularly respecting kinds of programs not now available from networks and local stations.
- Commission should give highest priority to the resolution of its

inquiry into ownership patterns now developing in the cable industry and proposals for standards in this area.

He urged CATVers to seek out new kinds of markets and new sources of program supply for the potential channel capacity of their cables, and said the best guarantee of security lies in local origination. Technologically, he said, it may be possible to have different areas of a city receive particular combinations of channels and special programming for minority groups within several communities. Such a cable system could reach selected geographic portions of a city which correspond to particular social and economic groups. He thought that cable might become a viable medium of intercity interconnection which would in effect be a number of large closed circuit systems.

The Commissioner felt that the FCC was not taking seriously the full potential of CATV, and was passing the buck to Congress on regulations of copyrights, and said that the FCC must not support copyright provisions which would restrict freedom to design solutions to CATV's problems.

On the subject of copyrights, Sen. John L. McClellan (D., Ark.) told the same meeting, "Although I believe your industry should pay copyright fees, I will oppose any effort to use the copyright statute for the purpose of obstructing the service which you render to millions of our citizens."

And FCC Commissioner James J. Wadsworth at the NCTA Cincinnati regional meeting proposed a plan under which all local—Grade B or better—signals could be carried without copyright liability. Imported distant signals would be fully liable for copyright charges. "In underserved areas, such as those without at least three network service, a reasonable compulsory license fee would be charged for the importation of distant signals. This fee would be similar to and administered in the same way as license fees such as those of ASCAP, BMI, SESAC."

The FCC Commissioner considered the toughest on CATV, Kenneth A. Cox, spoke at the Minneapolis regional NCTA meeting. On copyrights, he suggested all Grade B signals be carried without paying copyright fee, but no distant signals. He said CATV ought to be allowed to make local originations of material not provided by local stations, with time and weather on one channel, news ticker on a second channel, "public affairs, local candidates and perhaps local news and sports on a third. Perhaps a fourth channel devoted to filmed entertainment programming for which you would bid in the open market—all these to be carried without commercials." Commissioner Cox also suggested "any other non-broadcast service which your facilities will accommodate—burglar alarms, opinion polling, telemetering, etc." He concluded, "I want the public to be able to reap the benefits of the service you now provide—and can provide. But I don't want this to take place at the expense of a pretty good existing service, and without conscious public decision."

Proving Signals Inadequacy Burdens CATV

Bettervision Systems, Inc., Mannington and Pennsboro, W.Va., required to provide coverage and program exclusivity for WBOY-TV, Clarksburg, W.Va. Commission said Bettervision's allegation that WBOY-TV does not place an actual Grade A signal over Mannington and Pennsboro was unsupported.

Texas Community Antennas, Inc., Springdale, Ark., ordered to provide program exclusivity for signals of station KFSA-TV, Fort Smith, Ark. (ABC, CBS). FCC said Texas Community's allegation of lack of Grade B signal was not supported by affirmative engineering data.

Brainerd Video, Brainerd, Minn. must show cause why it should not give program exclusivity to translator station K74CM. Brainerd states K74CM's signal is of inferior and unreliable quality. FCC stated Brainerd must demonstrate inadequacy of signal.

Bluefield Cable, Bluefield, W.Va., has been ordered to carry WCYB, Bristol, Va., or prove that the Grade B contour of station does not reach Bluefield. But FCC waived carriage of the Bristol, Va., station for Flanery and Dingus TV and Electronics, CATV System in Prestonsburg, Ky., who told Commission it was willing to carry station but had tried and was simply unable to receive any signal.

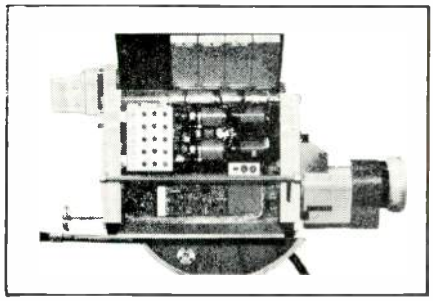
Clearview TV Cable Inc. ordered to cease and desist importing distant TV signals on its CATV systems at Enumclaw and Buckley, Wash. Order requested

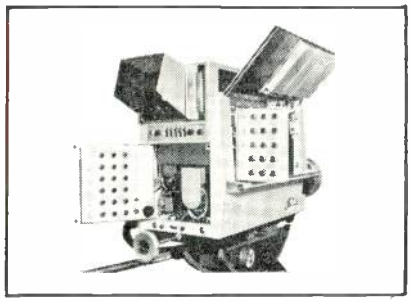
Continued on page 73

CAMERA HEAD:

12"X23"X18½"—110 lbs

Hard to believe a commercial TV color camera can be so compact?





Not hard at all . . . when it is Toshiba TV broadcast equipment! Besides being compact, the Model IK-37 camera chain provides improved compatibility and sharper pictures with wider grayscale on both types of receiver, color and black-and-white. A 3" Toshiba image-orthicon tube for Y signal and three Toshiba SENSICON tubes for C signal, arranged for easy servicing in this camera head, give signals that are ideal for colorplexing and equal in quality to any straight monochrome signals.

- All solid-state circuits with high-grade Toshiba semiconductor elements throughout the chain.
- Lightweight and easy-to-pan camera.
- Plug-in units for simplified maintenance.
- SENSICON tubes with nearly 100% conversion efficiency and twice as high sensitivity as that of ordinary vidicons.
- Optical system and coil assemblies fixed rigidly and reliably in an anti-shock arrangement.
- No need of adjusting the picture in view finder as its input is fed back from the controller.
- Provisions for mounting servo-operated zoom lens and for d-c remote control (up to 40 yards) of the zoom.

Tokyo Shibaura Electric Co., Ltd.
Producer Goods Export Division, Uchisaiwaicho, Tokyo, Japan
Toshiba America Inc.,
530 Ave, New York, NY 10036 Phone MU7-5471

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Circle 40 on Reader Service Card

Circle 41 on Reader Service Card ➔

diplexed power amplifiers . . . more reliable operation . . . up to 5 megawatts ERP . . . with antenna to match

This 110 KW UHF transmitter, combined with the right RCA antenna, provides RCA's most powerful transmitter-antenna package, affording up to 5 million watts ERP.

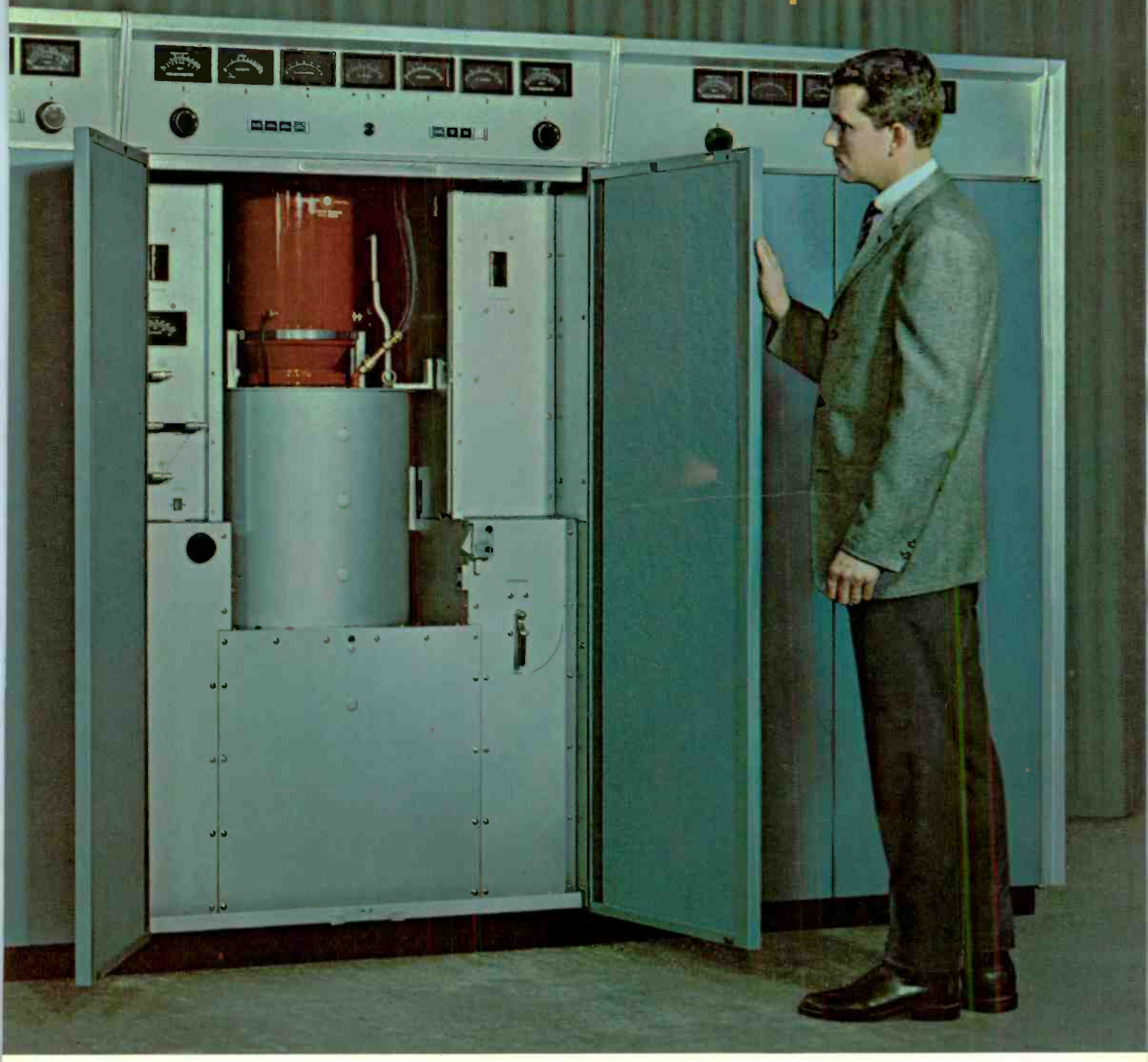
RELIABLE OPERATION. The diplexed visual power amplifiers assure the utmost in reliability. One amplifier is always ready to back up the other in case of emergency.

NEW TYPE KLYSTRONS. Unique, integral-cavity vapor-cooled klystrons are a high power development of those used in the proven RCA TTU-30A and TTU-50C Transmitters. Reliability and long life are major advantages, with faster warm-up time, less weight and pretuning among other points of superiority.

VAPOR COOLING EFFICIENCY. Vapor cooling is much more efficient than water cooling. This results in reduced operating expense. Lower input power is required.

WALK-IN DESIGN. New design techniques and walk-in cabinetry result in smaller size and easy maintenance. This means direct savings in installation and operation and will minimize building construction costs.

110-KW TRANSMITTER
. . . for maximum power UHF



ANTENNA CHOICES. RCA offers you a choice of Pylon and Panel Antennas for use with this new Transmitter. You get the kind of Antenna that suits your needs—directional or non-directional—as well as your power requirements.

COMPLETE LINE OF UHF TRANSMITTERS. There are three high-power integral-cavity vapor-cooled klystron transmitters: 30KW, 55KW and 110KW. Also two lower-power air-cooled transmitters: 2KW and 10KW (the 2KW is easily expanded to a 10KW).

YOU GET SO MUCH MORE FROM RCA—RCA offers the only full-line of broadcast equipment. RCA's long experience, engineering skills and improved products mean better performance.

From RCA you get matched system design, overall warranty responsibility, single supplier coordination and complete service. It all adds up to greater value.

For more information, call your RCA Broadcast Representative. Or write RCA Broadcast and Television Equipment, Building 15-5, Camden, N.J. 08102.

RCA

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The TH Varotal series of lenses comes in several models, each with a number of variations. Color and B & W. Indoor or outdoor use. Servo or manual controls. And each basic optical model is convertible to various camera image formats so that changes in camera technology do not necessarily obsolete the lens. We can now offer these 10:1 lenses for immediate delivery. (Sorry, due to demand there is still a short wait for our 16:1 models).

For more information, call Jim Tennyson at (914) 358-4450. Or write Albion, 260 N. Route 303, West Nyack, N.Y. 10994. Telex 137442

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Taylor Hobson V.F.L.* lenses

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*VARIABLE FOCAL LENGTH

Circle 42 on Reader Service Card

← Circle 41 on Reader Service Card for R.C.A.

by KIRO-TV, Seattle. Clearview contended that their systems are not within primary coverage area of KIRO-TV, but FCC stated its files show KIRO-TV's predicted Grade A contour extends at least six miles beyond the Enumclaw-Buckley area.

FCC Still Bans Distant Signal Carriage

GT&E Communications, Inc., authorized to begin CATV operations in Owosso and Corunna, Mich., to carry uncontested signals only from Lansing, Saginaw, and Flint, Mich. GT&E's requests for authorization to carry Detroit and Windsor, Ontario signals opposed by licensees of the Lansing and Flint stations denied pending further action.

H&B Communications Corp. authorized to import signals of KTNT-TV, independent Tacoma, Wash., station, and CHEK-TV sta- Canadian Broadcasting Co. station in Victoria, British Columbia, on its Richland and Walla Walla, Wash. CATV systems. Petitions by Spokane Television, Inc., licensees of KXLY-TV, objecting to the H&B request were denied. Commission order said Spokane's arguments are "unrelated to the purpose of our CATV regulatory program. Spokane does not provide predicted service over the CATV systems involved and has failed to advance arguments to justify a hearing on H&B proposals."

Empire State Cable TV Co., Inc., Binghamton, N.Y., permitted by FCC to carry distant ETV stations until September 1968. Empire State said it would end carriage of the distant ETV signals when a license is granted to the local educational permittee, Southern Tier Educational Television Association, Inc.

FCC permits Darlington, S.C. CATV system (Cosmos Cablevision Corp.) to import distant signals from Columbia, S.C. A petition by Rovan Television Inc., permittee of uhf-TV station at Florence, S.C., opposing grant was denied. Commission found, in view of size and location of Darlington, operation of system would have little, if any, impact upon uhf developments in the area.

FCC has waived rules to give Total TV, Inc., operator of a CATV system in Janesville, Wisc., authority to carry the distant signal of educational channel 10, Milwaukee.

NAMES IN THE NEWS

Thomas G. Kenny

Edwin R. Levine

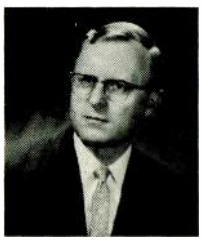
Thomas G. Kenny has been promoted to manager of purchasing by Philips Broadcast Equipment Corp., Paramus, N.J. Philips also announces **Edwin R. Levine's** appointment as senior field engineer.

Robert W. Kuhl

R. Bruce Walters

Visual Electronics has appointed of **Robert W. Kuhl** as regional manager for the thirteen western states, it was announced by George H. Wagner, vice president-sales.

The Anaconda Astrodata Co. Board of Directors has elected **R. Bruce Walters** vice president of manufacturing.



Howard Durbin

John Davlin

The promotion of **Howard Durbin** to vice president of marketing was recently announced by Albert Kahn, Electro-Voice president.

John Davlin has been appointed manager and program director of WGSU-FM, Division of Speech, State University College, Genesco, N.Y. Davlin was associated with station KUOP, Stockton, Calif.

Kaiser Broadcasting announces the appointments of **Hardie Mintzer** as news manager at WKBS-TV, Philadelphia, and **David S. Low** and **Frank R. Castillo** as account executives at WKBF-TV, Cleveland, Ohio. Kaiser also announces the transferral of Art Director **Roy E. Little** from WKBD-TV, Detroit, to KBHK-TV, San Francisco, and the additional duty assign-

ment to **Robert J. Somerville,** KFOG general manager, as sales manager of KBHK-TV, San Francisco.

Memorex announces that **Robert E. Wenning** has been named sales engineer northeastern region and **Edward A. Conti** as plant manager, Disc Pack facility.

R.H. "Luke" Brannon

W. Ronald Smith

The appointment of **R.H. "Luke" Brannon** as station manager of radio WOCI was announced recently by Russell George, executive vice president and general manager of Speidel Broadcasters.

Warren Adler, president of Adler Communications Corp., Washington, D.C. has announced the appointment of **W. Ronald Smith** as general manager of the firm's newly-acquired affiliate, WAYE, Baltimore, Md.

Cohu Electronics' Chief Executive Officer La Motte T. Cohu recently announced the election of two vice presidents: **A. Mack Rodgers,** administrative vice president and **N.D. Benner,** financial vice president.

Wendell Borrink has been appointed station manager of radio station WYCA-FM, Hammond, Ind.

Henderson Belk, of Belk Enterprises and owner of WPDQ, Jacksonville, Fla., has announced the appointment of **D.P. Welborne** to the position of general manager.

Howard H. Bell, code authority director of the NAB, recently announced the appointment of **Michael W. Burke** as assistant to Radio Code Manager Thom R. Winkler.

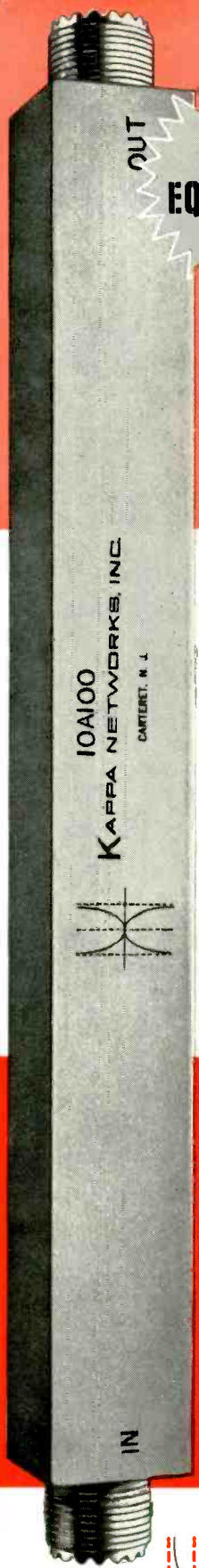
David Dubal has joined WNCN-FM as its new music director.

Appointment of **Robert M. Williams** to the post of manager, TV transmitter merchandising, for RCA Broadcast and Communications Products Division, Camden, N.J., was recently announced by A.F. Inglis, division vice president, Engineering and Merchandising Department.

George C. Stevens has been elected president of the Greenwich Broadcasting Corp., owners of station WGCH, Greenwich, Conn.

E. Murray Hahn, has been named account executive with WINE-FM, Brookfield-Danbury, Conn.

Carter S. Jones recently was appointed general manager of WIGO radio, Atlanta, Ga.



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Unit-to-unit uniformity and excellent temperature stability are also marked features of Kappa Super-η Video Delay Lines.

Where you need equalized cable performance without physical length in your video systems, do the job efficiently and economically . . . use Kappa Super-η Delay Lines!

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ACTUAL SIZE

Model No.	Length of Cable Simulated* (in feet)	Package Length (x 7/8" square)	Approx. Delay Range (nsec.)	Max. Insertion Loss (db)	Price**
10A50	50	5"	78	0.5	$52.75
10A100	100	8"	157	1.0	$69.50
10A150	150	11"	235	1.5	$86.25
10A200	200	14"	314	2.0	$103.00
10A250	250	16"	392	2.5	$119.75

*±2 ft. or 2%, whichever is greater. **Additional discounts available for quantity orders.

SPECIFICATIONS OF KAPPA SERIES 10A SUPER-η DELAY LINES

Impedance: 75 ohms ± 2%
K factor: less than 0.25% for sin² T Pulse
Cross talk: less than 46 db
Size: 7/8" square x length required
Case material: Electro-tinned brass
Finish: Mil-spec gray lacquer

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From surprisingly soft to surprisingly loud—new Ampex 404 Series low-noise tape can capture more audio reality than low-noise tapes of the past.

Its new small-particle oxide meets or surpasses the most demanding low-noise specifications. Holds inherent tape noise ("hiss") far below the level of your most delicate musical passage. Yet from this same quiet tape comes *greater high frequency response* and *broader undistorted dynamic range* —qualities previously sacrificed in low-noise tapes. So the silence has more silence. The flute sounds sweeter. *And* the cymbals crash louder, without distortion — on Ampex 404 Series low-noise tape.

Buy the full range of Ampex professional tapes for extra quality: New Ampex 404 Series low-noise tapes for mastering and duplicating. 600 Series for general purpose professional recording. 681 Series lubricated tapes for endless loop cartridges. 291 Series tapes for a/v. Plus others. Send the coupon for up-to-date information.

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☐ Send me literature on the full line of Ampex professional tapes, including new 404 Series low-noise tape, for

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- ☐ Duplicating
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ADDRESS _____

CITY/STATE/ZIP _____

Career opportunities? Write Box D, Redwood City, Calif. 94064.

AMPEX

Circle 50 on Reader Service Card

BROADCASTERS SPEAK

Sirs:
Thought you might be interested in my reply (enclosed) to some of the fan mail which has arrived due to the article your *BM/E* magazine published on Georgia ETV.

You folks—again—certainly know how to handle an article.

Let me know if you didn't receive a copy of the *Congressional Record* —Senate, dated October 19, 1967, p. S-14990 in which your magazine was inserted.

Louis A. Peneguy
Georgia State Department of Education
Atlanta, Ga.

Quite an honor, L.P. Thanks for letting us know.

Sirs:
Thank you for your very informative article on the Pre-Sunrise regulations (*BM/E*-Oct., pg 18).

WPIM is greatly, and adversely affected! Although the closest station with similar frequency is about 100 miles distant and has never complained, we have been instructed to reduce pre-local sunrise power to 128 watts and not the usual 500 W. We are 1,000 daytime with a "reduced power" transmitter capability of 500 W.

In an effort to conform, our engineers have estimated an equipment cost of $2 to $3,000!

The cost of conforming, plus the tremendous loss in early morning listeners because of our decreased strength (1,000 W to 128 W), is a staggering blow.

Fred G. Hartman, Jr.
WPDM Radio
Potsdam, N.Y.

Sorry we couldn't get this installment into print sooner, F.H. Hope you find a way out of your predicament.

Sirs:
Several days ago, I received the October 1967 issue of Broadcast Management/Engineering. On page six, I note a picture of WCBS and WNBC antenna which was demolished on August 27, 1967 when struck by a light aircraft. In the small comment beside the picture, I note several inaccuracies. For the record, here is the sequence of events regarding our return to transmission from the site on High Island in the Bronx.

Immediately after word was received that the combined antenna for WCBS and WNBC had been struck by aircraft, arrangements were made with Stainless, Inc., of North Wales, Pennsylvania to provide a two-hundred foot tower for emergency transmission. This was on Sunday evening, August 27. The tower was hit at approximately 4:22 P.M. on that date. That same night, WNBC made arrangements with ABC to use an auxiliary transmitter and antenna at the WABC transmitter site in Lodi, New Jersey. WCBS Radio had received a kind offer from WOR to permit us to use their auxiliary transmitter and an auxiliary antenna tower. Work progressed on this project throughout the night into mid morning, August 28. WNBC was successful in matching the WABC antenna to their transmitter at the WNBC frequency. We at WCBS were unable to effect a match between the WOR auxiliary antenna and their transmitter at our frequency of 880 kHz. WNBC was able to sign on Monday morning, August 28, at 5:30 A.M. from the WABC site, but with some intermodulation problems due to the proximity of the antenna to the WABC antenna. About mid afternoon on Monday, August 28, WCBS had received an offer for the use of equipment and tower from WLIB. By approximately 8:45 P.M., Monday evening, WCBS was on the air from the old unused WLIB transmitter site in Queens. While all this was going on, the CBS Radio engineering department, under the direction of Ogden Prestholdt, was supervising the installation of a temporary two-hundred foot antenna at High Island. On Thursday, August 31, eighty-two hours and twenty-four minutes after the tower was struck, both WCBS (with ten-thousand watts) and WNBC (with five-thousand watts) were on the air from the High Island transmitting site without difficulties. During the next couple of weeks, a second antenna was erected on the base of the original antenna and on Sunday morning, September 24, at 5:30 A.M., both WCBS and WNBC went on the air with fifty-thousand watts each. As of the writing of this letter, the engineering staffs of both CBS and NBC are discussing plans for the erection of the final antenna to replace that which was demolished. I trust that this clarifies the record in this matter.

If you would like to discuss the history and background of the joint operation of WCBS and WNBC on a common antenna and the plans for the future in order to present an article on this in your magazine, I am sure that Ogden Prestholdt, Director of Engineering for CBS Radio, would be pleased to meet with you. . . .

Ralph E. Green, Jr.
Director, Technical Operations
WCBS
New York, N.Y.

Thanks for the whole story on your antenna disaster and the offer of the new tower story, R. G. Good to have you back on the air. We'll be in touch with you about the story.

There's a change in our name...

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is now

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Systems Equipment Division, Hickory, N. C.
Electronics Division, Euless, Texas
Communications Apparatus Co., Melrose Park, Ill.
Universal Controls Co., Dallas, Texas
Research and Development: Engineering and Research Center, Hickory, N. C.
Continental Telephone Laboratory, St. Louis, Mo.

Circle 53 on Reader Service Card

SONY AIDS THE COMMUNICATORS

—AT XEROX CORPORATION

In the business world, the name "Xerox" is synonymous with streamlined duplication and reproduction techniques. But the success of Xerox products also means continued growth, diversity, complexity and an escalation to the communications challenge.

That's why Xerox has turned to the immediacy of a Sony Industrial closed-circuit TV system. Company officials feel that the audio-visual environment offers unique opportunities for training, engineering, research, employee relations and overall exchange of intra-company information.

Heart of the system is the Sony PV-120U Videocorder.® complete with cameras, monitors, production controls and ancillary devices usually found only in commercial TV studios. Field offices and remote locations link the company network via the highly mobile recording and playback facilities of the Sony EV-200 Videocorder.

A Xerox spokesman sums up the economic justification of the system in this way: "Training is the first and most important reason for any manufacturing company, Xerox included, to install a CCTV system. It's a natural association. If our system's sole purpose were to make training tapes, it could pay its way. Video taped programs are easier and cheaper to make than films."

This is only one of the hundreds of applications of Sony Videocorder systems in education, research and training for science, industry and government.

To find out how Sony can help you meet the challenge of communications . . . and make it a bi-lateral process . . . write or call us today.

For complete details on this application, ask for APB 102.

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INDUSTRIAL DIVISION
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Circle 54 on Reader Service Card

Now it's Andy Moore praising Audiopak. I'm still waiting to see me in one of your ads.

Here's what I think of Audiopak tape cartridges:

_____

_____

_____

Name_____

Title_____ Station_____

Address_____

City_____

State_____ Zip_____

P.S. If I've checked this box ☐, it means you'd better send me a sample Audiopak. That way, I'll know what I'm talking about if you decide to print what I say.

Andy Moore

Production Manager
K-DOT Radio, Scottsdale, Ariz.

"I saw what Gene Landau of WAPO said about Audiopak in your last ad. If he thinks Audiopak is the best cartridge on the market, then we agree.

"We have been using the Audiopak for some time here at K-DOT and find it better and more trouble-free than any on the market."

Audiopak™

Audio Devices, Inc., 235 E. 42 St., N.Y. 10017.

Circle 55 on Reader Service Card

LITERATURE of INTEREST

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

Tape-to-film video transfers general information and rates are contained in 8-page booklet from Reeves. **150**

Airmobile Video System description, capabilities and rates are outlined in illustrated 5-page booklet from Reeves. **151**

Heating element application Bulletin 124 from Electrofilm explains capabilities of Electromesh heaters. **152**

"Magnetic Metals," 36 pages, from Magnetic Metals Co., contains electrical and mechanical design considerations, tabular matter and illustrated product data on electromagnetic shielding. **153**

A ten-to-one zoom lens is presented with full specifications in data sheet from Zolomatics. **154**

6EV5/CATV, a sharp cutoff tetrode, intended for extra reliable CATV amplifier service, is described in data sheet from State Labs. **155**

"Awards, Citations and Scholarships in Radio and Television," fifth edition, from NAB, provides a comprehensive list of broadcasting awards available primarily to radio and television stations, their management and personnel. **156**

Rf and electromagnetic interference shielding products are the topic of an 8-page short form catalog from Tecknit. Catalog features reader service cards for additional information on specified products. **157**

"Blackboard-by-Wire" teaching system by Commercial Electronics of Sylvania is explained in 6-page brochure. **158**

DTL integrated circuits are described in 25-page catalog from Raytheon. **159**

"CATV and the Copyright Law" is the title of an 18-page cartoon illustrated booklet from NCTA. **160**

Nonduplication switcher for ETV military and broadcast switching and control applications is described in data sheet from TeleMation. **161**

Business/industrial 2-way radio communications systems are explained with diagrams and product descriptions in 15-page catalog from Johnson. **162**

"Measurement of White Noise Power Density," application note 63c, from Hewlett-Packard presents step-by-step procedure for measuring noise power spectral density **164**

Speaker systems for buildings ranging in size from night clubs to auditoriums for stereophonic and monophonic sources are detailed in Brochure AL-1315-3 from Altec Lansing. **165**

Live cartoon character system, capable of mouthing conversation of operator in synchronization with sound is described in 6-page brochure from Aniform Midwest. "Live" cartoon is suitable for presentation before camera and/or audience. **166**

Amplitude distortion analyzer and analysis procedure are described in 7-page illustrated brochure from B&K Instruments. **167**

"Coaxial Transmission Line With Minimal Discontinuities" is the title of a 7-page technical paper from NBS. **168**

Video equipment including bar graph generators, video analyzers, laboratory cameras, and sync generators are presented in short form catalog from Colorado Video. **169**

Solid-state devices made by solitron are presented with specifications in 28-page condensed catalog. **171**

Diode reliability report (25 pages) from Unitride Corp. summarizes results of over 27 million diode hours of testing of over 19,000 diodes and assemblies at their maximum rated dissipations. **172**

"Understanding Schematic Diagrams" explains in nontechnical language the functions of compo-

VA2080 Video Processing Amplifier

Set it- Forget it!

Once the operator has set the VA2080 Video Processing Amplifier, no adjustment is necessary to maintain stability and crisp picture transmission. Performance of the clipping circuits is unexcelled—maintaining 0.2% linearity to within two IRE units of clipping level. Expandable from monochrome to colour, or from studio to transmitter applications by the addition of modules. Back porch clamping is used on all models—exclusive in this price class.

The initial cost of the VA2080 series is much lower than you might expect—lower than any other proc amp in its class. As to proof of performance, more than 300 VA2080 installations are now in use! Find out more about the dependable, trouble-free VA2080. Write, wire or telephone Central Dynamics for a convincing demonstration.

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Circle 57 on Reader Service Card

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nents, their use in electronic circuits, the symbols and techniques of schematic diagrams. **173**

High fidelity components and speaker systems are the topic of Brochure AL-1368 from Altec Lansing. **174**

Microphones, and high fidelity loudspeakers and systems from Electro-Voice are presented in Forms 1184. **175**

"Expanding the Community of Education," a 14-page Ford Foundation Reprint by Edward J. Meade, Jr., presents technology's expanding rate in education. **176**

Regulator modules for 5, 6, 12, 18 and 25 V, 1 A dc application are described in data sheet from Bendix Corp. **177**

Sync generator systems—Series 2470 from Cohu Electronics—are described in 4-page bulletin. **178**

Videotape—Series 79—from Memorex is described in brochure now available. **179**

Case history of industrial training program using 8mm film copies and videotape is presented in Bulletin 6254 from Ampex. **180**

Miniature switch series E22 featuring operating force of 10 grams is presented in bulletin from Cherry Electrical Products. **181**

Rf and electromagnetic shielding and ventilating panels are described with illustrations, graphs and tabular matter in Data Sheet EMC-600 from Tecknit. **182**

Portable ac electric power supplied by 110-V, 30 A alternator is described in bulletin from Electra-Tronics. **183**

Color video encoder—Series 9840 from Cohu—is described in Data Sheet 6-465. **184**

Monochrome TV monitor—Model 6M901 from Setchell Carlson—is presented in Products Description Sheet No. M674. **185**

Digital panel meter made by Weston Instruments is presented in illustrated Bulletin 07-100-B. **186**

Cabinets and consoles in aluminum or steel are fully illustrated and described in 15-page Catalog S-67 from Zero Manufacturing. **187**

Distribution of standard frequency and time signals is topic of IEEE proceeding 55, No. 6, 827-836 (June 1967). Proceeding is available from NBS Office of Technical Information and Publications. **188**

"Year of Decision for CATV"—an address by Frederick W. Ford before the 16th annual NCTA convention—is available in an 11-page booklet from NCTA. **189**

Graphic recording component equipment is described in short-form catalog from Alden Electronic and Impulse Recording Equipment Co. **190**

"Elements of Color in Professional Motion Pictures," a 104-page book published in 1957 by SMPTE, will be reprinted and available for $7.00 this winter. A booklet containing basic outlines of procedures for making motion-picture prints from color originals is expected to be distributed with "Elements of Color . . . " **191**

Synchronizing system for maintaining synchronous operation of 2 or more videotape and/or audio recorders is described in Ampex Bulletin No. V119. **192**

Video control unit handling input and output for up to 6 live or automated CATV or ETV program sources is described in brochure from TeleMation. **193**

Video Institute courses offered by Ampex Corp. are described in Brochure C-555-7A. **194**

Automatic speech generation equipment designed for communications and other applications and featuring vocabulary of ten spoken numbers is described in 3-page brochure from Cognitronics Corp. **195**

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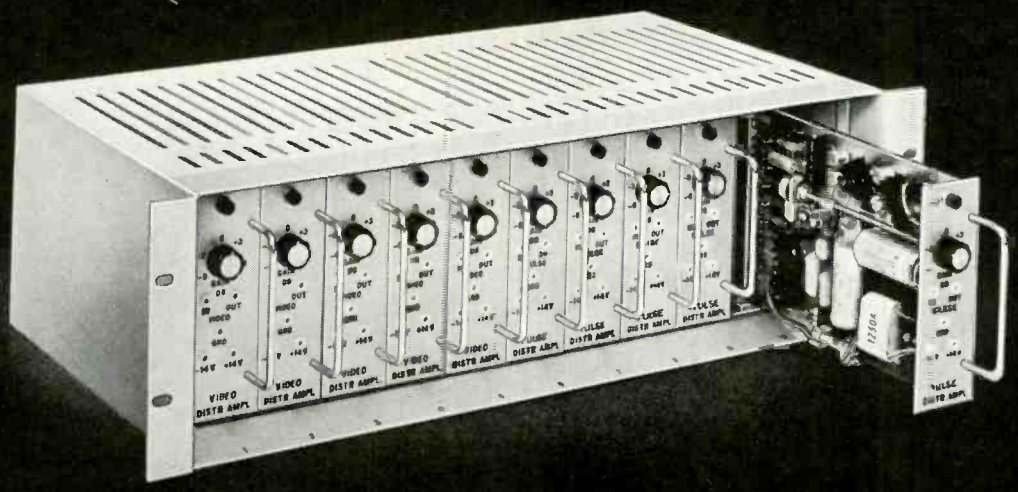


Ball Brothers Research Corporation designed the Mark IX to out-perform any other video/pulse distribution amplifier on the market. And as far as we know, it does. Video differential gain is 0.25 per cent, and differential phase is 0.25 degrees maximum. These low distortion characteristics provide excellent sub-carrier performance. Pulse rise time is less than 50 nanoseconds. DA's on the Mark IX are plug-in modules, each with its own power supply. To make sure they perform the way we say they will, we age them at nominal power for two weeks. Then we sell them like this: Video and pulse DA modules are $255. Sync-add option is $25. Ten-card chassis is $275. Two-card chassis is $100. Data sheets are free. So is an evaluation of the Mark IX in your operation.

BBRC BROADCAST TELEVISION EQUIPMENT · BALL BROTHERS RESEARCH CORPORATION · BOULDER, COLORADO 80302 · TELEPHONE: 303/444-5300

Circle 60 on Reader Service Card

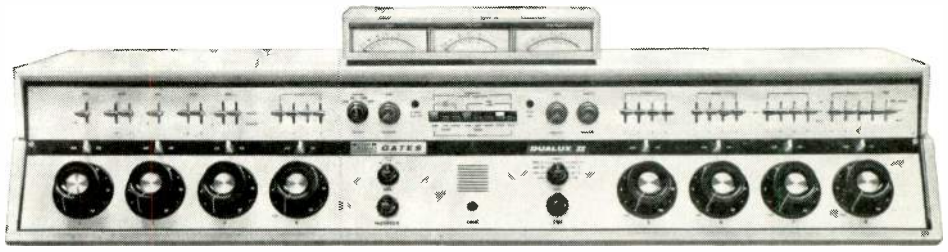
3 ALL NEW AUDIO CONSOLES from GATES

Plug-in silicon amplifiers • 20-20,000 cycle response

Solid state, all new – inside and out. Featuring 100% silicon transistors. All amplifiers and DC power supplies plug in. All three consoles feature 20-20,000 cycle frequency response, with less than 1 db variation. At all frequencies, distortion is less than 0.5% at rated output. Write for complete details. You'll wonder how we could build so much into such compact, handsome packages.

Stereo Statesman

The Gates Stereo Statesman features 5 full stereo mixing channels from 11 inputs. Full logic audio switching. New illuminated program keys... exciting new packaging concept.



Dualux II

The Dualux II provides monophonic and stereophonic mixing facilities separately or together. Designed to control AM and FM, FM Stereo and SCA from one control point. Features 8 mixing channels, 13 mono sources and 6 stereo sources... a total of 22 audio inputs, plus inputs for automatic programming equipment and an SCA audio signal.

Gatesway II

The Gatesway II with 8 monaural mixing channels from 18 inputs features in-built cue/intercom system; provision for remote announcer operation of studio microphone channels, and a novel variable equalizer for special effects or line correction.

GATES
HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY
QUINCY, ILLINOIS 62301, U.S.A.
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Circle 61 on Reader Service Card

BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

SITUATIONS WANTED: 15¢ per word; $2.00 minimum
HELP WANTED: 20¢ per word; $2.00 minimum.
ALL OTHER ADVERTISING: 25¢ per word; $3.00 minimum.
BLIND BOX NUMBERS: No extra charge. Send replies to address below.
DISPLAY CLASSIFIED ADVERTISING: $21.50 per inch 1x; $20.00 per inch 6x; $18.50 per inch 12x. Professional Cards $15.00 12x.
CASH DISCOUNT: 2% cash discount if remittance accompanies order.
CLOSING DATE: 5th of the second month preceding issue date.

BM/E, Monterey and Pinola Avenues, Blue Ridge Summit, Pa. 17214 Phone 717/794-2191

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1KW full time. Profitable. Price is firm with $81,000 down, but buyer can easily handle payments out of present billing, plus salary.

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POSITIONS WANTED

Take charge programmer—Dynamic young grad ready to trade profitable ideas, sound judgment, ten years' experience in all phases of broadcasting and the energy to obtain and hold top ratings, if you'll provide realistic salary, freedom in programming, permanency and advancement. Proven record, excellent references, complete resume and tape by calling 1-517-684-5788 mornings or writing to Box 1267-1, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Creative Producer-Director, writer, supervisor manager, TV-Radio, film, P. R. outstanding record, agency, major network affiliate, University ETV, International Education, experience. Seeks real challenge, stable opportunity which will reward loyal, imaginative hard work and ability. Presently employed. Will consider any location or overseas. Box 1267-2, c/o BM/E, Blue Ridge Summit, Pa. 17214.

We can make a lot of money together. Dynamic broadcaster, world traveler, seeks metro station interested in "talk personality." Authoritative voice, warm, compassionate air personality. Highest character references. Now employed, seeks broader horizons. Creates own original commercials. Box 1267-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

General Manager: currently general sales manager excellent property one of the top three markets. Desire General Management (full responsibility) large market, Aggressive, responsible creative & top salesman. Organizer. 40, with family, A-1 character. 18 years radio. Rounded background. Box 1267-18, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Assistant to producer or production assistant or? Graduate female director but directing is for men. Capable of handing all phases of production and writing-varied background — well trained and experienced — early 30's — mother of 3 — willing to relocate. Box 1267-4, c/o BM/E, Blue Ridge Summit, Pa. 17214.

POSITIONS WANTED (cont'd.)

Producer/Director, B.A. Degree, 5 years in top 2 market, seeks similar position with a progressive organization. Experience in all production phases, plus agency and sales contacts. Considering management position. Will relocate, immediate availability. Box 1267-5, c/o BM/E, Blue Ridge Summit, Pa. 17214

Mature (48) Californian currently in Wash., D.C. seeks return to west coast as newsman/annor.—20 yrs. experience radio & TV-AFTRA-interested MOR op. in major mkt. Replies confidential. Box 1267-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Broadcast engineer with control room, Special events, remotes and motion picture projection, recording total of 20 years' experience. What have you got to offer me? Box 1267-7, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Negro announcer, authoritative newscaster, family man, tight board, non floater, non prima donna. Graduate of New York broadcasting school. Have third class ticket. Box 1267-8, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Experienced traffic/bookkeeper/receptionist; some copy, news and walk in sales—Have excellent references and business background.—Prefer midwest or western states. Box 1267-9, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Experienced first class engineer desires maintenance or chief job. Fully qualified for any job AM-FM Radio. West Coast preferred. Box 1267-10, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Newswoman — announcer — DJ — experienced. Public relations: writing: advertising. Currently employed. Available ninety days. Will relocate. Tape available. Box 1267-19 c/o BM/E, Blue Ridge Summit, Pa. 17214.

Production Administrator, network TV and film experience, desires similar position with station or production house. Prefer NE area. Degree. veteran, married, dependable. Box 1267-21, c/o BM/E, Blue Ridge Summit, Pa. 17214.

3rd Phone endorsed, D.J., announcer, authoritative newscaster, tight board. Graduate Broadcast school, personable, not a floater. Desires sales. Box 1267-22, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Disc jockey, announcer, experienced, authoritative, newscaster, tight board, personable. Family man. Desires sales. Box 1267-23, c/o BM/E, Blue Ridge Summit, Pa. 17214.

A well trained announcer seeking position in radio or nightclub MC. NY or Conn. area. Box 1267-24, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Negro D.J. announcer newscaster top 40 MOR, recent grad, family man, 3rd endorsed. Box 1267-25, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Announcer. Negro. Modern approach. SWINGING AIR PERSONALITY. Some experience. Tape available. Box 1267-11, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Soul jock—3rd endorsed, tight board. Draft exempted. College training, relocate. Box 1267-12, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Young aggressive sales promotion director seeks job as manager of radio station anywhere in U.S. Box 1267-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED

ENGINEERS—TV—Sunny California. Discover job security, and a new way of life in California. Have top openings for qualified Maintenance Engineers, especially Video Tape and Live Color Video. Send resume or letter to The AMPS Agency—3924 Wilshire Boulevard, Los Angeles, California 90005. 388-3116
By Broadcasters — for Broadcasters

Immediate opening for engineer-first phone Television Station, operation—no announcing. Location—Northern Lower Michigan. Box 1267-26, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED (cont'd.)

CATV Engineer

Technical administrator required in corporate headquarters office of one of the largest and most well known multiple system owners.
This position requires experience and competence in all phases of CATV system engineering, construction, operation, and performance evaluation. Familiarity with microwave systems is desirable.
The work will consist of participating in the administration of all the technical phases of multiple CATV system operation. There is the opportunity to contribute to very interesting and technically advanced projects presently in process or planning.
This is basically a NON TRAVELLING job although occasional trips will be required.
This is a job in New York City.
This position should appeal to a field engineer who is strong technically and TIRED OF TRAVELLING.
This company is totally engaged in the cable television field and is not an offshoot of a broadcast, telephone, publishing, etc. business.
Send resume to:

TelePrompTer Corporation
50 West 44 Street
New York, New York 10036
Att'n: Roger Wilson

Combo engineer announcer for an AM FM station in South Florida market of 50,000. Good pay ($135-$150 weekly). Good benefits. Best climate. Modern equipment to work with. Engineering background necessary, some announcing required. Send resume and audition tape to Box 1267-14, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted: An experienced newsman. Should be capable of setting up complete news department. Have mobile units, beep phones, all paraphernalia. Need a man to run those plus hot line set up stringers, etc. Write or call M. E. Danbom, Radio Station KTBB, Tyler, Texas, Area Code 214, Lyric 4-7278.

IMMEDIATE OPENINGS — Qualify for any of the following positions: Technicians for RCA closed Circuit Television equipment — Camera men — Maintenance men — Video Tape Men — Video Engineers. RCA Rep. 143-08 94th Ave., Jamaica, New York, or (212) 297-3344.

Looking for experience. Live color, color VTR, and color film with new modern equipment. WREX-TV, Rockford, Ill. has an opening for a first class engineer. TV experience desirable but not necessary. Contact Chief Engineer WREX-TV.

Announcer with sincere showmanship including production; sales experience preferred, or available for sales training. Active market, nonmetropolitan. No tapes, just a letter; confidential. Box 1267-27, c/o BM/E, Blue Ridge Summit, Pa. 17214.

"Texas station has immediate opening for announcer—1st phone engineer. New equipment and building. Our first opening in over six years. Replies confidential. Experience is necessary. Contact Clint Formby, Mgr., KPAN, Hereford, Texas.

Have openings for two first class, licensed, experienced technicians capable of maintenance of all types of studio color gear. WPTV, 5 Coconut Row, Palm Beach, Florida. Telephone: Area code 305, 833-2471.

Qualified combo men command top salaries! I'll teach you professional announcing, newscasting techniques—fast—via taped correspondence. HAL FISHER, Broadcast Consultant, 2237 Elsinore, Winter Park, Fla. 32789.

Needed immediately — Experienced announcer with first phone. 5000 watt NBC affiliate with MOR adult format. Good pay and fringe benefits. Contact Larry Collins, WBCK, Battle Creek, Mich. 49015.

Program director/community involvement/production spots. Solid locally owned in major growth area. Box 1267-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED (cont'd.)

First Class engineers, maintenance background, no board work. Immediate openings. Excellent growth opportunity with independent group. Rush reply by letter to C. Dingmen, WCTC, 385 George St., New Brunswick, N.J.

If you have a First Class license, experience and ability, and are worth $150 per week to start, a well-run east coast station would like to hear from you. Box 1267-28, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Needed-Experienced combination salesman & announcer. Good future, security, living conditions, hours & pay. Excellent recreation. Southeastern location. Box 1267-29, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted! Broadcast technicians to enter aircraft electronics. Numerous jobs everywhere. Write: Avionics, Reno/Stead Airport, Reno, Nevada 89506.

Immediate opening for Chief Engineer. Experienced only, Salary open. Many fringe benefits. Call or write, Manager, WITY, Danville, Illinois.

Experienced announcer with First. No maintenance. News or Production experience desirable. Afternoon air shift. WNRK, Box 425, Newark, Delaware.

"N.M. CATV group desires producer-salesman-announcer; double commissions: "505-437-7258." Box 1267-30, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Chief for 5,000 watt directional—Midwest—excellent facilities. Box 1267-31, c/o BM/E, Blue Ridge Summit, Pa. 17214.

WCOD FM on Cape Cod wants "take over" manager. Must have strong sales background. Write Room 804, 59 Temple Place, Boston, Mass. 02116.

Announcer with first ticket. Job open in southern California on MOR operation. Box 1267-16, c/o BM/E, Blue Ridge Summit, Pa. 17214.

"Wanted—1st class engineer-announcer, Radio Station WNKY, Box 248, Neon, Ky.

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All types of Electron Tubes for Communications

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Five Packard-Bell Model 920 television cameras. Three in original package, two used less than 10 hours. $475.00 each. Jack Lowrey, Box 711, Mansfield, La. 71052.

Spotmaster cartridge equipment and accessories, Crown tape recorders, QRK, REK-O-KUT, RUSSCO (turn-tables and preamplifiers) Gray and Euphonics tonearms, Metron modulation monitors, Universal audio products, Pultec, Norelco-AKG microphones, Fidelipac and Audiopak cartridges. Write for special money saving offers. Audiovox, Box 7067-55, Miami, Fla. 33155.

AMPEX authorized Sales and Service. New and used equipment for sale. 48 hour service on most repair including head rebuilding. Other professional equipment also available. ACCURATE SOUND COMPANY, 15 N. Tyler, San Angelo, Texas AC 915 949-1904.

Largest supply of G.E. & Motorola radio and mobile telephone equip. in the U.S. (30-50), (150-174), (450-470), Base, repeater, and dial equip. Dealers invited. Western Mobile Telephone Company, 200 South Anaheim Blvd. Anaheim, Calif. (714) 774-0520.

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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.

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For Sale . . . TR-22 tape recorder. Fully colorized. Three years old, excellent condition all modifications. Highest offer above $40,000. Avail. July. Call 717 823-3614. Or Box 1267-32, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Two modified RCA TK-40A color camera chains in working condition. Exceptional value. Inspection invited. Write P.O. Box 18151, Tampa, Florida 33609, or phone area 813, 253-0447, Tampa.

Programatic automation system. Two tape decks and control. Mono and stereo heads. 1962 cost $3672. Excellent condition. Presto PB-17-C IGM tape rewinder. All for $700. KOZE Radio, Lewiston, Idaho.

Brand new remote amplifiers, 2 channel remote microphone amplifiers, 2½ inch VU, battery operated, 7 transistors $95.00 FOB Kokomo. **Gredco, Inc.,** 1830 S. Webster, Kokomo, Ind. 46901. Area 317-883-5688.

Browning model BR-3A-67 and BT-3A-67 Background Music SCA receivers—67kc. Some require service. As is $35.00 each—House of Sound, 714—2nd Avenue, South Minneapolis, Minn. 55402.

POLICE — fire — aircraft — amateur calls on your broadcast radio! Tune the band with TUNAVERTER. Free catalog. Salch Company, BM/E, Woodsboro, Texas 78393.

For sale: Ampex model 300 C, console tape recorder . . . brand new, just unpacked, with manual. Best offer over $2,000. Contact WTRI, Brunswick, Md. 301-834-8141.

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

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New Gates producer used 100 hours, no modifications. Best offer over $400. Box 965, Fremont, Nebraska. 721-1176, Mr. Nelson.

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Professional Electronics Projects — $1 up. Catalog 25¢. PARKS, Box 15265, Seattle, Wash. 98115.

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

Japanese electronics catalog, $1.00. Dec, 10639A Riverside Drive. North Hollywood, California 91602.

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Wanted. Harmony Isle 15 minute transcriptions. (Macgregor?) 2889 21st Street, San Pablo, Calif. 94806.

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AMPEX HEAD ASSEMBLY relapping and replacement head service for all AMPEX professional studio model recorders. Our precision relapping extends head life for maximum use. Brand new shelf stock replacement heads of our manufacture available when relapping not advisable. Prices include thorough assembly cleaning, optical and electrical inspection and complete testing on Ampex equipment. Monaural assembly relapping . . . $35.00 complete. Monaural assembly replacements . . . $119.50 complete. "Loaner" assemblies available. For more data, contact LIPPS, Inc., 1630 Euclid St., Santa Monica, Calif. 90404 (213) EX 3-0449.

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Precision relapping of all heads and supporting posts, includes cleaning and testing. AMPEX VTR audio assemb.y . . . $75.00 complete. Brand new shelf stock replacement heads of our manufacture available when relapping not advisable. RCA units also serviced. LIPPS, Inc., 1630 Euclid St., Santa Monica, Calif. 90404 (213) EX 3-0449.

BROADCAST EQUIPMENT REBUILDERS . . . your headquarters for tape cartridge reconditioning, all work fully guaranteed! Write Quin Morrison about your used equipment needs. New address: Box 276, Hickory, N.C. 28601.

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Broadcast maintenance — five inspections $30.00 week plus hourly. Mailtronics, 109 Pinetree Drive, Woodbridge, Va.

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16mm CATV
SOUND PROJECTORS
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$650.00
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PROGRAM SERVICES (cont'd.)

"DEEJAY MANUAL" is a folio of Gags, Ideas, Breaks, Gimmix, Fun for the working deejay. Special $3.00 with this ad. Write for free "Broadcast Comedy" catalog. Show-Biz Comedy Service (Dept. E) 1735 E 26 St., Brooklyn, New York 11229.

Deejays! 6000 classified gag lines, $5.00! Comedy catalog free. E. Orrin, Box 679 Boyer Road, Mariposa, Calif. 95338.

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FCC License preparation by correspondence. Also, associate degree in electronics by three semesters in correspondence and two semesters in resident classes. Free details on either course. Write: Grantham Desk 7-B, 1505 N. Western Avenue, Hollywood, Calif. 90027.

REI First Class Radio Telephone License in (5) weeks Guaranteed. Tuition $295.00. Rooms & Apts. $10-$15 per week. Job placement free. Two Schools—Sarasota, Florida & Kansas City, Mo. For information contact R.E.I., 1336 Main Street, Sarasota, Florida.

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Please run the ad attached in BM/E's CLASSIFIED MARKETPLACE in your next:

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☐ 3 issues ☐ 1 issues

BM/E, Classified Advertising Department, Blue Ridge Summit, Pa. 17214.

BM/E

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FROM THE EDITOR

It's Our Anniversary

Pardon us while we take time out to wish ourselves a happy birthday. It's our third. Hardly seems possible that we've put out thirty-six issues—this is our thirty-seventh—but it's true.

It's a natural reaction to reminisce a bit. Having stockholders as parents, our record book doesn't have the usual cute infant items such as when we cut our first tooth. Rather, it notes when RCA became an advertiser, when the profit corner was turned, and things like that. With such demanding parents, expressions of sentiment and loving encouragement are not forthcoming even though quite vital to one's sense of security. Fortunately, we get this from you, our fans—readers, contributors, authors and advertisers. We thank you. In a large sense, you've been the surrogate parent and we appreciate the attention you have given us.

Your response to our efforts makes us stand tall for our limited years. Up through June of this last year, over 8400 of you, through our reader service card, said you liked us and offered to help. In 1966 alone, we processed over 60,000 inquiries for more information from advertisers and industry manufacturers.

Now that we are a little older, we can claim to have judgment as well as opinions. We think our philosophy of bringing together and addressing at the same time management (profit-oriented) and engineers (performance-oriented) to build more effective communication systems has been a sound one. We will continue in this effort. Our concern with system effectiveness has caused us to track closely developments in fm (including stereo), uhf, ETV and CATV. It prompts us to monitor developments in solid state and automation and how these advances are being incorporated in broadcast and distribution equipment.

Communication managers and engineers (as well as publishers and editors) are continuously caught in CPM—cost per thousand—squeezes. The C, or cost, factor forever goes up, unless one can stem it by less troublesome, more maintenance free, or more automated equipment—*BM/E*'s meat. The M, or thousands, is a function, in part, of programming, marketing, promotion, and competition (more C, P and M's). Our emphasis on M in *BM/E* is not in reaching mass millions. That's the proper concern of national advertisers, agencies and network pundits, and other publishers who cover the subject very adequately. However, programming for *local* interests and *local* public service is grass roots communication, and *BM/E* is happy to report on how managers of communications make do and make out in this area.

The coming year, 1968, our fourth, should be another good one. All modes of communication, including a-m are growing. *BM/E* has scheduled for next year special emphasis on antennas, programming and promotion, NAB products, color TV, CATV products, ETV developments, automation, station planning and construction, and audio and recording techniques. A forum series on cable distribution products will continue.

Wish us continued success by continuing suggestions, criticisms and contributions.

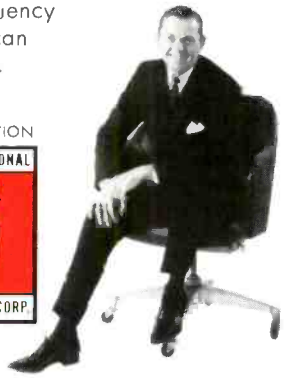
James A. Lippke

Look the same? Right, they look the same. But the one on top is the old TDA2 . . . the first and original Transistorized Distribution Amplifier on the commercial market, and the standard of the industry. The new one is the TDA2-D. The D stands for Differential Input, which we have added to the TDA2. And not only did we add a differential input, we subtracted 30 dollars from the price. Now you can order the new TDA2-D for $295.00. Let us send you more information.

TDA2-D Specifications.

Printed Circuit—All Transistor—Bridging input—
—4 to +12 db gain—4 outputs at 75 ohms—Differential phase less than 0.5 degrees—Differential gain less than 1%—Draws 4 watts of power—weighs 4 lbs.
—Frequency response flat within ± 1/4 db from 10 cycles per second to 10 megacycles.

Differential Input has common mode rejection of 26 db, a maximum common mode voltage of 3 p-p and is effective over a wide frequency range. Differential Input can be disconnected if desired.



Write or wire or phone collect

Ray Weiland, President
INTERNATIONAL NUCLEAR CORPORATION
608 Norris Avenue
Nashville, Tennessee
(615) 254-3365

"Transistorizing the Television Industry"

INTERNATIONAL
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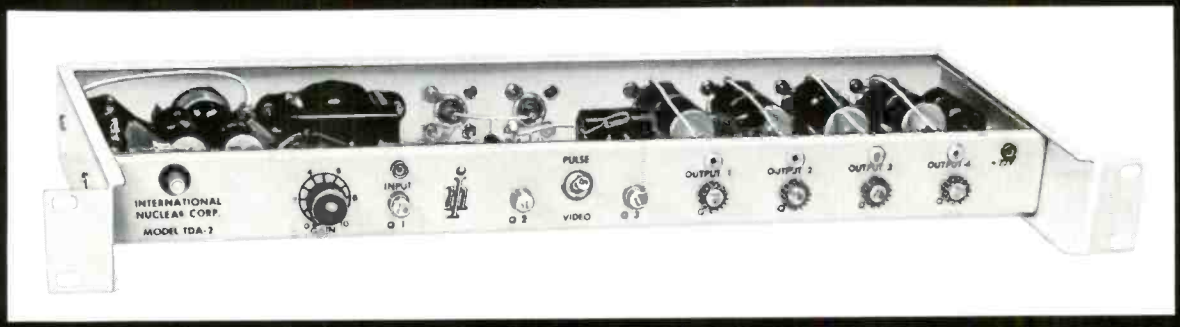
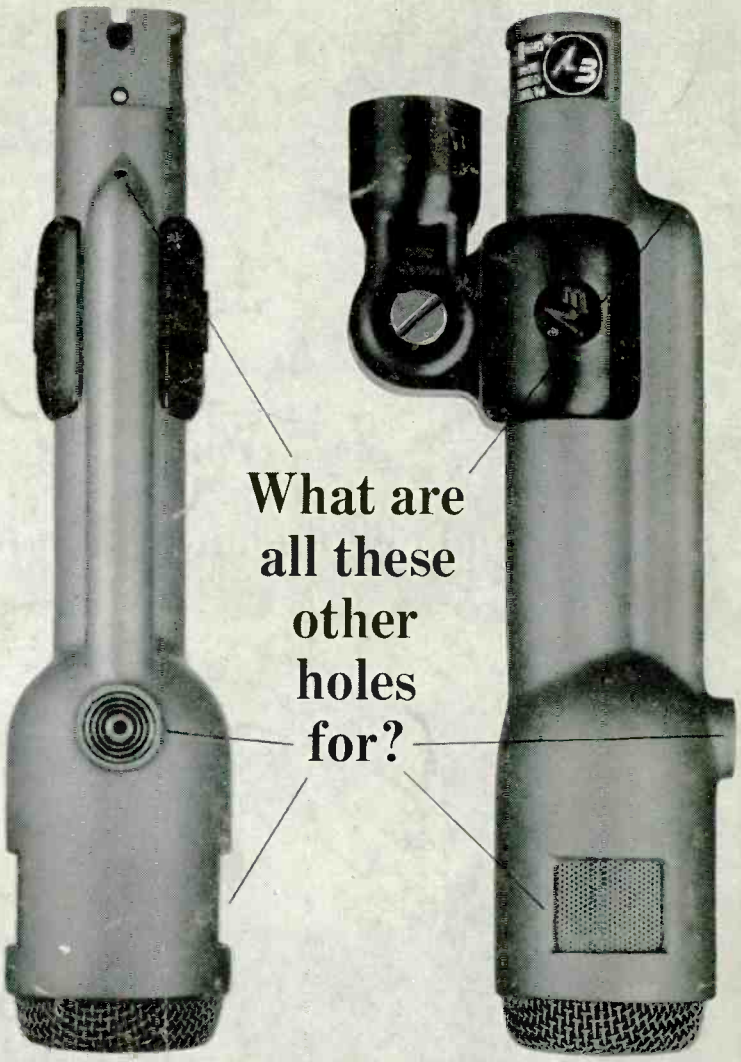
The Old One



The New One

Circle 2 on Reader Service Card

If the Electro-Voice Model 666 picks up sound here...



What are all these other holes for?

The holes in the top, sides and rear of the Electro-Voice Model 666 make it the finest dynamic cardioid microphone you can buy. These holes reduce sound pickup at the sides, and practically cancel sound arriving from the rear. Only an Electro-Voice Variable-D® microphone has them.

Behind the slots on each side is a tiny acoustic "window" that leads directly to the back of the 666 Acoustalloy® diaphragm. The route is short, small, and designed to let only highs get through. The path is so arranged that when highs from the back of the 666 arrive, they are cut in loudness by almost 20 db. Highs arriving from the front aren't affected. Why two "windows"? So that sound rejection is uniform and symmetrical regardless of microphone placement.

The hole on top is for the mid-range. It works the same, but with a longer path and added filters to affect only the mid-frequencies. And near the rear is another hole for the lows, with an even longer path and more filtering that delays only the bass sounds, again providing almost 20 db of cancellation of sounds arriving from the rear. This "three-way" system of ports insures that the cancellation of sound from the back is just as uniform as the pickup of sound from the front—without any loss of sensitivity. The result is uniform cardioid effectiveness at every frequency for outstanding noise and feedback control.

Most other cardioid-type microphones have a single cancellation port for all frequencies. At best, this is a compromise, and indeed, many of these "single-hole" cardioids are actually omnidirectional at one frequency or another!

In addition to high sensitivity to shock and wind noises, single-port cardioid microphones also suffer from proximity effect. As you get ultra-close, bass response rises. There's nothing you can do about this varying bass response — except use a Variable-D microphone with multi-port design* that eliminates this problem completely.

Because it works better, the E-V 666 Dynamic Cardioid is one of the most popular directional microphones on the market. Internal taps offer 50, 150, or 250 ohm impedance output. Frequency range is peak-free from 30 to 16,000 Hz (cps). Output is—58db.

To learn more about Variable-D microphones, write for our free booklet, "The Directional Microphone Story." Then see and try the E-V 666 at your nearby Electro-Voice professional microphone headquarters. Just $255.00 in non-reflecting gray, complete with clamp-on stand mount. Or try the similar Model 665. Response from 50 to 14,000 Hz (cps), $150.00 (list prices less normal trade discounts).

*Pat. No. 3,115,207

ELECTRO-VOICE, INC., Dept. 1271 EM
614 Cecil Street, Buchanan, Michigan 49107

Electro-Voice®
SETTING NEW STANDARDS IN SOUND

SEND FOR NEW PROFESSIONAL MICROPHONE CATALOG TODAY!

Circle 3 on Reader Service Card