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099, 3

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Circle 102 on Reader Service Card

OCTOBER 1969/VOLUME 5/NUMBER 10

BM/E

BROADCAST MANAGEMENT/ ENGINEERING

This month's cover: Recording is big business today, and the emphasis is on multi-track. The remix is at least as important as the original take, and this electronic blending is the subject of Art Sudduth's cover design. For more on audio, see pages 31-47.

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BROADCAST INDUSTRY NEWS

Court asks FCC to clarify lottery rule

The United States Second Circuit Court of Appeals asked the FCC early in August to clarify what constitutes and differentiates promotion and news in reporting a state lottery.

The request was included in a 22-page, unanimous opinion ruling on New York State Broadcasters Association's petition for review of a Commission decision.

Working without decisions on similar lottery cases as precedent, the Court asked the FCC to set aside declaratory judgment "to allow it to reconsider petitioners' requests in light of this opinion."

Although the decision agreed with the FCC that it is against Federal law to broadcast advertising or direct promotion of lotteries, it agreed with the broadcasters that the regulatory agency hadn't been specific about defining promotion and news.

Members of the New York State Broadcasters Association own 175 radio and TV stations; both the State and City of New York supported its request for appeal.

WCBS to go all-news 23½ hours a day

With the cancellation on December 31 of its programming standby for over 16 years, "Music 'Til Dawn," WCBS Radio will extend its all-news format to cover 23½ hours daily; Arthur Godfrey's half-hour, daily broadcast from 1:30 to 2 p.m. will continue.

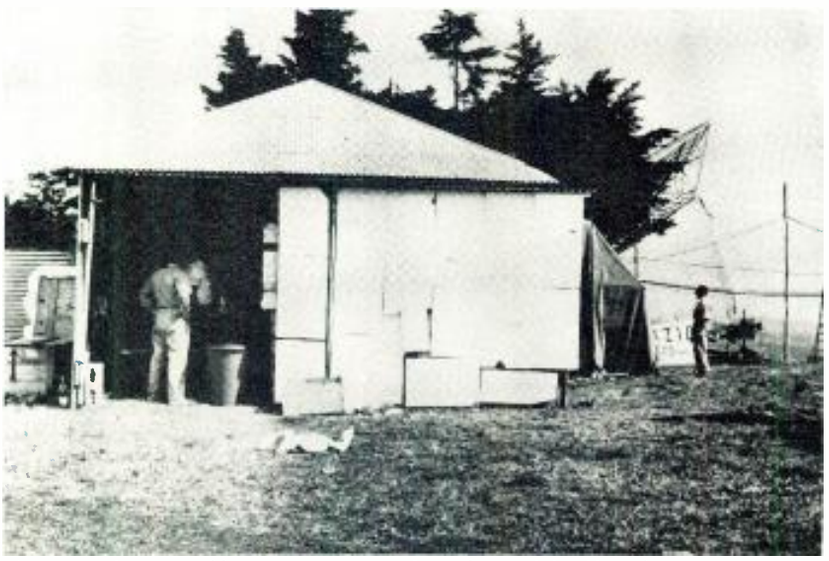
Although WCBS lost money before and continued to lose cash after it switched to an all-news format on August 28, 1967, a spokesman has predicted that the station will be running in the black by next year.

WINS, which is presently New York City's only around-the-clock news station, will get its first competitor with the move. WINS and WCBS will have only their around-the-clock setups in common; their approaches to broadcasting news will differ.

WINS, which went all-news on April 19, 1965, broadcasts in telegraphic style; features are not common, unless they are related to current news.

WCBS will concentrate more on "the back of the book," according to Joseph Dembo, WCBS vice president and general manager. News analysis, rather than fast-breaking items, will be emphasized.

The Mark IV gets around



The Mark IV color film processor is going places. Like Uganda. Pictured is its African processing lab—a steel-roofed hut—for film of Pope Paul's visit. (A part of the antenna used to beam the pictures to the satellite can be seen at the right.) Developed and built by Jamieson Film Company's equipment division as an air-transportable system for CBS News, the processor was most recently delivered—in its fixed-use version—to the Japanese National Network. Since it debuted at the Republican and Democratic National Conventions, the Mark IV has covered President Nixon's around-the-world trip, the moon launch, and has performed in more than 50 TV stations, networks and labs around the world.

Pennsylvania files for educational network

The Department of Public Instruction of the Commonwealth of Pennsylvania has filed with the FCC a plan for an educational radio network.

Said to be the first detailed state-wide engineering plan presented to the Commission, the state's "Educational Fm Radio Plan" contains a request for channel approval for 53 noncommercial fm radio stations.

Ocko Associates, consulting engineers of Bryn Mawr, Pa., were commissioned by the Department to design the network and prepare the table of channel allocations.

RKO General splits a-m/fm

In a move to make fm swim or sink, RKO General in late August divorced six of its seven fm stations from their sister a-m operations, in sales and programming.

Spearheading this action was the new FM Sales Division, under the aegis of RKO Radio Representatives, Inc. James F. O'Grady, Jr., is overall supervisor and Ed Lubin

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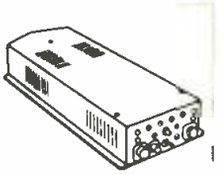
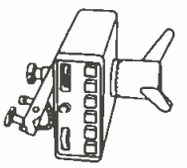
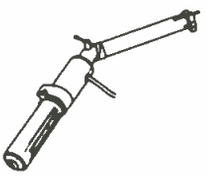


Servopak



Shot Box



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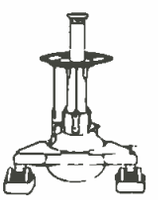
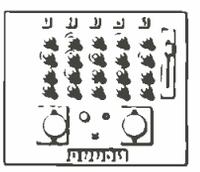
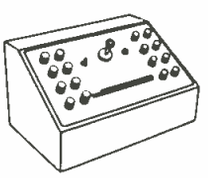
TVP Camera Pedestal



TVP Pneumatic Hi-Lo Pedestal



Broadcast Control Panel



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Circle 104 on Reader Service Card

is general sales manager for the national sales outfit, which will represent all RKO-owned fm stations and selected outside fm stations. Borrowing from a pioneer fm dictum, salesmen must make their living by fm sales only; they are forbidden to sell a-m.

The move was sparked by the two-year-old success story of RKO's WOR-FM, New York City, which has just gone into black ink as probably the nation's No. 1 fm station, and one of the top six radio (a-m or fm) stations in the country's biggest market. WOR-FM garners the young adult audience with its mix of old rock and contemporary pop music in full stereo (see *BM/E*, July 1969, p. 51.)

Programming Chemistry

The magic, audience-grabbing formula was concocted by programming chemists Bill Drake and Gene Chennault, consultants to RKO General for WOR-FM and other stations. Capping their success was the competition-zapping 48-hour documentary of music and interviews, "The History of Rock and Roll" (from the dawn of rock to the age of Aquarius). Produced by RKO's KHJ-FM, Los Angeles, "History" premiered in New York in February, broke Boston in August and then returned to NYC for a repeat. It was repeated this past September, and is said to be eagerly awaited in other markets.

The WOR-FM formula of golden oldies, some current Top-40 and album cuts, is essentially continued in the new Drake-Chennault "Hit Parade 1969" automation service, which will program RKO fm stations in four other markets. (WOR-FM remains live.) Drake-Chennault programs both stereo music and jocks on cartridges, intro'ing and outtro'ing each tune with automation-unusual voice overrides which make a sound nearly as live as Top-40 a-m stations. The Drake Chennault service is all-cartridge using multiple-source machines. Therefore, it's most possible that the 150-Hz stop cue is used to trigger the next tune, while the 8000-Hz trip cue keys a supered, open-end voice track with override DJ comment to provide the live sound. Only time and temperature announcements are lacking to add the last live touch.

Both blockbusters—"The History of Rock and Roll" and "Hit Parade 1969" (soon to be updated to 1970)—are being offered to fm stations, (but not to a-m stations) in non-RKO markets.

The company's a-m flagship, WOR, New York, is nearly all-talk, appealing primarily to over-35's, while sister fm dominates the 25-35 segment. RKO is playing the split to the hilt, shunning a-m/fm crossplugs in an effort to bracket both age groups. Even WOR-TV is silent on radio promos. Similar actions are planned in other RKO markets.

Around the U.S., four men have been named by RKO as general sales managers of the now-autonomous fm stations. They are: Hugh Wallace, WOR-FM, New York City; Dan McCabe, WROR-FM Boston; Wes Gregory, KFMS-FM, San Francisco; Tom Boise, KHJ-FM, Los Angeles. Similar appointments, it is said, will soon be made at WGMS-FM, Washington, D.C., and WHBQ-FM, Memphis. WGMS-FM, Washington, will continue its classical music format. Plans for CKLW-FM, Windsor/Detroit, have not been announced.

GE packs up PJ-400

Tom Lane, of General Electric, takes a last look at the first PJ-400 color video projector to come off the production line. One of four ordered by Metromedia, this projector is headed for WNEW-TV's New York corporate

presentation room; the next one is scheduled for KTTV, Los Angeles. The PJ-400 makes color pictures up to 15 × 20 feet using the single-gun, light valve approach (the light valve uses a transparent oil film instead of a phosphor screen).

NAEB board proposes NPR establishment

The board of directors of the National Educational Radio Division of the National Association of Educational Broadcasters has proposed that the Corporation for Public Boardcasting establish in Washington, D.C., National Public Radio—an independent radio program and production center to handle interconnection for public radio stations.

The NPR would be governed by 12-member board composed of nine public radio station managers and three members representing the public at large.

NAB schedule revisited

The NAB fall conferences listed in the September issue of *BM/E* on page 8 weren't marked (as they should have been) for 1970.

The NAB schedule for the 1969 fall conferences includes: Oct. 23-24, Chicago, Palmer House; Oct. 27-28, Boston, Mass. Statler Hilton; Oct. 30-31 Atlanta, Atlanta Marriott; Nov. 13-14, Dallas, Tex., Marriott; Nov. 17-18, Denver, Brown Palace; Nov. 20-21, Portland, Ore., Sheraton Motor Inn.

Again, for anyone we unintentionally confused, here is the NAB schedule of conferences for the fall of 1970: Oct. 19-20, Atlanta, Ga., Sheraton Biltmore; Oct. 22-23, Chicago, Ill., Palmer House; Oct. 26-27, Philadelphia, Pa., Benjamin Franklin; Nov. 12-13, New Orleans, La., Monteleone; Nov. 16-17, Denver, Colo., Brown Palace; Nov. 19-20, San Francisco, Calif., Mark Hopkins.

The 1970 schedule will all follow a 1½-day format, and will include an "early bird reception" the night before in each case. Morning sessions both days will be for both radio and TV delegates. The first-day afternoon session will be divided into concurrent radio and TV sessions.

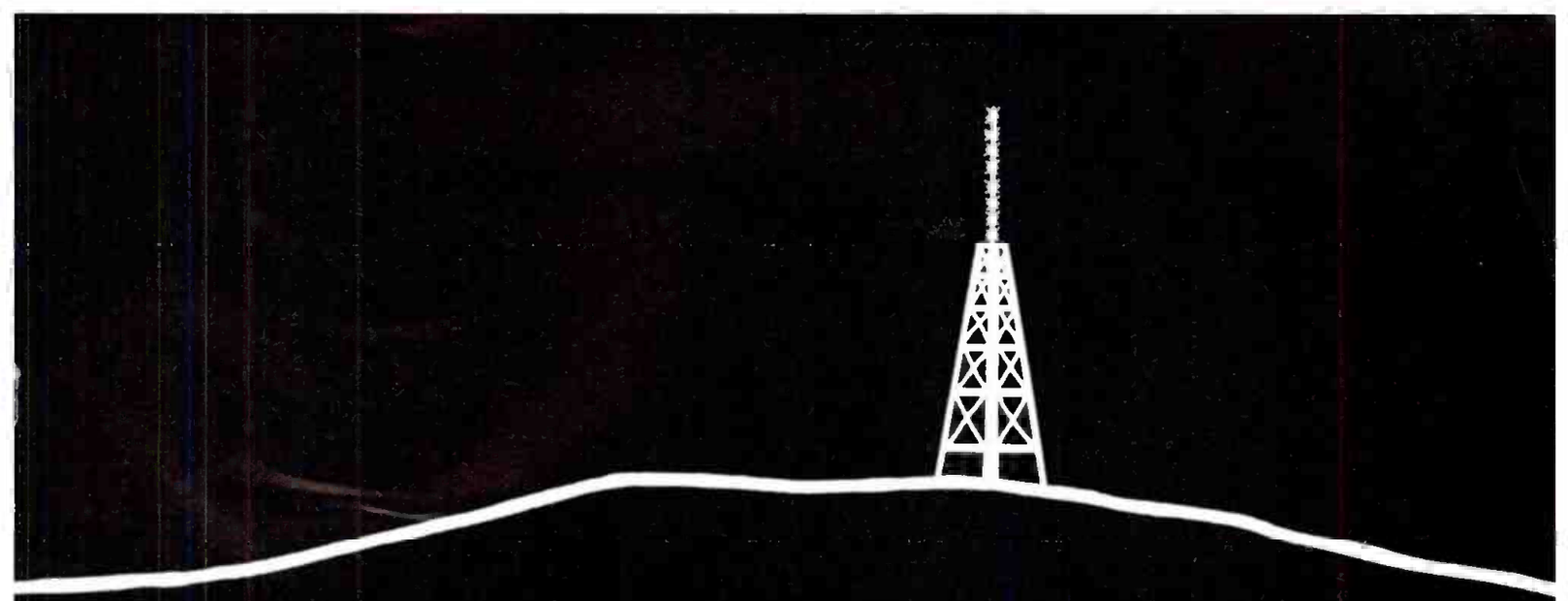
New England Life to switch to EVR

New England Mutual Life Insurance Company will soon be converting about 300 videotape programs to EVR format for field distribution and playback of programmed learning materials, according to an agreement it recently concluded with CBS Electronic Video Recording Division.

Motorola Inc., first licensed manufacturer of EVR players, has agree to install the players in New England Life's agencies throughout the country.

Charlotte heaps awards

Charlotte, North Carolina, stations WBTV and WBT Radio recently re-



Varian klystrons hold back the cost of doing business.

You might say that UHF TV klystrons from Varian cost about a buck an hour. Although Varian warrants its UHF TV klystrons for 5,000 hours video, their average operating life is 8-9,000 hours . . . at an average cost of about $9,000 per tube. If that's not a bargain, think of the UHF stations that get 20,000 hours per tube, or the one in Texas that's logged over 30,000 operating hours on one tube.

It's a fact that since the first commercial UHF TV station went on the air back in the '50's, Varian has more than doubled the operating life of UHF TV klystrons. And the price hasn't changed much since then. No wonder over 90% of the stations use Varian tubes.

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You can get all the figures on Varian klystrons from any one of the more than 30 Electron Tube and Device Group Sales Offices around the world. Or write the Palo Alto Tube Division, 611 Hansen Way, Palo Alto, California 94303.

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New Stereo Modulation Monitor TBM-2200

New transistorized model with two meters which simultaneously indicate left and right channel modulation. Also indicates pilot injection, crosstalk, separation, frequency response and FM s/n ratio. Compact, modular design uses plug-in cards. Can be used in combination with TBM-3500A for monitoring FM stereo or with TBM-4000A for FM stereo/SCA.

New FM Frequency Monitor TBM-3000A

A new transistorized digital frequency monitor. Measures carrier frequency and 19 kHz stereo pilot frequency of FM broadcast stations. Digital readout provides maximum ease of operation. Optional outputs for driving automatic logging equipment or remote meters. Contact closures (activated by greater than 2 kHz frequency error) may be used for an alarm indicator or transmitter control. By far the most versatile frequency monitor available at its price.

New FM Modulation Monitor TBM-3500A

New transistorized model with plug-in modular design. Basic modulation monitor for FM monophonic stations. Monitors total modulation, main channel modulation, AM/FM noise and frequency response. Can be used in combination with other McMartin monitors for FM stereo, FM/SCA and FM stereo/SCA. *FCC Type Approval Number 3-161.*

Write Dept. B-8 for free "McMartin McMonitor" Guide.

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McMonitors!

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ceived nine awards from United Press International for "outstanding news coverage" during 1968.

Both stations won first-place awards for "best multi-man news operation" and for "best editorial or documentary."

WBT Radio also got first placement for "best coverage of a spot news story" and "best year-end review of the news."

Atlanta to host 4th Radio Conference

The Fourth Annual Radio Program Conference for communications media executives has been set for December 5-7 in Atlanta by the sponsoring Bill Gavin organization. Special meetings on communications advances in broadcasting, advertising and music and news dissemination are to be featured. For further information, contact: Bob Levinson or Al Ross, LITROV/LEVINSON, 9171 Wilshire Blvd., Beverly Hills, Calif. 90210.

Riker or Ward: What's in a Name?

If you've ever been confused by the corporate name-juggling at Riker and Ward, be consoled; so's everyone else. Here at last is a scoreboard. Parent company (as we go to press) is Riker-Maxson Corp., headquartered at 280 Park Avenue, New York, N.Y. 10017.

All sales and manufacturing for both Ward and Riker will be handled at the Ward plant, 142 Central Avenue, Clark, N.J. 07066. The name on the door is still Ward, and regional sales offices have been established in Denver, Dallas, St. Paul, Van Nuys (Calif.) and Deltona (Florida).

Bob Hope to chair com for broadcasting's gold

Unlike 50th wedding anniversary celebrations, which are usually over in one night, the half-century anniversary of broadcasting will last all of 1970. Recently chosen to head the special committee for the observance is the 1963 recipient of the NAB's Distinguished Service Award, Bob Hope.

"We are very pleased that Mr. Hope can accept this appointment," said Vincent T. Wasilewski, NAB president, "for I can think of no other American who so completely represents the broadcasting industry and transcends affiliation with any one facet."

"I am very happy to do anything that will help to make the 50th anniversary a great one," said Hope.

Members of the committee are all former recipients of the service medal, the highest award given by the broadcasting industry.

The year-long observance will especially focus on how the industry will meet the future's demands.

FCC gets more complaints in July

July complaints about broadcasting from the public to the FCC increased 210 over those received in June to total 1350. Other comments and inquiries totalled 3285 —an increase of 655 over June's total.

Many of the complaints concerned duplicated coverage by the networks of the Apollo 11 flight. Other objections included those to simultaneous presentation of different kinds of sports events to the exclusion of other kinds of programs, and cancellation of programs by the networks.

The Commission sent 2378 letters in response to all corresspondence.

Prix Jeunesse elects NET man president

Paul K. Taff, director of children's programs for National Educational Television, has been elected president of the International Advisory Board of the Prix Jeunesse Foundation.

Taff has served as judge on two of the biennial Prix international contests and has participated in the seminars held with the competitions.

Devoted to establishing, intensifying and improving international relations in children's programming and television, the Foundation has been active since 1964.

Upcoming conventions

1969			
Oct.	13—16	AES	New York Hilton
	19—22	U.S. Independent Telephone Assn.	Sheraton-Park Hotel Washington, D.C.
Nov.	8—12	NAEB	Sheraton-Park Hotel Washington, D.C.
1970			
March	23—26	IEEE	New York Coliseum & New York Hilton
April	5—8	NAB	Conrad Hilton Hotel Chicago
May	26—1	SMPTE	Drake Hotel Chicago
	4—7	AES	Los Angeles Hotel
June	2—5	NCTA	Palmer House Chicago

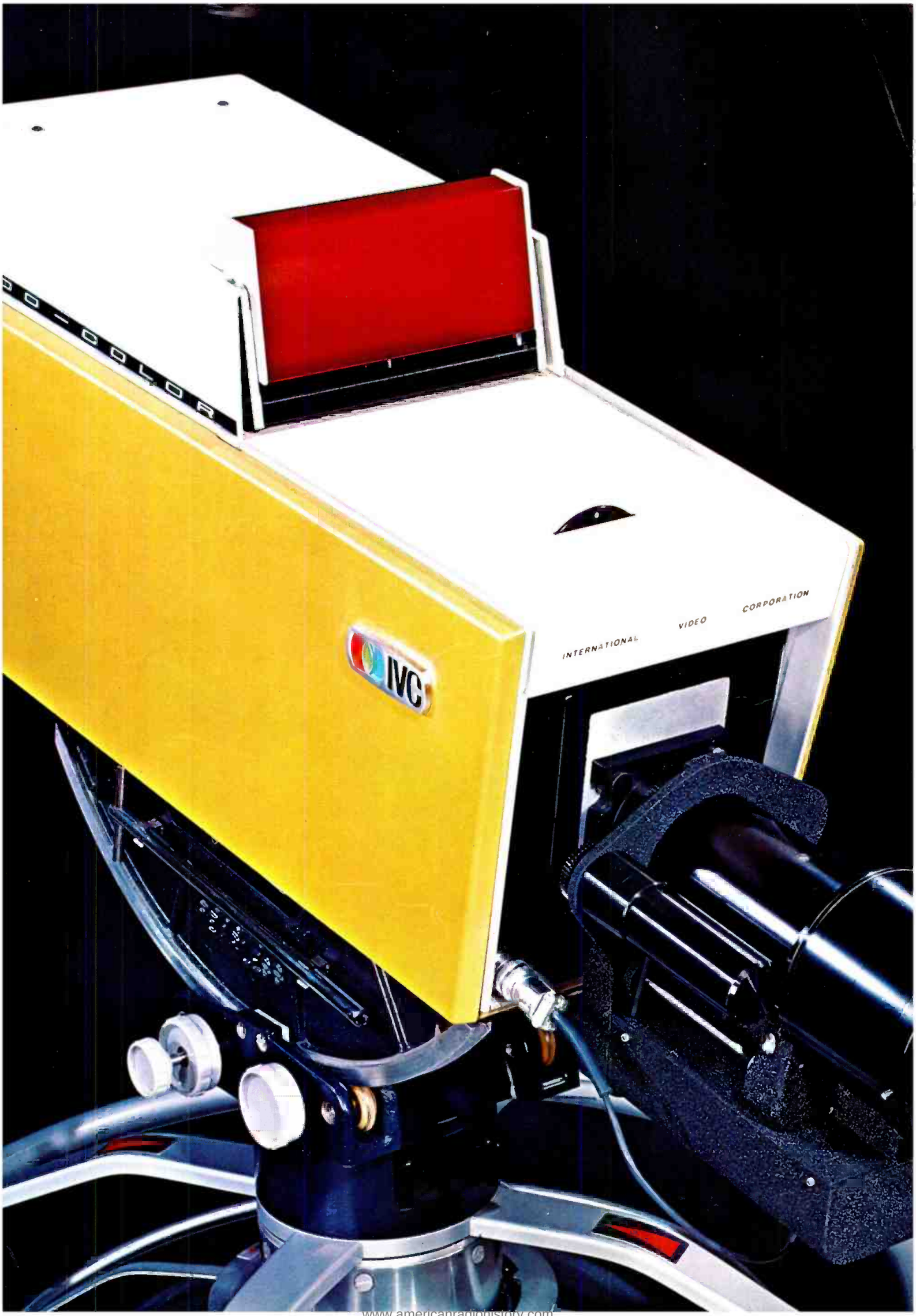
IVC-300 THE 3-PLUMBICON* COLOR CAMERA PRICED AT $29,500.

Now there's a 3-Plumbicon color camera you can afford. It's IVC's "Maverick." For the first time, studio, remote and commercial colorcasting is now easier and less expensive. The IVC-300 gives true Plumbicon flexibility, registration and stability. It is versatile enough to be used as a front-line studio camera, a utility, auxiliary or back-up unit. The IVC-300 is compact (weighs 67 lbs. without lens), mobile, transportable — an easy one-man operation. Low light level performance is outstanding. Fast action pick-up produces superior results. All the sophistications are built-in — Varotal XX, 10:1 zoom lens, with local or remote servo-driven iris, negative registration, adjustable gamma correction, 9-inch viewfinder, built-in filter wheel, R/G/B sequencer (optional) and cable corrector.

The IVC-300 is priced for every broadcaster's application — at $29,500. It's flexible, affordable and available. Made in the U.S. by IVC, the company that built and sold more color television cameras in the last year than any other manufacturer. Phone (408) 738-3900 or write International Video Corporation, 675 Almanor Avenue, Sunnyvale, California 94086 for literature and a demonstration.

IVC

*TM N.V. PHILIPS



INTERPRETING THE FCC RULES & REGULATIONS

Amendments to the "Program Log" Rules

AMENDMENTS TO Sections 73.112, 73.282, and 73.670 (the a-m, fm and TV program log rules) were released by the Commission on March 15, 1968[1], amending the a-m and fm rules to conform to provisions of the TV rule, and, additionally, clarifying the basic intent of certain parts of the TV rule. Because of frequent Commission challenges to licensee classifications as to program type and source, many readers will probably need a review of the basic elements of program logs—program type and source.

Program Types

(a) **Agricultural** (A) includes market reports, farming, and other information specifically related to the agricultural population. (Too many licensees improperly place agriculture-type fare in the public affairs category.)

(b) **Entertainment** (E) includes all programs intended primarily as entertainment, music, drama, variety, comedy, quiz, etc.

(c) **News** (N) includes reports dealing with current local, national, and international events, including weather and stock market reports; and commentary, analysis and sport news, when an integral part of a news program.

(d) **Public Affairs** (PA) includes talks, commentaries, discussions, speeches, editorials, political programs, documentaries, forums, panels, round tables, and similar programs primarily concerning local, national, and international public affairs. *A public affairs program is one which deals with public ISSUES.* The licensee should expect the Commission to challenge the PA classification of a program which does not have this essential characteristic.

(e) **Religious** (R) includes sermons or devotionals, religious news, and music, drama, and other types of programs designed primarily for religious purposes.

(f) **Instructional** (I) includes programs (other than those classified under Agricultural, News, Public Affairs, Religious or Sports) which deal with the discussion or appreciation of literature, music, fine arts, history, geography, and the national and social sciences; and programs devoted to occupational and vocational instruction, and hobby programs. (Here again, too many licensees erroneously classify "instructional" fare as "public affairs.")

(g) **Sports** (S) includes play-by-play and pre- or post-game related activities, as well as separate programs of sports instruction, news or information—fishing opportunities, golfing instructions, etc.

(h) **Other** (O) includes all programs not falling within categories (a) through (g).

(i) **Editorials** (EDIT) includes programs presented for the purpose of stating opinions of the licensee.

(j) **Political** (POL) includes those which present candidates for public office or which express (except in station editorials) views on candidates or on issues subject to public ballot.

(k) **Educational institution** (ED) includes any program prepared by, on behalf of, or in cooperation with educational institutions, educational organizations, libraries, museums, PTAs or similar organizations. Sports programs are not included.

Program Type Definitions

The definitions of the first eight types of programs (a) through (h) are intended *not* to overlap each other and will normally include all the various programs broadcast. Definitions (i) through (k) are *sub*-categories, and programs falling under one of these three sub-categories will also be classified appropriately under one of the first eight categories. There may be further duplication within types (i) through (k)—a program presenting a candidate for public office, prepared by an educational institution, for instance, would be within both Political (POL) and Educational Institution (ED) sub-categories, as well as within the Public Affairs (PA) category.

Program Source Definitions

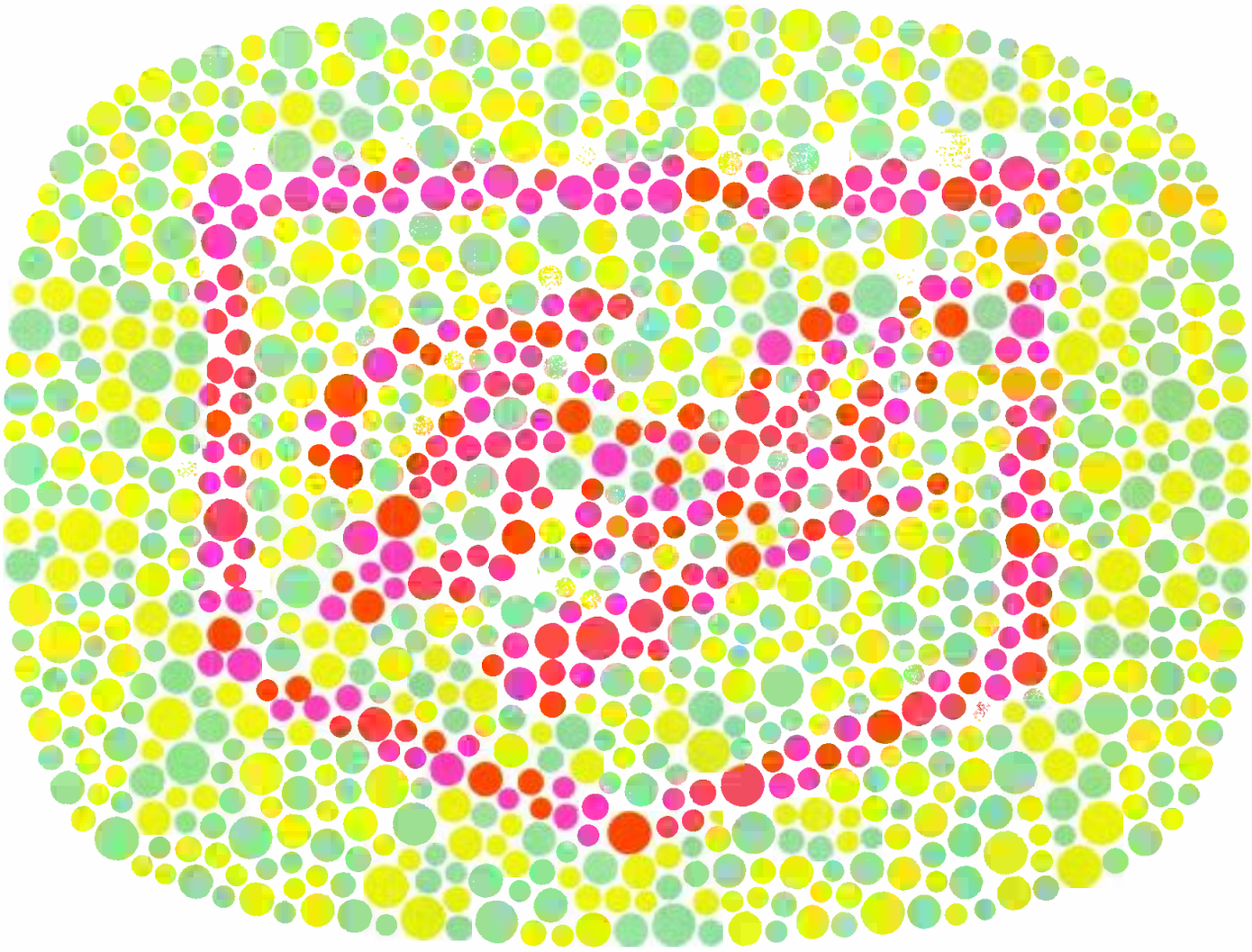
A Local Program (L) is any program originated or produced by the station (or which the station is primarily responsible for producing), *employing live talent more than 50% of the time,* even if taped or recorded for later broadcast. A local program fed to a network will be classified by the originating station as local. All nonnetwork news programs may be classified as local. Programs primarily featuring records or transcrip-

Continued on page 16

1. Memorandum Opinion and Order, RM-1242, FCC 68-291.
2. Report and Order in Docket No. 14187, 1 FCC 2d 449.
3. Report and Order in Docket No. 13961, 1 FCC 2d 439.
4. Report and Order in Docket No. 14187, 5 FCC 2d 185; see also Report and Order in Docket No. 13961, 5 FCC 2d 175, dealing with the television program form (Section IV-B).

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.

color blind?



Not Ball Brothers Research Corporation's new TCB-14R color broadcast monitor! It gives you the truest colors available today in a color monitor. Rare earth phosphors used in the 14-inch CRT display give you reds that are truly red, and flesh tones look alive — not like muddy brown pancake make-up!

And, once you have made your critical alignments such as balancing separate color cameras — the highly stable TCB-14R monitor locks on without drift, so you know any change in color is the result of misaligned signals from other equipment — not your monitor!

The TCB-14R monitor is a unit only 10½ by 19 by 18 inches that fits in your studio console in the space you used for your black and white monitor — or in a small amount of space in your mobile unit. In either location, all-solid-state circuitry gives you maintenance-free reliability, day-in and day-out.

As an added feature, frequently-used controls are on the front panel — which pulls out to expose the critical controls used in initial set-up and adjustment.

Don't rely on a color-blind monitor for your critical alignment! Get the same highly-stable performance from your monitor you expect from your cameras. Get the true-color Ball Brothers TCB-14R. Write for full specifications.

Ball Brothers Research Corporation, Boulder, Colorado 80302

BB9/2

Circle 107 on Reader Service Card

FCC Rules

Continued from page 14

tion will be classified as recorded programs (see below) even though a station announcer appears in connection with such material. However, within such recorded programs, identifiable units which are live and separately logged as such may be classified as local. If during the course of a program featuring records or transcriptions, for example, a nonnetwork two-minute news report is given and logged as a news program, the report may be classified as local. More local programming is expected of TVs than a-ms, the amount varying with the size of the station, its profitability and the vicissitudes of FCC policies (check with your lawyer periodically).

A network program (NET) is any program furnished to the station by a network (national, regional or special). This includes delayed broadcasts of programs originated by networks.

A recorded program (REC) is any program not otherwise defined—including, without limitation, those using recordings, transcriptions, or tapes.

ANALYSIS OF AMENDMENTS

The Commission adopted new logging rules for a-m and fm, effective December 1, 1965[2], and at the same time adopted a new a-m and fm program form (Section IV-A, statement of program service.) This form is to be filed as part of applications for renewal, for assignment and transfer of control, for new stations, and for major changes in facilities[3]. Because certain requirements of the a-m and fm logging rules were found unnecessary for the preparation of the program reporting form or for other Commission purposes, the logging rules for TV (effective December 1, 1966) differed from those previously adopted for a-m and fm[4].

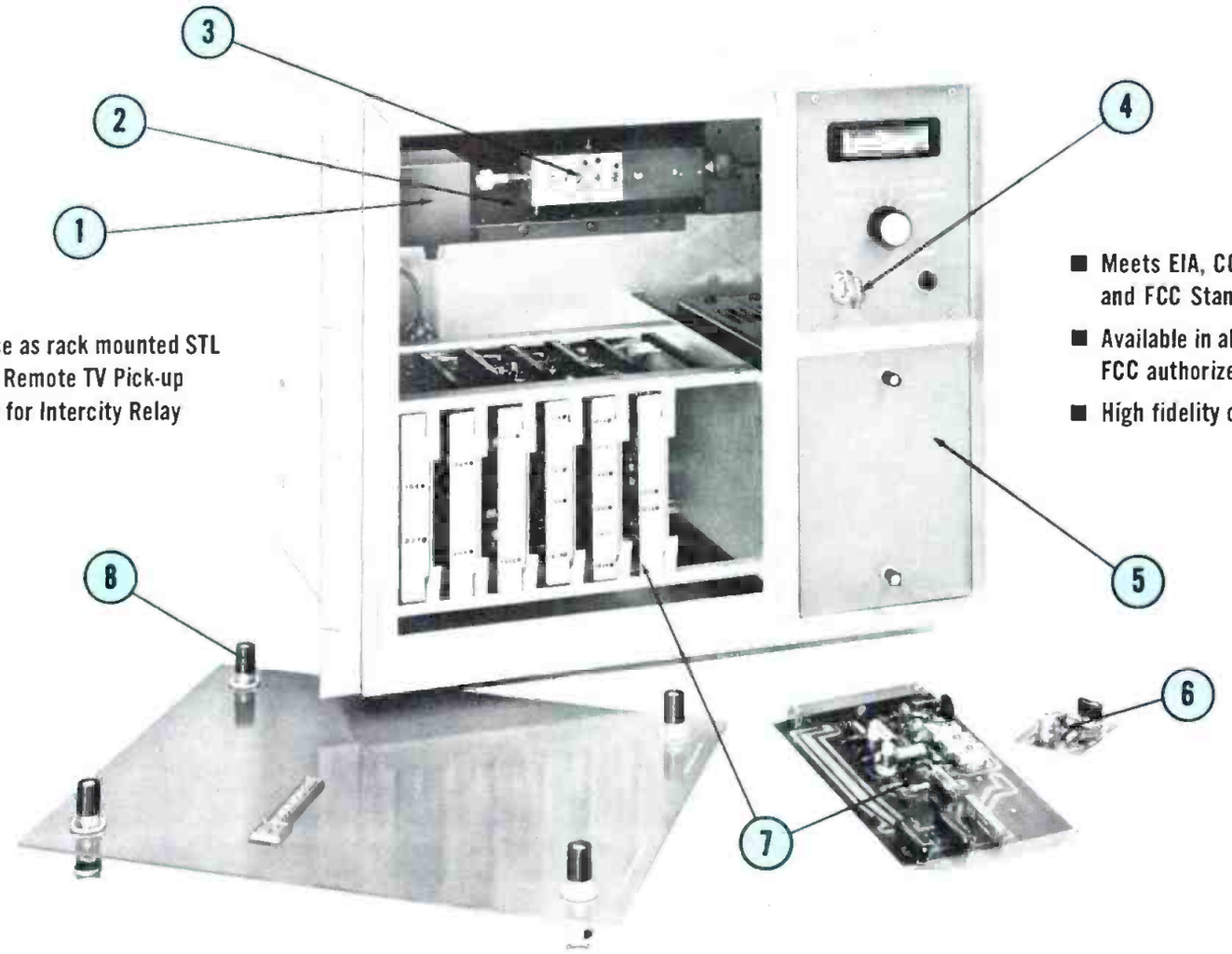
Meanwhile, unsure of the intent of the television logging rules, a number of licensees raised questions about paragraph (b) of Section 73.670 (dealing with network fare) and subpart (ii) of Section 73.670 (a) (2) (logging of commercials).

Network Fare

Under paragraph (b) of Section 73.670, TV stations carrying network programs needed to log only the name of the program and time the station joined and left the network (along with whatever nonnetwork matter had to be logged). Licensees generally relied upon the networks to supply other information necessary for the composite week, such as number and length of commercial messages. This section also required the station to save information furnished by the network and attach it to the related pages of the program log. In adopting this rule, the Commission intended that only the information a network furnished its affiliates for completion of their

Continued on page 18

All Solid State Television Microwave Relay Links for High Quality Color and Monochrome TV Systems



Use as rack mounted STL
or Remote TV Pick-up
or for Intercity Relay

- Meets EIA, CCIR, and FCC Standards.
- Available in all FCC authorized bands.
- High fidelity color.

1. Built-in ferrite isolator
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3. High efficiency varactor multipliers
4. Key lock for secure unattended operation
5. Removable power supply module
6. Plug in pre / de-emphasis
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8. Instant panel removal by finger tip fasteners

RHG, a leading supplier of military TV relay links, now offers Series MRS to the broadcast industry. Transmitters and receivers, with advanced field proven designs provide solid state reliability, no warmup, and low power drain.

To improve your color transmission quality and to insure trouble free operation specify RHG equipment fully described in Bulletin 69C. Call for "no obligation" demonstration.

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Circle 109 on Reader Service Card

FCC Rules

Continued from page 16

composite weeks should be associated with the pertinent logs submitted with the application for license renewal. Licensees are not required to attach all the information furnished almost daily by the network.

Logging of Commercials

Section 73.670 (a) (2) (ii) called for *an entry showing the total duration of commercial matter* in each hourly TV time segment beginning on the hour. But this did not mean that a licensee should stop logging the duration of each commercial. It is sufficient to log the length of each commercial message rather than logging an hourly total. The provision for logging an hourly total was intended as a convenience to licensees; however, they are free to do it in another way. The subparagraph was amended to clarify the requirement. However, *the log should be devised and kept so that it can be accurately divided into hourly segments for composite-week reporting purposes.* Paragraph (a) (2) (ii) of Sections 73.112 and 73.282 (a-m and fm commercial logging) were amended to conform to the language of Section 73.670 (TV commercial logging). Similarly, Paragraph (b) of Sections 73.112 and 73.282 (a-m and fm network fare) were conformed to TV's Section 73.670 as revised. Thus, the a-m, fm and TV logging rules on these points are now the same.

Sponsored Political and Religious Programs

In adopting the Report and Order amending the lodging requirements for TV broadcast stations (Docket No. 14187), the Commission noted that *a special problem in logging commercials is raised by certain (e.g. political and religious) sponsored programs in which it is difficult to measure the exact length of what would be considered commercial continuity.* For such programs, *the Commission decided not to require licensees to compute the commercial matter.* The programs could be logged and announced as sponsored. This exception is also applicable to a-m and fm broadcast stations. The exception does not, of course, apply to any program advertising commercial products or services; nor is it applicable to any commercial announcements.

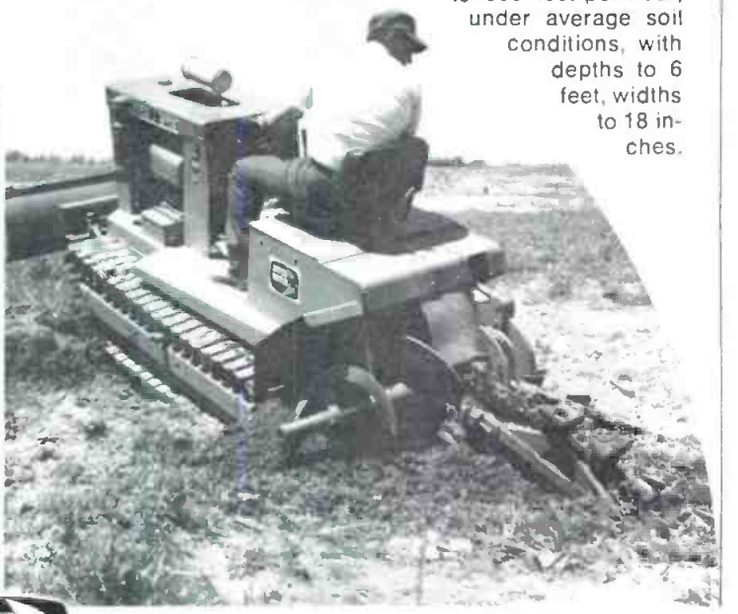
No single log form exists that will meet the needs of all licensees. In fact, FCC staff members are the first to admit that the Commission has not adopted a uniform logging system. You are permitted to include in the log any information necessary. However, it is most important to review your logging procedures to determine whether it meets the Commission's requirements. For example, the log should include information concerning your own purpose (e.g., billing of accounts) in separate columns. The columns devoted to the Commission's logging rules should be maintained in the Commission's language as reviewed above.

Finally, of course, when you find it difficult to classify any of your programs, consult with your communications counsel. **BM/E**

DITCH WITCH Proven Performance Now Available on Track or Rubber

The Ditch Witch J-Series gives you small-machine economy and big-machine performance — plus your choice of standard rubber tire mounting or the new Ditch Witch track mount. The J20T track mount offers all of the famous Ditch Witch design features: 18-horsepower engine, 3 mechanical digging chain speeds plus reverse, independent hydraulic travel speed control, trenching capacities to 800-feet-per-hour, ranges to 1 foot wide, 5 feet deep.

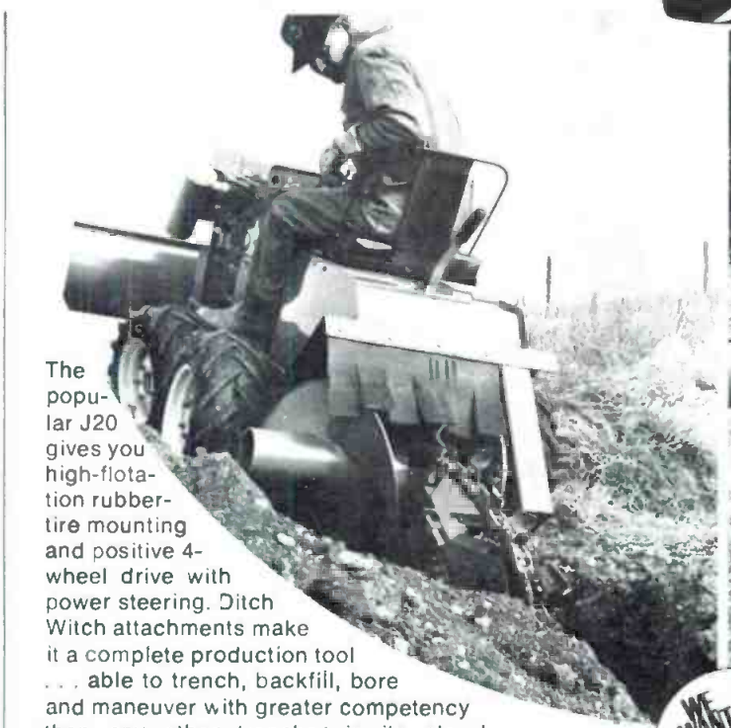
The V30T is the only track-mounted design to deliver the same design features that have made the popular V30 the leader in the 30-horse class. You get all of the standard features, plus wider 10-inch track pads, a full 10-inch undercarriage clearance, hydraulic power system coupled with dry friction steering, and totally hydraulic backfill blade. Trench up to 900 feet-per-hour, under average soil conditions, with depths to 6 feet, widths to 18 inches.



18-horsepower J Series

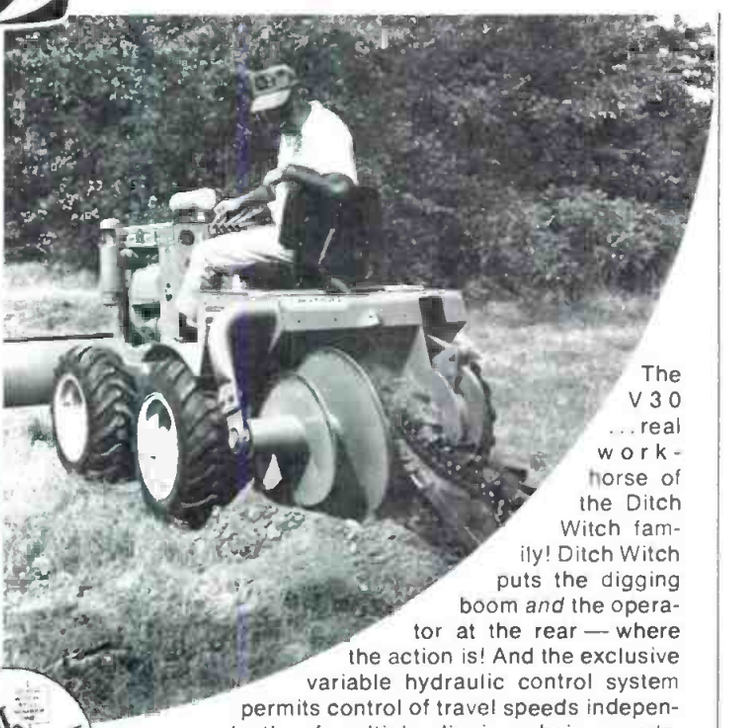
DITCH WITCH

30-horsepower V Series



The popular J20 gives you high-flotation rubber-tire mounting and positive 4-wheel drive with power steering. Ditch Witch attachments make it a complete production tool . . . able to trench, backfill, bore and maneuver with greater competency than any other trencher in its class!

Other Ditch Witch Models Available from 7- to 60-horsepower



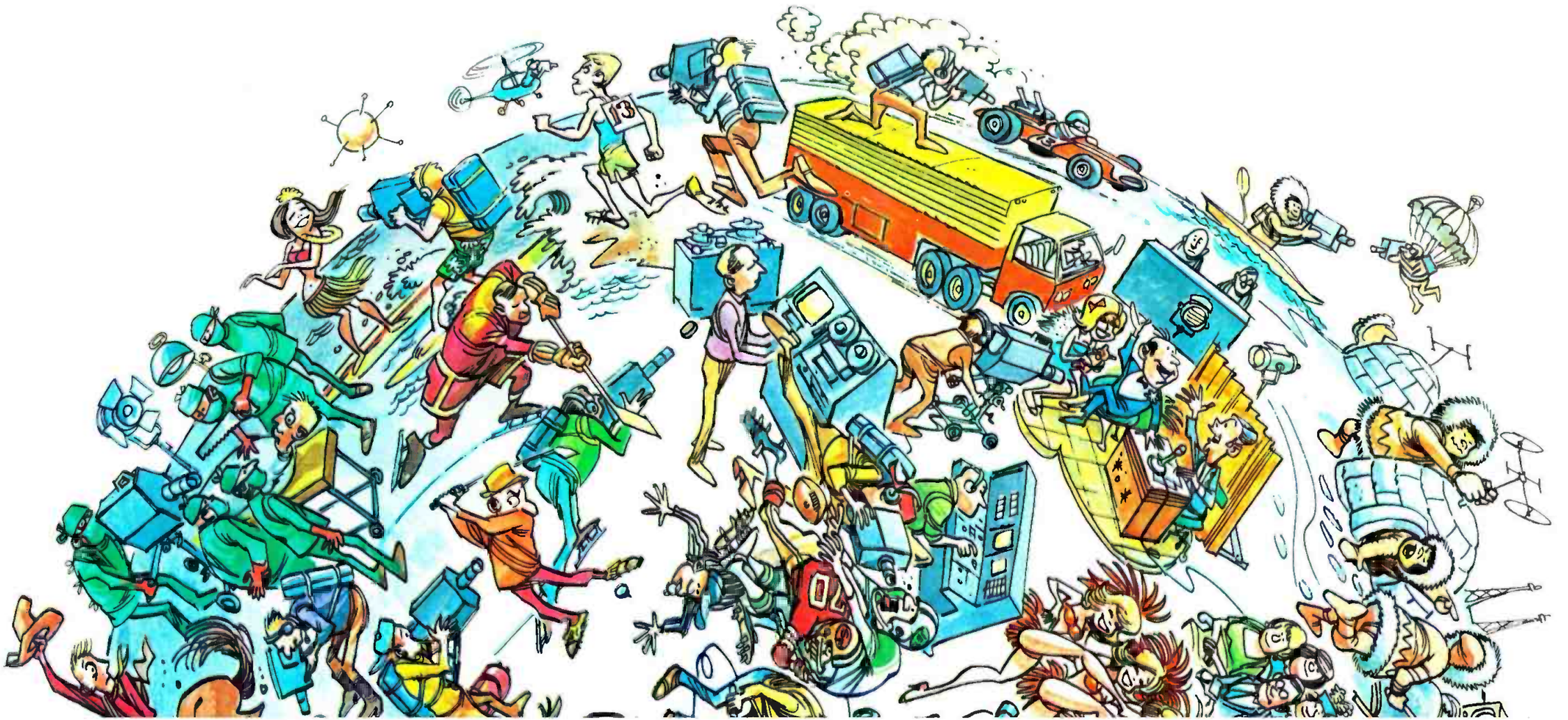
The V30 . . . real workhorse of the Ditch Witch family! Ditch Witch puts the digging boom *and* the operator at the rear — where the action is! And the exclusive variable hydraulic control system permits control of travel speeds independently of multiple digging chain speeds.

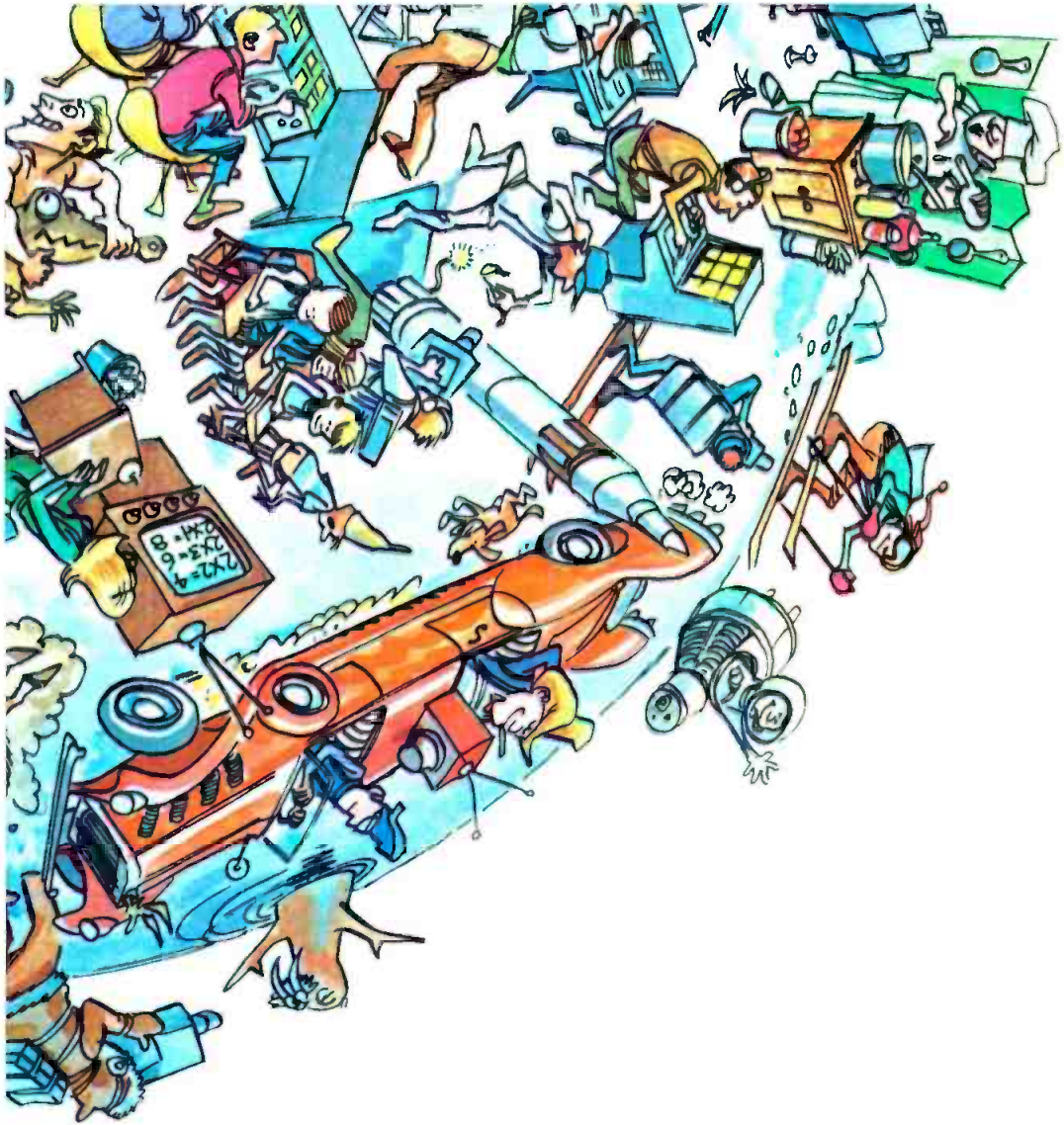
WE WANT TO DEMONSTRATE

Ditch Witch, a Division of Charles Machines Works, Inc.

1852 Ash Street, Perry, Oklahoma 73077 U.S.A.

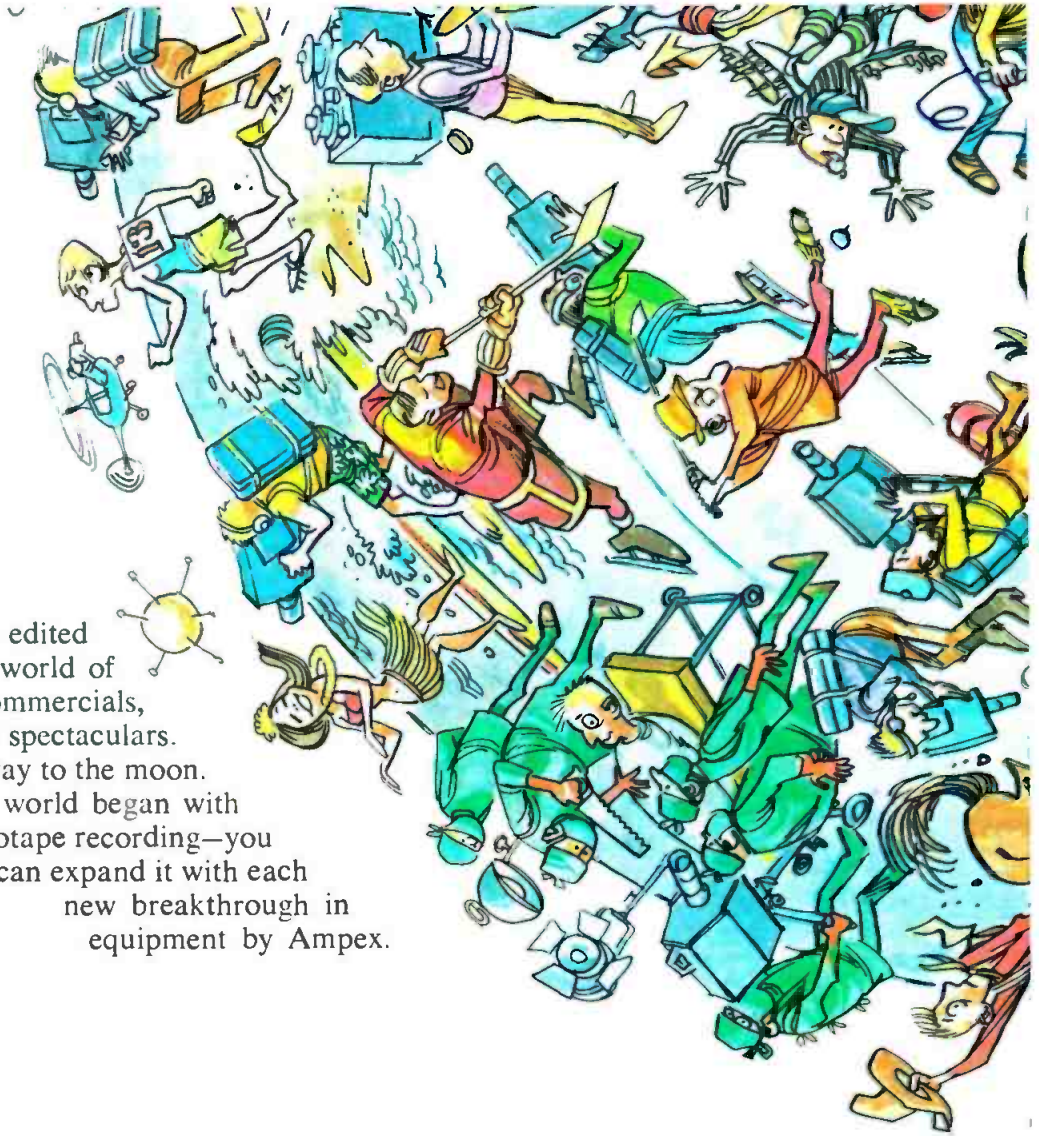
Circle 112 on Reader Service Card





The total TV scene

AMPEX



Instant replay! Lightning edited
laugh-ins. A whole new world of
breathtakingly sharp color commercials,
news coverage, sports and spectaculars.
All the way to the moon.
This total TV world began with
Ampex videotape recording—you
can expand it with each
new breakthrough in
equipment by Ampex.

Worlds ahead in cameras

BC-300 Hand-Held Camera. It's fifteen pounds of instant coverage. Monochrome picture with less than 30 ft. candles, and with minimum image lag. Use it with the VR-3000 backpack VTR for totally power-packed action.

BC-210 Studio Color Camera. New maximum-light-efficiency optics provide brilliant sharp color with as little as 100 ft. candles. Two Plumbicon* tubes. Light weight. Beautifully simple stability and set-up controls are adding hours of live time.

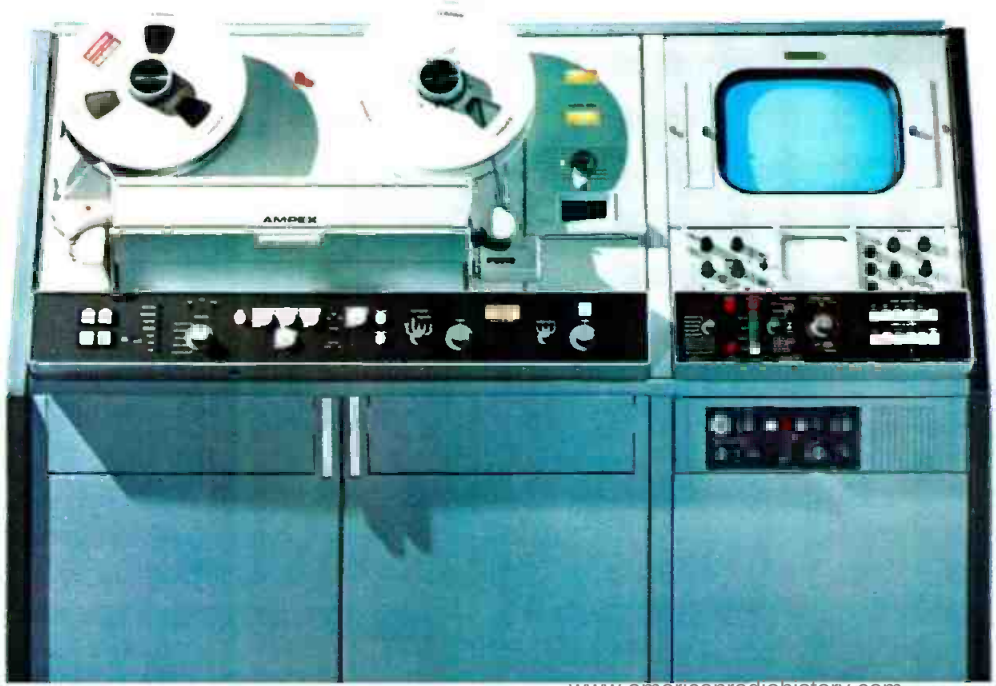
VR-3000 Backpack Videotape Recorder. Self powered low-band/high-band. Just fifty-five pounds. Instantly switchable between monochrome, high-band and color. Available in NTSC, PAL and SECAM. Tapes meet SMPTE, USA, EBU standards. Use it with the BC-300 for monochrome, or our portable/studio BC-210 Plumbicon camera for color.

*TM N.V. Philips.

Total scene in teleproduction

VR-2000B Color Teleproduction Videotape Recorder. Its high-band color brought us an "Emmy." Now at hundreds of studios and stations, this new world standard for sharpness, color quality has the latest operating/editing refinements. Unsurpassed technical performance. Every feature operator-perfect for total teleproduction.

Our VR-1200B offers every station optimum high-band/low-band capability with maximum economy. Performance is second only to the VR-2000B.



VR-660C Portable Color Videotape Recorder. Put it in the trunk, and rush to the scene. This industry's favorite broadcast portable is now delivering NTSC-type color with a full 4.2 MHz bandwidth. Records up to five hours. Meets RS-170 spec for monochrome. Built-in Edicon editor offers easy "productions."

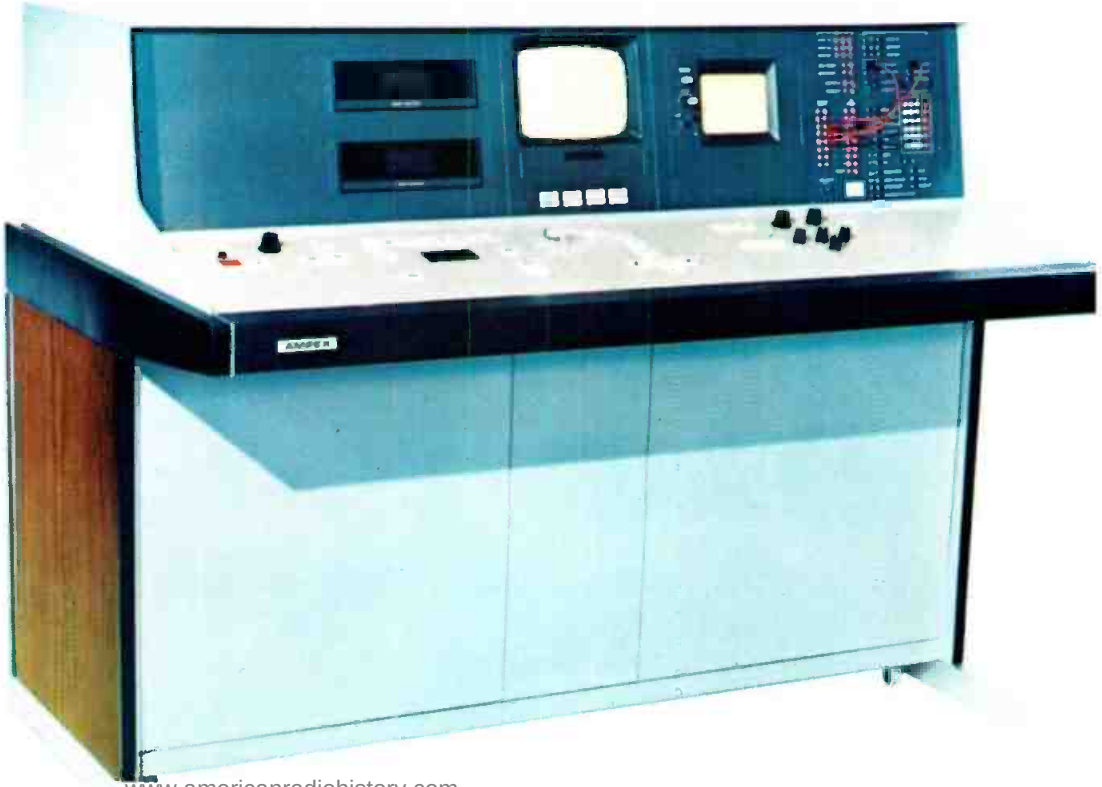
RA-4000 Random Access Programmer. Automates your editing. Controls up to 3VTR's and audio recorders. Allows search, cue, and synchronizing in one automatic sequence with *true* random access of the VTR. It records a unique address to identify each frame. The desired address is called by manual keyboard or computer entry. The RA-4000 automatically searches for the address, stops, cues itself ahead of the address, and waits for a normal roll command.

Switching and Control Systems. Ampex provides the newest computer control switching with proven software packages. Features automated or manual control of all video/audio channels. Automatically prints the complete station log with real-time entries of all events. Each system is tailored to studio needs.

All the way to the antenna

HS-100 Color Slow-Motion Sports Recorder/Reproducer. Ampex instant replay that revolutionized sports coverage. Compatible with all existing world color standards. Continuously variable slow motion in both forward and reverse. Recording time 30 seconds in normal mode, 60 seconds in alternate field mode. Unmatched high-band color quality in slow motion, stop freeze, and fast action. Locks into any local sync source for mixing with live programming.

HS-200 Teleproduction System. Fast new high-band color editing. Computer-controlled disc recorder lets you produce special effects instantly, and more economically than with film. Capabilities include: freeze frame, instant frame access, time-controlled freeze frame, double speed playback, computer logic for sequential programming, variable frame animation, automatic dissolves of variable length, and more.



Transmitters. Conceived and built by and for experienced broadcasters. Every feature designed for operator convenience. UHF power levels from 15 to 100KW. VHF from 50 watts to 50 KW. Modular construction and solid-state circuits provide optimum performance and reliability.

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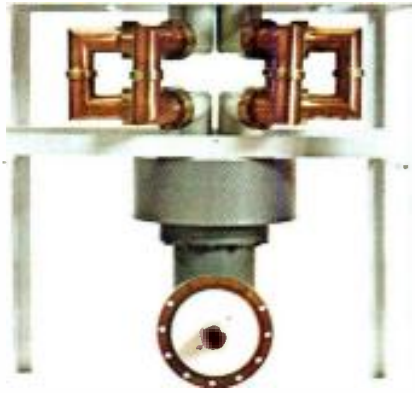
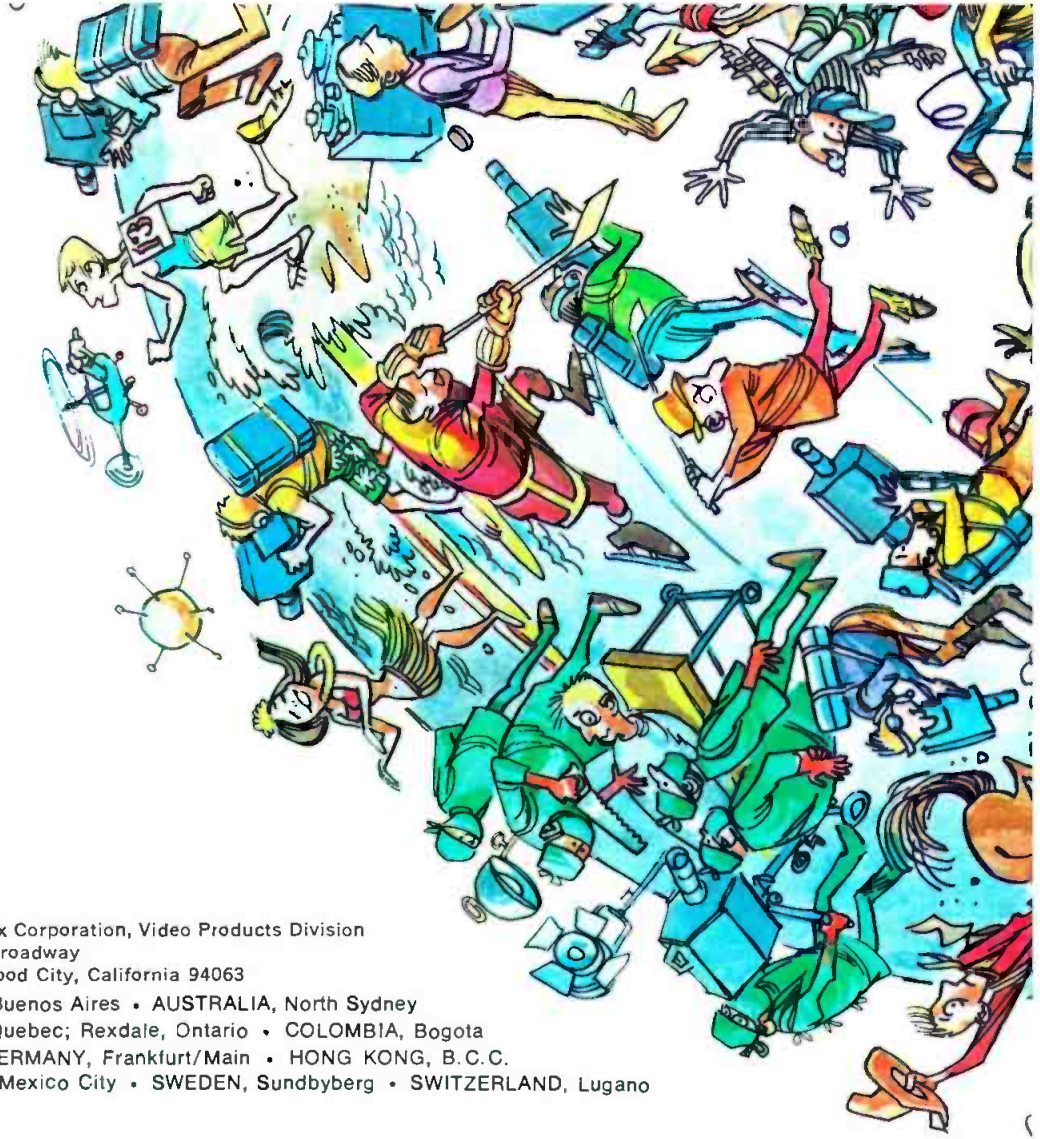
100 Watt Translator. Translates any VHF or UHF signal to desired UHF channel. Designed for reliable, unattended operation, the UHF linear amplifier uses a 10,000-hour MIL-spec traveling-wave tube.



The total TV scene

Whatever it takes to make it in teleproduction is ready at Ampex. Call us for anything in our world you need.

The total TV scene



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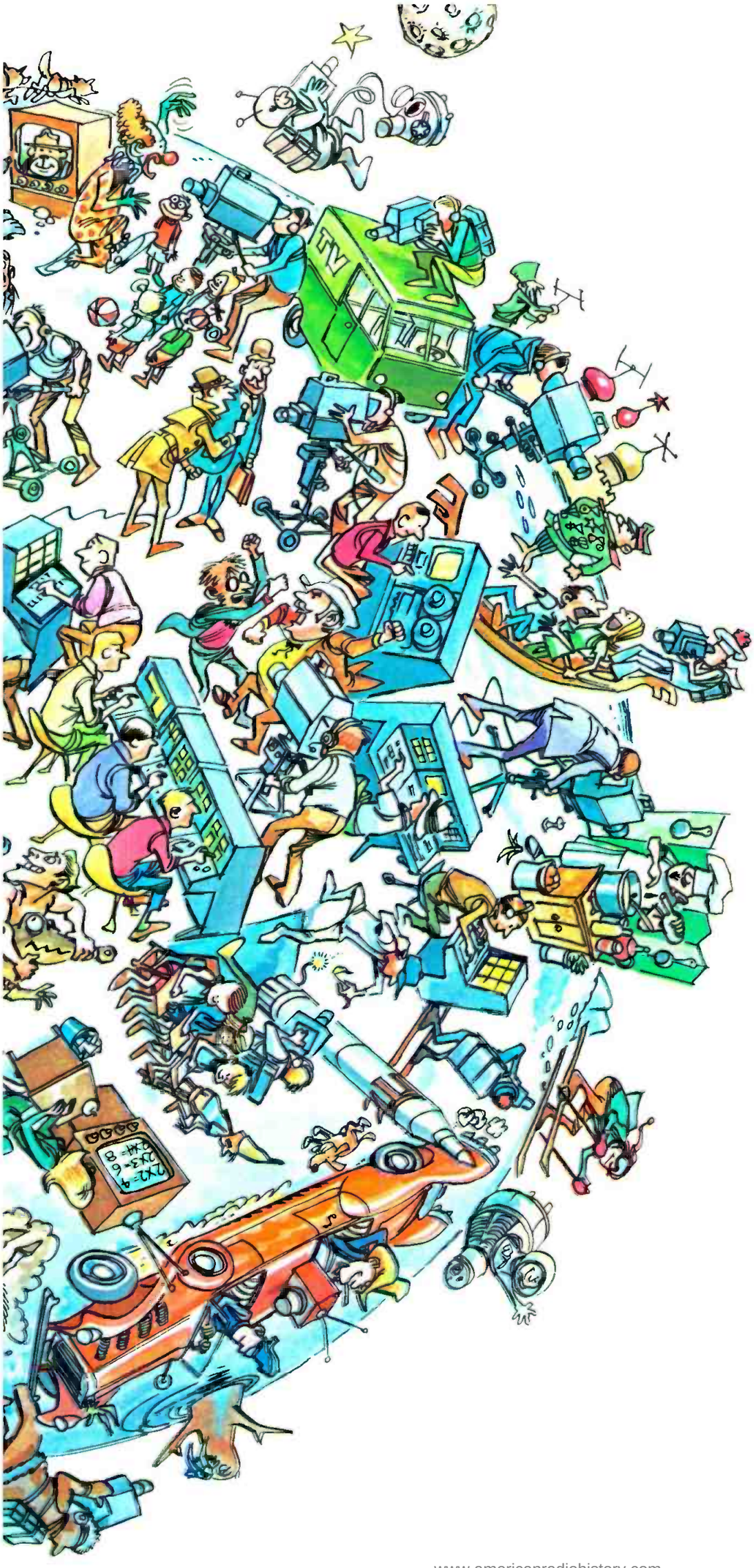


Attention TV Stations:

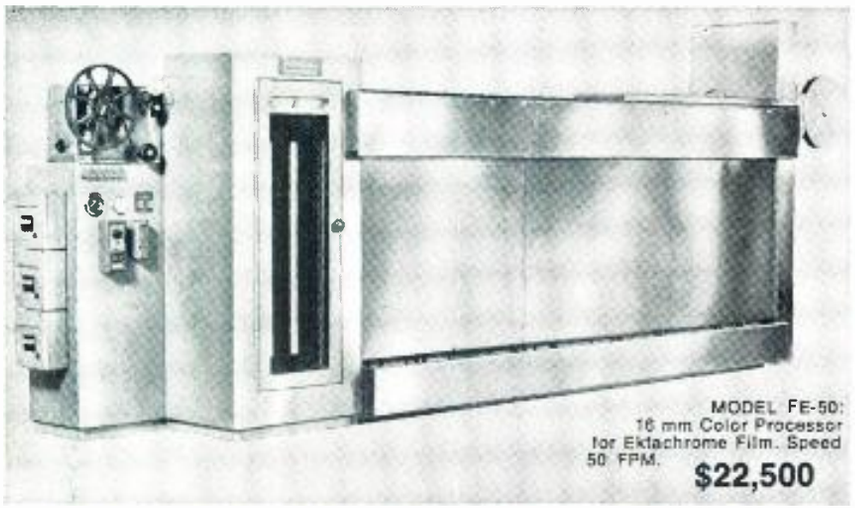
We've got news for you!

FILMLINE'S professional color film processors now available for TV NEWS

The FILMLINE Models FE-30 and FE-50 are exciting new color film processors designed specifically for use in television station news departments. The design is backed by Filmline's reputation as the world's leading manufacturer of professional film processors for the commercial motion picture laboratory industry.

Now for the first time the television industry can enjoy the benefits of professional caliber equipment incorporating exclusive FILMLINE features that have paced the state-of-the-art in commercial laboratories, at a cost lower than processors offering less.

After you check these exclusive Filmline features you'll want to install a Filmline processor in your news department NOW!



MODEL FE-50: 16 mm Color Processor for Ektachrome Film. Speed 50 FPM. **$22,500**

MODEL FE-30: 16mm Color Processor for Ektachrome film. Speed 30 FPM. **$16,400**

- **"FILMLINE OVERDRIVE FILM TRANSPORT SYSTEM"** This marvel of engineering completely eliminates film breakage, pulled perforations, scratches and operator error. The film can be deliberately stalled in the machine without film breakage or significant change of film footage in solutions. The heart of any film processor is the drive system. No other film drive system such as sprocket drive, bottom drive or simple clutch drives with floating lower assemblies can give you the performance capability of the unique Filmline Overdrive Film Transport System.
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- **"TEMP-GUARD"** positive temperature control system. Completely transistorized circuitry insures temperature control to well within processing tolerances. Temp-Guard controls temperatures accurately and without the problems of other systems of lesser sophistication.
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- **"ZERO DOWN TIME"** The reputation of any film processor is only as good as its reliability. The combination of the exclusive and special added Filmline features guarantees trouble-free operation with absolute minimum down-time and without continual operator adjustments. Recapture your original investment in 2 years on maintenance savings alone. Filmline's "Push the button and walk-away processing" allows inexperienced operators to turn out highest quality film.
- **"MATERIALS, CONSTRUCTION AND DESIGN"** All Filmline machines are constructed entirely of metal and tanks are type 316 stainless steel, heliarc welded to government specifications. The finest components available are used and rigid quality control standards are maintained.

Compare Filmline features to other processors costing more money. Feature-by-feature, a careful evaluation will convince you that Filmline offers you more for your investment.

Additional Features included in price of machine (Not as extras).

Magazine load, daylight operation ■ Feed-in time delay elevator (completely accessible) ■ Take-up time delay elevator (completely accessible) ■ Red brass bleach tank, shafts, etc. Prehardener solution filter ■ Precision Filmline Venturi air squeegee prior to drybox entry ■ Air vent on prehardener ■ Solid state variable speed D.C. drive main motor ■ Bottom drains and valves on all tanks ■ Extended development time up to two additional camera stops at 50 FPM ■ Pump recirculation of all eight solutions thru spray bars ■ Temperature is sensed in the recirculation line ■ All solutions temperature controlled, no chilled water required ■ Built-in air compressor ■ Captive bottom assemblies assure you constant footage in each solution ■ Change over from standard developing to extended developing can be accomplished in a matter of seconds ■ Impingement dryer allows shorter put through time.

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TV Stations: WAPI-TV, KTVI-TV, WXYZ-TV, WTPA-TV, WBTV-TV, WEAT-TV, WMAL-TV, WSYR-TV, WDSU-TV, WVUE-TV, WJXT-TV, WTOP-TV, WAVY-TV, KTAR-TV, WTVR-TV, WFBC-TV, WMAR-TV, WCKT-TV, WAVE-TV, WCPO-TV, WAPA-TV, WCIV-TV, WJIM-TV, WWL-TV, KYW-TV, KETV-TV, WNBQ-TV, KSLA-TV, WSAZ-TV, WHP-TV, WHCT-TV, WTWO-TV.

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"When you buy quality Filmline Costs Less"

Custom Consoles from the Factory

You don't have to roll your own to get a custom audio console. Fairchild's been producing tailor-made units for years.

THE NAME FAIRCHILD has been almost synonomous with quality recording for over four decades. The company has been responsible for a lot of industry firsts—including the first professional tape console in the late 1940s. But now, there's been a general shift in the philosophy of hardware design. Today's Fairchild product is all electronic; no longer do turntables, pickup arms and tape recorders come out of the hallowed plant near Long Island City's waterfront.

Floor space is rather large for the company's product mix—with much space and production equipment left over from previous eras. The fully equipped machine shop, while not an absolute necessity for today's production, gives the firm a custom-design capability that's difficult to match in the trade.

"We started our conversion to all solid-state equipment in 1960," says George Alexandrovich, vice president and general manager. "But initially, there was a lack of general acceptance of the transistor; it was too new and too little understood, even then. The audio engineer understood and could service tube-type equipment; to him the transistor was an uncharted ocean."

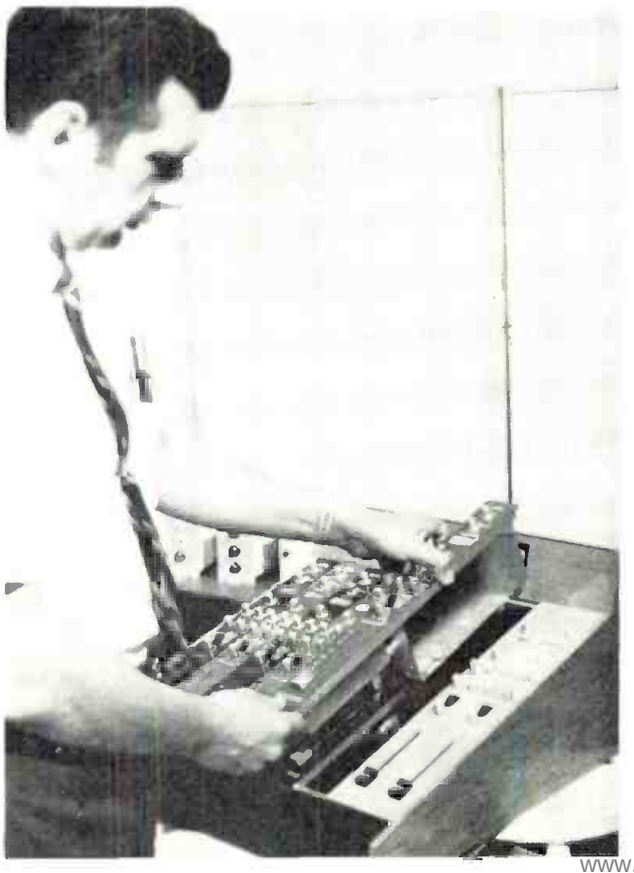
Compact Design

Today, the latest in solid-state technology is the watchword at Fairchild. Studio equipment uses FETs, integrated circuits and light-operated devices. A typical fader control, using a slider pot, can be anything from the passive basic attenuator to a fully active, amplified, fader module with built-in amplification and photo-coupled cadmium-sulfide resistance elements for complete electrical isolation and constant impedance. The wired active assembly is no larger than the basic passive attenuator.

This kind of design integration and simplicity makes it relatively easy for the company to manufacture custom consoles virtually on a production-line basis. Touring the plant, Alexandrovich pointed to a pile of aluminum chassis members that had just come out of the machine shop. "That's the frame for a console ordered by a recording studio on the west coast. It doesn't look like much now, but in three weeks, it'll be completed and on its way out of here." And that, too is part of Fairchild's production philosophy: test it and ship it out immediately.

A result of this type of operation is very fast turnaround on custom orders. There was one

Demonstration console modeled by George Alexandrovich, is being readied for exposure at AES.



Dual-purpose console for station WLIB will handle both mono a-m and stereo fm operations simultaneously.

BM/E Photos

finished console to be seen in the shop—a dual-studio board ready for shipping to New York's WLIB. The compact unit was designed (to the customer's needs) to handle two studios simultaneously—one mono and one sterco—for split a-m/fm operation.

Customer Isn't Always Right

"One serious problem," says Alexandrovich, "is that our typical customer doesn't really know what he wants or will need a year from now. We try to suggest additional features or built-in room for future expansion, but the buyer often doesn't want to go the additional expense of expandability. Certainly this add-on capability costs more, but the total cost of expansion is far less this way than it is when you make major additions from scratch."

The WLIB console is an example of this built-in expandability. The board has room for five additional faders with the below-board positions already wired up, ready for the plug-in modules as needed. The console itself is about one-third the size that would be needed for tube-type equipment.

Another aspect of solid-state design is the ease of replacing defective modules when trouble crops up. "But the user won't keep a couple of extra replacement modules on hand," says Alexandrovich. "Instead, he'll have us wire in the 'extras' as operational units. Then if a channel goes bad, he can switch over instantly to the extra and then pull out the defective module for his technician to work on."

Nuts and Bolts

It's a small shop, but Fairchild believes in doing most operations in-house. Virtually all chassis fabrication is done in the very complete machine shop—a vestige of the days when tape- and disc-handling equipment was being manufactured there. The shop even has a small injection-molding machine for making special knobs and other plastic parts.

In the paint shop, a full-time artisan keeps busy not only with the spray gun and oven, but with a variety of silk-screen operations. Virtually all printing and legends on outgoing equipment get professional silk-screening right on the premises. Around the corner from the paint shop is a two-place engraving bench with elaborate pantographs. This is where those indented markings are deep-cut on all control panel escutcheons.

The production line is relaxed and efficient. This isn't the sort of shop where thousands of identical units are manufactured at once. Rather, a few dozen modules may be dip-soldered for restocking depleted storage shelves. After dip-soldering, each circuit card gets a thorough inspection and soldering-iron touchup. The modules then are packaged and sent through an elaborate final checkout before going onto the shelf.

The bulk of Fairchild's business is not for individual modules or circuits, but for complete consoles and systems. There are those customers who prefer to custom-build their own consoles from stock modules, but often the same console can be fabricated in the Long Island City shop at lower cost and much more professionally. Still, many console customers come back for add-on or expansion components. The small studio may need to add a couple of reverb channels or perhaps some compression amplifiers. "We'll give the customer what he wants," says Alexandrovich, "provided he knows what he really needs." Trouble is, too many people underestimate their immediate requirements, and can end up in trouble. But then, they can always ask Fairchild. **BM/E**

Production-line inspector touches up dip-soldered circuit board with pencil soldering iron.

BM/E Photos

Fader module gets final look-over before cover plate goes on and unit goes onto the shelf.

Studio engineers Richard Beekman (center) and Sandy Fisher (right) set up mikes for percussion section. BM/E Photo

Multi-Track Studio Has Multi Faces

Pioneering in large-scale, multi-track recording, Mirasound is facelifting its new quarters in a New York hotel. In the studios are closed-circuit TV, 40-channel recording capability, and a multitude of specialized operations.

RECORDING STUDIOS COME in a variety of shapes and sizes, depending on business volume and the client's needs. Taking over an entire floor of a hotel is a somewhat unusual way to build new and expanded studios. This is what New York-based Mirasound Studios has done and the present facility is a strange mixture of ultra-sophisticated recording facilities and workmen tearing down plaster.

Working with a design that will ultimately provide four studios and associated control rooms, Mirasound currently is operating with one gargantuan studio that measures 40 x 80 x 24 feet. Dubbed Studio A, it was at one time a hotel ballroom designed to hold 300 people. Originally, Mirasound President Bob Goldman found the room with floor-to-ceiling windows which all had to be ripped out and bricked up. New ceiling, subfloor, parquet floor and walls had to be added —along with appropriate audio line wiring. The air-conditioning system had to be rebuilt to pro-

Big board is checked out by president Bob Goldman's wife, Lynn, before engineers come in for recording session. BM/E Photo

vide noise-free operation, and a well insulated air return was installed.

The studio complex occupies the onetime ballroom floor of the Henry Hudson Hotel, which provides more than 22,000 square feet of floor space. An unusual feature of the floor is the open-roofed garden in the center. This garden currently isn't being used but is constantly being pared by the installation of new walled-in air-conditioning units and new structural overlap.

The many banquet and meeting rooms are naturals for redesign into studios, control rooms, workshops and offices. In one area that didn't lend itself well to the modification, a walk-through string of halls is being converted into a series of remix rooms with an external hallway added on. The new hallway's outside wall juts out into the open garden. "We may eventually roof over this garden and use it, too," says Goldman.

Everything is done on a large scale at Mirasound. In A Control, an enormous audio board can handle a multiplicity of recording situations, feeding eight-, 16- and 24-track recorders. All line and mike inputs pass through a businesslike patch panel at one end of the board. The board can simultaneously provide a mix for the recorder and a separate mix for monitoring.

A separate room adjacent to the studio provides 10 echo chambers, all accessible at the control console. The console itself has 32 distinct outputs—24 taken directly from the microphone channels or the slider-fader channels and another eight coming off the mix bus. It also has 32 inputs and an additional eight faders—complete chains used as auxiliaries which can be patched into separate mix buses or with patchers, used as an extra eight mix buses.

The console was built on the premises by Mirasound technicians. Stock components and modules include Dana faders from Gotham Audio, equalizers and mike preamp modules from Electrodyne. Slider faders are used throughout. "We could use rotary controls," says Goldman, "but a quick glance at 24 return faders lets the engineer see the positions much better. It comes up looking almost like a graphic equalizer." Other equalizers on the board were built in-house. Switchcraft switches are used; oscillators and mixing buses are by Electrodyne. The console contains 65 ACN (active combining network) mixing buses, about 70 booster amplifiers and 55 line amplifiers.

Behind the console is a panel of crossbar switches, providing additional flexibility. The Coord crossbar uses individual pin selectors to route signals into and out of the big board. The pin selector adds another dimension of versatility to the control room complex.

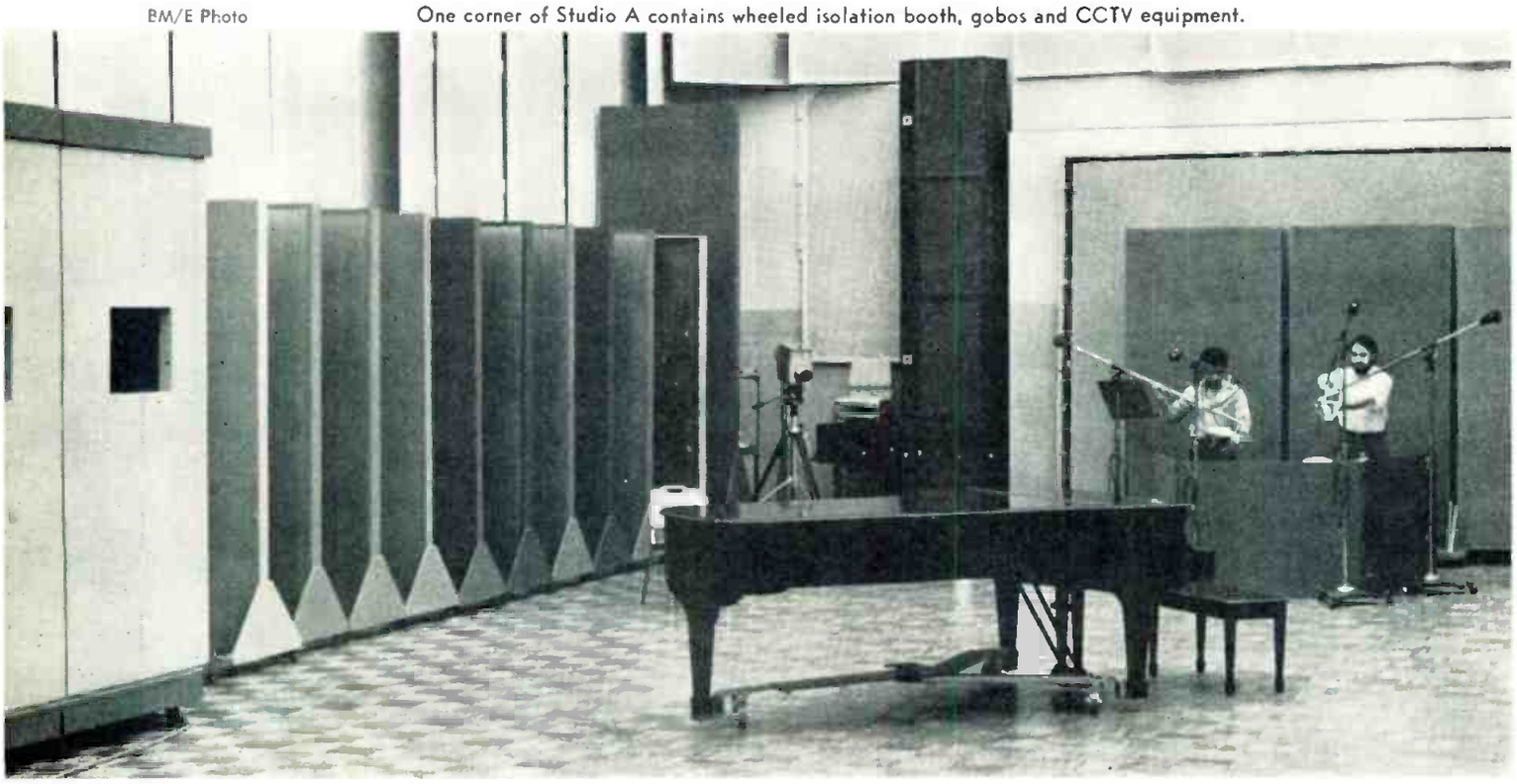
Control-Room Kingpin

Kingpin of the control room is the Ampex 24-track recorder, built to Mirasound's specifications. Goldman had originally intended to build the recorder himself. Planning to use the transport and two-inch wide tape, he bought a second-hand VR-1000 videotape unit. He told Ampex what he was planning, and the manufacturer offered to build the unit for him. After it was completed, the company offered similar models to the industry—introducing the system at the 1968 AES Convention in New York. Goldman has model number one and he also has a partly dismantled, second-hand VR-1000.

Special headphone talkback lets the control room talk to individual performers or all of them at once without disturbing the take. Additional switching is provided by a Sealectro matrix board and a slide-switch selector board made by Cherry

BM/E Photo

One corner of Studio A contains wheeled isolation booth, gobos and CCTV equipment.



Electric. The two boards contain 58 switches, each with 48 positions. The switchers route program information from the console to the appropriate track of the recorder being used. This can get to be a little hairy, since A Control has, besides the 24-track Ampex, a 16-track, eight-track, four-track, two-track and one-track recorders.

In spite of the large size of the finished facilities, Goldman is quick to point out that the cost to recording artists is not prohibitive. "We tailor our sessions and our prices to group size, not to the amount of equipment we use," he says.

Big Board Remix

Since the remix studios are still under construction, the big board in A Control is also used for remix. This is roughly equivalent to chartering the *Queen Elizabeth 2* for the wife's Thursday Afternoon Bridge Club. But it works, and Mirasound has already produced a number of contemporary record albums using this technique. As Goldman says, "The board is capable of everything."

The multi-track recorders in the studio are fully remote-controllable, both from the console itself and from the equipment racks directly behind the engineers' positions. This dual system provides still more operating flexibility. An electronic counter runs off the recorder's tachometer; the counter can be preprogrammed to control events at preset points in time. The counter can be used for such special effects as punching in a recording, switching a non-recording channel into record mode, or starting another machine that's cued up for sound effects. Here's how Goldman describes it: "Let's say a guitar player did the first eight bars well, but from then on, he goofed. With this counter, we can keep the first eight bars and re-

Goldman readies tape on 24-track Ampex.

BM/E Photos

Electronic counter can be programmed to switch individual tracks at preset time.

record the rest of the number. The recorder will automatically go from playback into record mode on that channel at precisely the right moment."

The multi-track equipment has provision for external sync. This lets a control track on one recorder synchronize another machine, locking the two together for a total of 40 channels on tape. Presumably, this recording capacity will be enough for the immediate future.

Describing the studio, Goldman says, "This room had problems when we first moved in. There were windows from the floor up to the ceiling, and they all had to be bricked in." The room has 36 microphone inputs distributed among seven boxes. The studio also has nine video lines, and TV cameras are very much in evidence. One remote-controlled camera sits on its pedestal high up on one wall. This lets the control room engineers zoom in to get a close look at corners of the studio in the glass window's blind spots. Other cameras on the floor can be dollied in.

Mirasound contains a strange marriage of audio and video. Closed circuit TV is everywhere. A camera scans the entrance lobby, providing some measure of personal security for the lone receptionist. Other cameras spotted strategically throughout the floor are in aid in keeping track of personnel and putting a lid on pilferage. TV is even used as a message and paging channel.

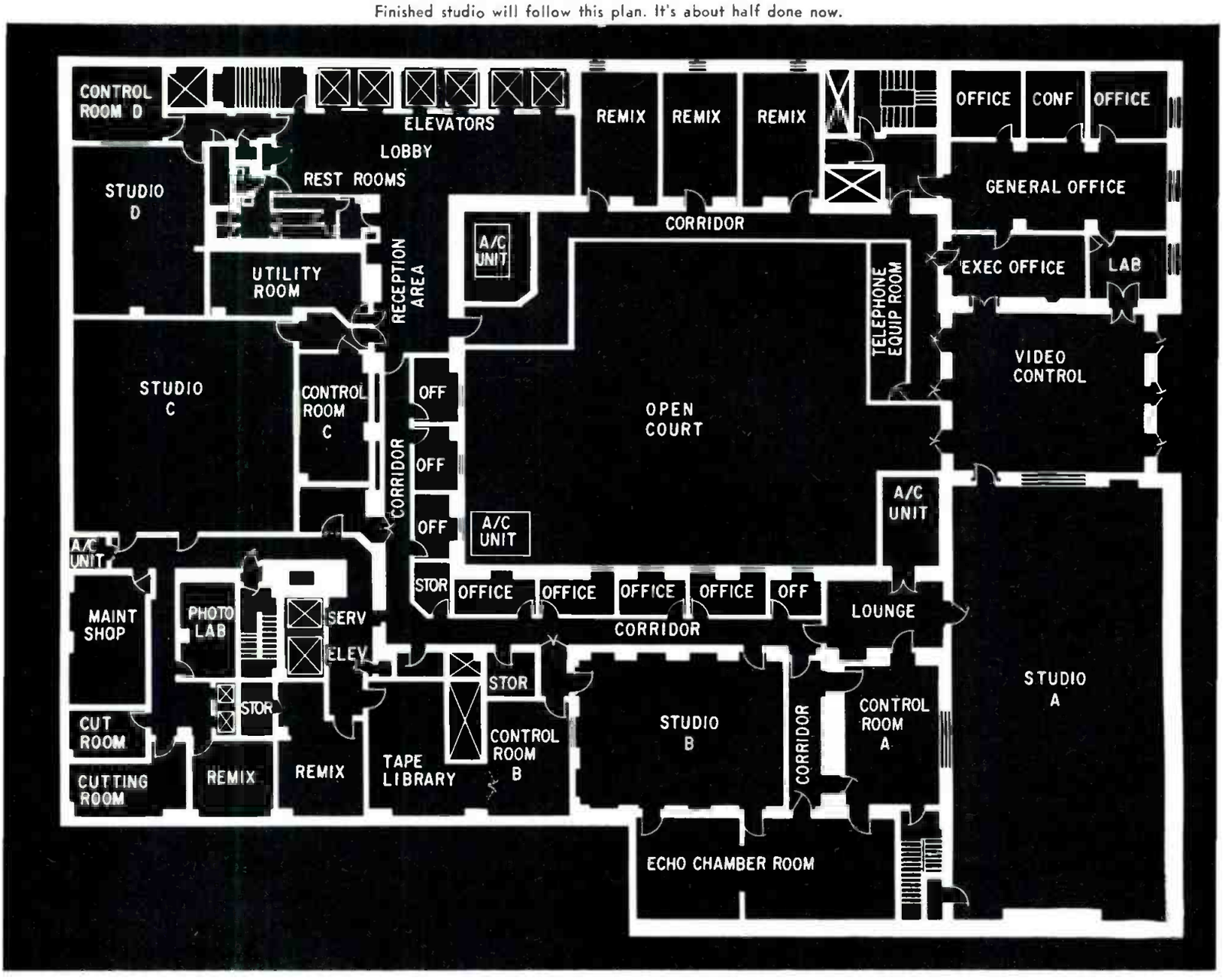
One end of Studio A has an empty picture window looking into a room full of stored equipment. This will ultimately be a video control room. Goldman believes that the record industry will start to move to video. "A prerecorded tape will contain two tracks of audio," he says. "The tape will also include a picture band—not an elaborate affair, but a videotaping of the actual making of the record. This will let the buyer watch the recording session in progress." He also feels that Mirasound will get involved in more conventional videotape production.

Studio acoustic treatment consists of sheets of fiberglass behind pegboard-type material on the walls instead of the more conventional acoustic tile. The ceiling is covered with fiberglass blankets, and the room is equipped with a number of "gobos." These units are tall wheel-mounted roll-around panels with a highly absorbing surface on one side, and highly reflecting surface on the other. Most of these gobos are made in house.

An unusual feature of the Mirasound setup is a machine shop. Here, special metal parts for cabinets, consoles, racks and homemade equipment take shape. Nothing has a homemade quality, though; it all looks very professional and factory-

Continued on page 48

Finished studio will follow this plan. It's about half done now.



The Importance of Being Biased

Do you use different tape formulations interchangeably? Chances are you're not getting all you should be from the oxide. Correct biasing is the answer, and one that's poorly understood.

By Don Eger

BIAS IS THE MOST important parameter in tape recording. Bias level and waveform affect such vital audio characteristics as level, distortion, frequency response and noise. Recording bias is a high-level, ultrasonic signal somewhere in the range of 30 kHz to 1 MHz. When mixed approximately in a 10:1 ratio with the audio, this bias signal makes the very nonlinear tape characteristics appear to be linear. If the bias is misadjusted or totally missing, the most expensive professional recorder will sound little better than a $10.00 dime-store toy.

Don Eger is an engineer at Crown International, Elkhart, Indiana.

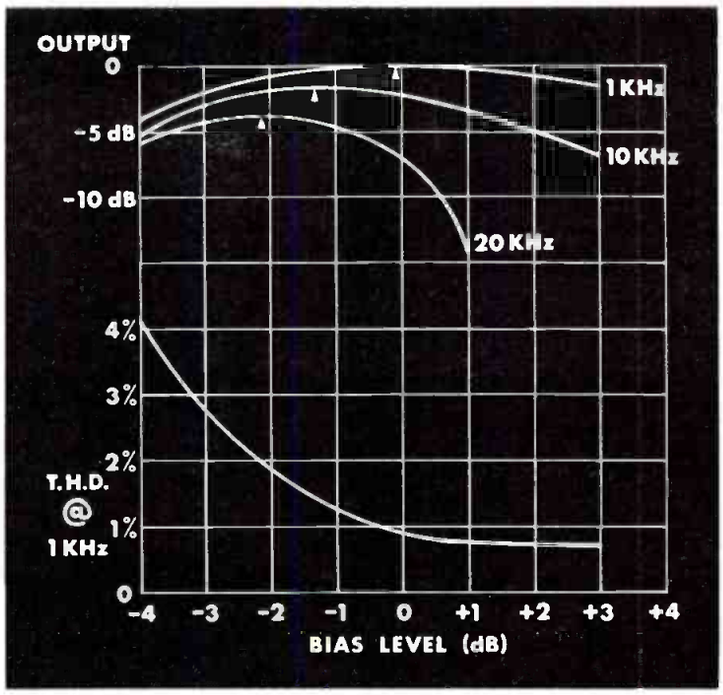


Figure 1. Upper curves show output level variations vs bias level, while lower curve is total harmonic distortion.

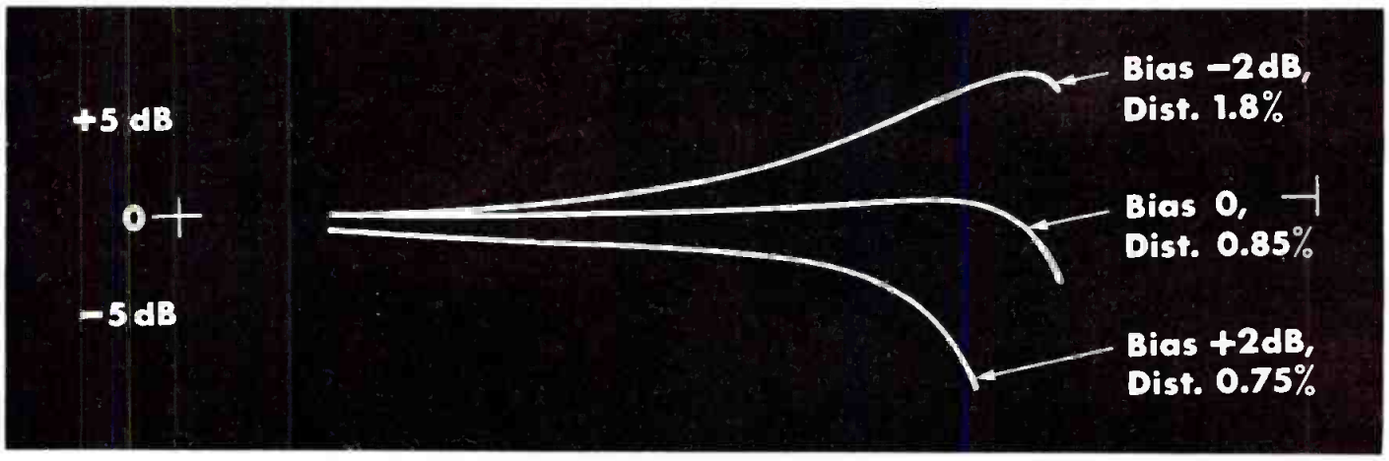
Bias affects tape performance at all levels. Let's assume that the bias frequency is high enough to avoid beats with any audio harmonics present in the program and that the bias waveform is pure enough (0.1 percent) for minimum noise. To understand the total effect bias has on the recording process, we must look at its effects on tape output level, high-frequency response and distortion—separately at first and then the total picture, including all the interrelationships.

Peak Level Reached

In Figure 1, we can see that as the bias is added to the signal, the recorded signal climbs to a peak and then drops off as the bias is further increased. At this point, there are three important effects:

- The point of maximum output decreases as the recorded signal's frequency increases.
- Changing the bias level has a drastic effect

Figure 2. These curves show the effects of bias on output level from Scotch Type 202 tape.



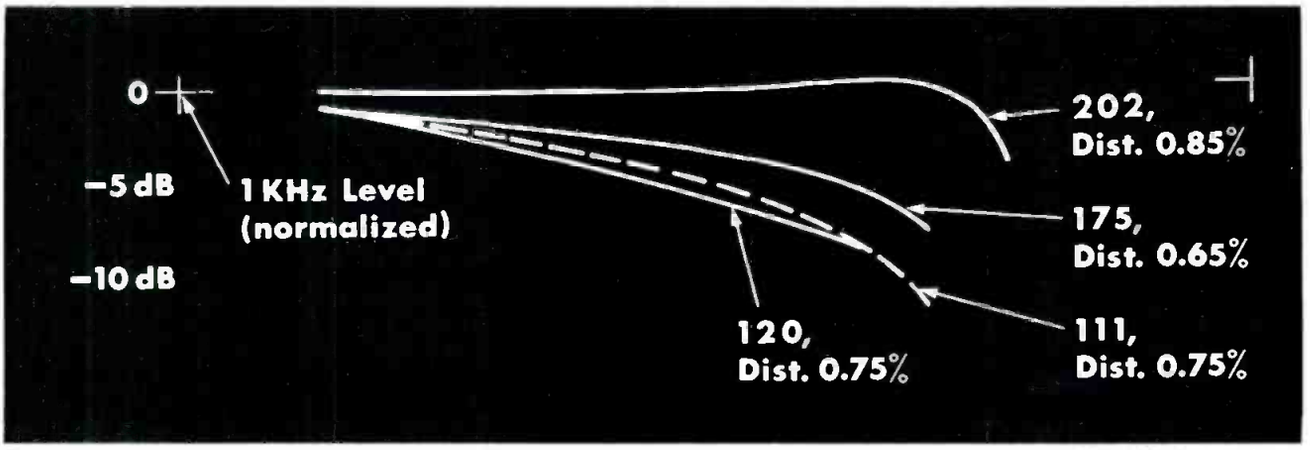


Figure 3. Tape oxide coatings vary considerably. Here bias is held constant; output curves are for tape types 202, 175, 111, and 120.

on high-frequency level.

- Increasing the bias level decreases distortion level.

From all this, it's reasonable to conclude that Murphy's Law[1] on the perversity of inanimate objects applies quite well to recording bias. If lowest distortion is wanted, then reduced high-frequency response will result. If maximum high-frequency is needed, the penalty is high distortion. What then is the answer? Obviously, some sort of compromise is needed. The "correct" compromise can be a very personal kind of decision, since it's up to the recording engineer. A realistic compromise is shown in Figure 2, which also indicates how this kind of bias affects overall professional recorder performance.

It doesn't seem likely that any recording engineer will get ulcers over this relatively basic decision. But the recording industry's inventiveness is against him. There is available a virtual cornucopia of different oxide formulations, each one with its own peculiar advantages. And each one of these tapes needs a different bias setting for optimum performance. The basic bias characteristics of these different tapes vary drastically from the "ideal" curve shown in Figure 1. To make matters worse, the characteristics of even a single generic oxide formulation (such as low-noise tape, for example) vary all over the map from one manufacturer to another.

1. Klipstein, D. L., "The Contributions of Edsel Murphy to the Understanding of the Behavior of Inanimate Objects." EEE Magazine, August, 1967.

Optimizing the Recorder

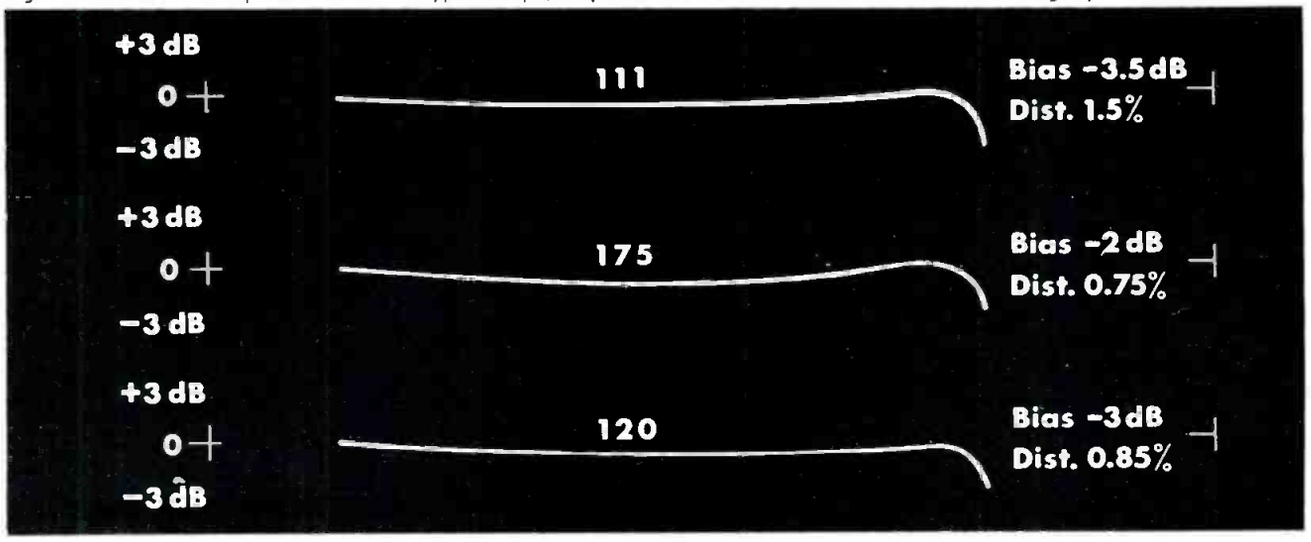
As an example of how widely these oxides differ, let's take a look at the Crown SX824. This machine, when optimized for Scotch 202, has significantly different performance characteristics when Scotch 111, 120 and 175 are used without changing the bias. Figure 3 shows what happens. Note that the high-frequency response is poor while distortion is low—0.75 percent for types 111 and 120 and 0.65 percent for type 175.

When the bias is optimized individually for each tape type, good high-frequency response with low distortion levels are the result. But again, the frequency range vs noise level tradeoff operates here; both parameters represent a realistic compromise.

Figure 4 shows an increase in distortion levels over those of Figure 3, and the 1-kHz output level has increased slightly. Table 1 shows the actual

Continued on page 48

Figure 4. When bias is optimized for each type of tape, output curves level out, but distortion increases slightly.



CBS LABORATORIES

TECHNICAL BULLETIN

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MARK II IMAGE ENHANCER

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Using the new "crispened" comb filter, the Mark II Image Enhancer provides video enhancement without degrading color signal quality by effectively separating chrominance and luminance signals.

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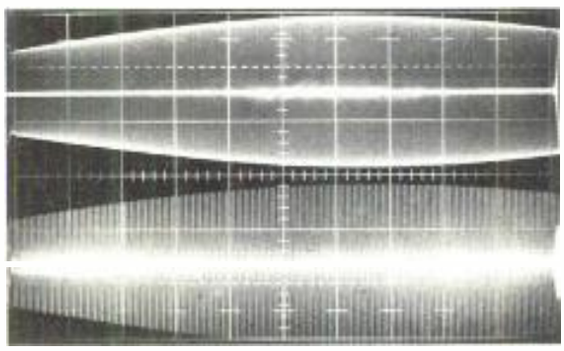
MARK II IMAGE ENHANCER WITH "CRISPENED" COMB FILTER

VERTICAL ENHANCEMENT is accomplished by comparing the elements on each line to the respective elements on the lines preceding and following it. When element differences are detected, corrective signals are introduced to enhance the sharpness of the element being acted upon. This is far more effective than single line correction.

HORIZONTAL ENHANCEMENT is accomplished by comparing each element of each scan line to the adjacent elements. The difference is added to the element being acted upon, thus sharpening horizontal transitions.

"CRISPENED" COMB FILTER. The CBS Laboratories Mark II "crispened" comb filter enables enhancement to be performed only on the luminance signal. Actual oscilloscope readouts show the horizontal element waveform with and without the "crispened" comb filter. Notice the separation of color signals from luminance signals by the comb filter, eliminating the possibility of color signal distortion during enhancement of the luminance signal.



Top: Horizontal detail frequency response without "crispened" comb filter
Bottom Horizontal detail frequency response with "crispened" comb filter

LEVEL-DEPENDENT APERTURE EQUALIZING. Live color cameras have high noise levels in the dark picture areas due, in part, to the black noise being stretched in the gamma circuits. Because aperture equalization of these dark areas is unnecessary, the Mark II Image Enhancer has a control to remove the detail signal from black to any shade of gray. thus permitting maximum equalization without increasing the black noise in the picture.

DYNAMIC BLACK AND WHITE CLIPPING. Normally, when the detail signal is added to the main signal, it results in blacker-than-black and whiter-than-white peaks. Simple diode peak clippers are ineffective because the peaks might intrude into the main video signal. CBS Laboratories Mark II Image Enhancer solves this problem by clipping the peaks of the detail signal only, as a function of the instantaneous video content of the main signal. This assures that the sum of the detail and main signals can never exceed peak black or peak white and that the normal picture peaks of the main signal will not be affected.

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Mix that Remote

On-location broadcasting and recording demands portable audio mixing facilities. Here's a survey of what's available in today's market, to mix from one to 14 inputs, mono and stereo, with and without turntables.

REMOTE BROADCASTS and on-the-scene recording sessions are done by radio and TV stations and recording studios everywhere you can think of, from drive-in restaurants to churches. One essential ingredient of all these operations is a portable audio mixer which one man can carry out and set up on location. For a simple job, you might need to mix only a couple of mikes; for a fairly complex session you might use a dozen mikes, perhaps a turntable or a tape machine. Maybe you want cue and PA feed facilities, and an air monitor. Whatever you need, you can find it in the equipment shown here.

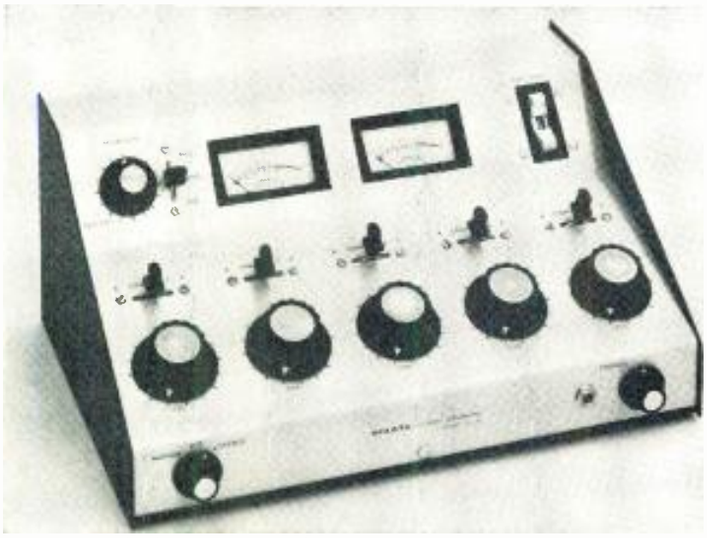
Portable mixers are also useful with theater sound systems, public-address systems, and in similar applications in schools, government, industry and medicine. And don't overlook one other fact: a portable mixer is a useful extra and backup for studio gear, as you can use it for production-taping of spots nearly anywhere, or as an emergency console if the ac power fails.

Ampex. For some time, this company has sold the vacuum-tube MX-10 mixer without VU meters for use with its tape recorders. Now updated as the transistor AM-10, the mixer has a meter panel accessory which makes it just right as a portable consolette. It works either stereo or mono. The VU meter lights are switchable on and off, and each input fader has a plastic dial apart from the knob, to let you mark the pot setting for reference. The two high-level inputs can be converted to low-impedance mike use with accessory plug-in transformers. All circuits (preamplifiers, mixing amplifiers, and line amplifiers) are plug-in for ease of maintenance. Any number of AM-10 mixers can be paralleled through a connector strip, providing for as many inputs as desired.

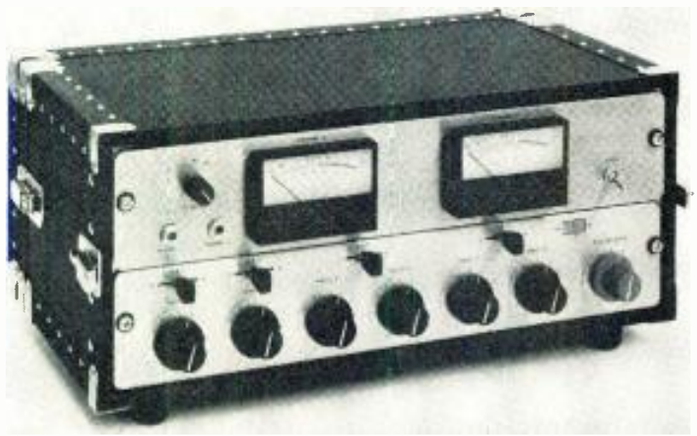
Bogen. Inexpensive yet versatile, the MXM-A handles seven inputs. Bass and treble tone controls allow frequency equalization of program ma-

Covering a dress-up affair? Use the Gately PM-1 stereo mixer in an attache case for that debonair look.

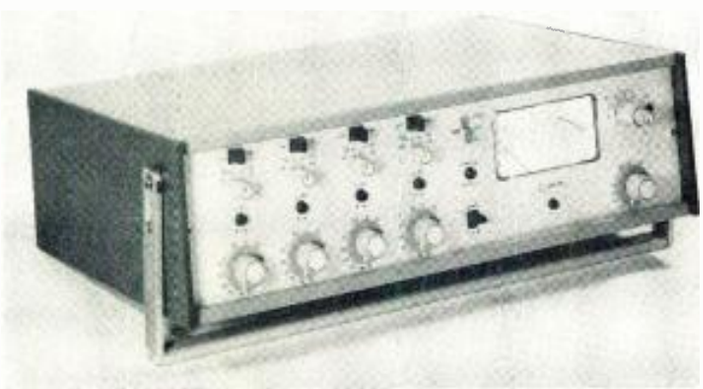
If you can't keep your eyes on the VU meter, you can feel the pot setting by large index tabs on Gates' Dynamote 70.



Inbuilt monitor speaker in Sparta AS-30 stereo mixer is switchable between audition, program and external air monitor.



You can switch off the VU meter lights when they aren't needed with Ampex's AM-10 six-input stereo mixer.



An incoming cue lights an indicator lamp in the upper right-hand corner of the Norelco/Philips MP-4 mixer panel.

terial. As many as three units may be paralleled to increase input capability.

Collins. Inputs here appear not only on standard mike receptacles, but on barrier strips, so you can use bare wires in an emergency. Monitoring facilities are convenient; a built-in monitor speaker is switchable between program and audition controlled by a front-panel pot, and each input fader has a cue position which overrides the monitor channel. There is a separate studio monitor speaker jack. Both local and studio speakers mute when mikes are open. An adaptor permits parallel operation of two 212J-1's for eight-input jobs. The battery power supply is built in and rechargeable through the ac power supply.

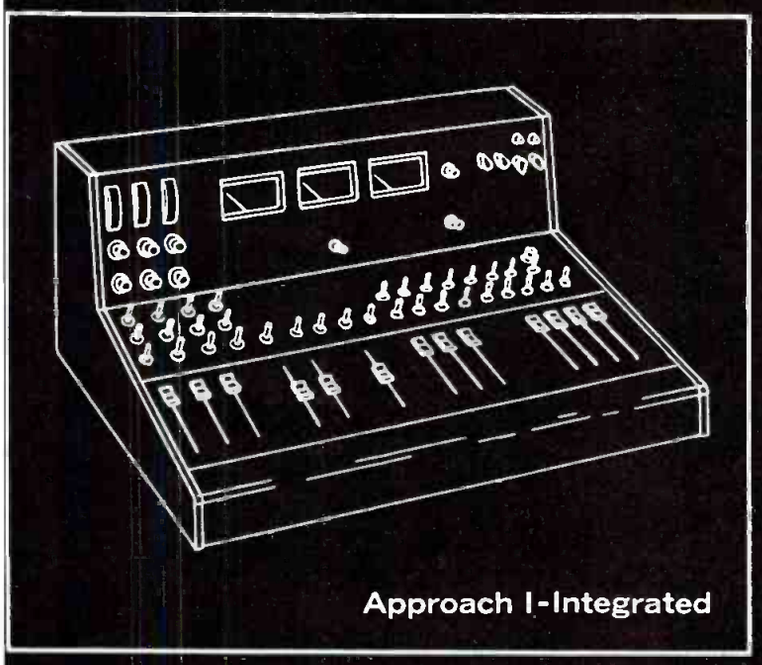
EMT-Gotham. Made in West Germany, the EMT 104 mixer is sold in the U.S. by Gotham Audio Corporation of New York. A bass-rolloff filter can be switched into each of the four inputs, and monitor-overriding cue is also available. A panel-mounted monitor speaker with volume control allows hearing the program. For testing the output line, a built-in, 1-kHz oscillator can be switched across the output. Two VU meters are mounted on the panel; one shows output line level, while the other indicates the amount of compression furnished by the internal compressor-limiter. The internal batteries are recharged automatically via the ac power supply.

Gately. A mixer in an attaché case, the PM-1 is compact and easy to carry. Plug-in preamplifier modules that are available include: 40-dB gain mike preamp; 60-dB gain mike preamp; RIAA phono preamp; NAB tape head preamp; balanced line-bridging transformer. Two or more PM-1's can be paralleled for greater input capacity, and the VU meters are illuminated. Accessories include the EM-7 stereo echo mixer, which adds echo to the four mike channels, and the EQ-7 equalizer, which permits both high and low boost to all four inputs.

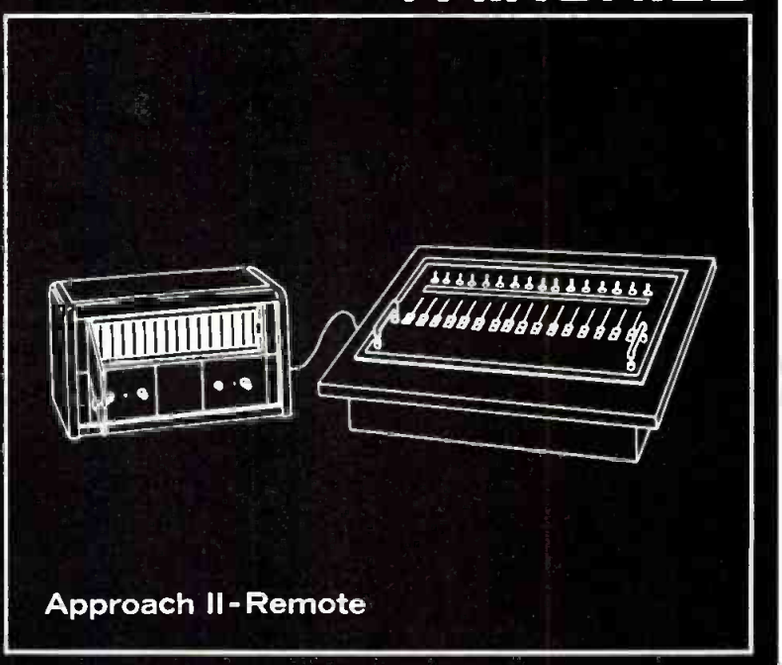
Gates. This company has four remote mixers, having respectively four, three, two, and one input channels. The Dynamote 70 has four inputs; one is microphone only; a second is microphone or built-in tone oscillator; the remaining two are switchable between microphone, turntable and high-level inputs. The turntable inputs have RIAA equalization and accept standard VR-type phono cartridge outputs.

The three-input Attaché 70 mixer is similar and has the tone oscillator. The two-input Courier 70

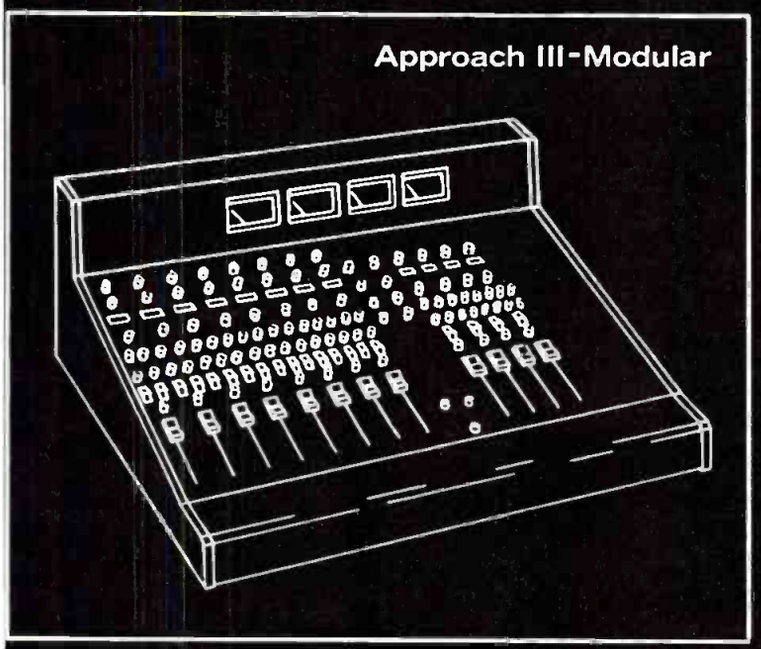
FAIRCHILD



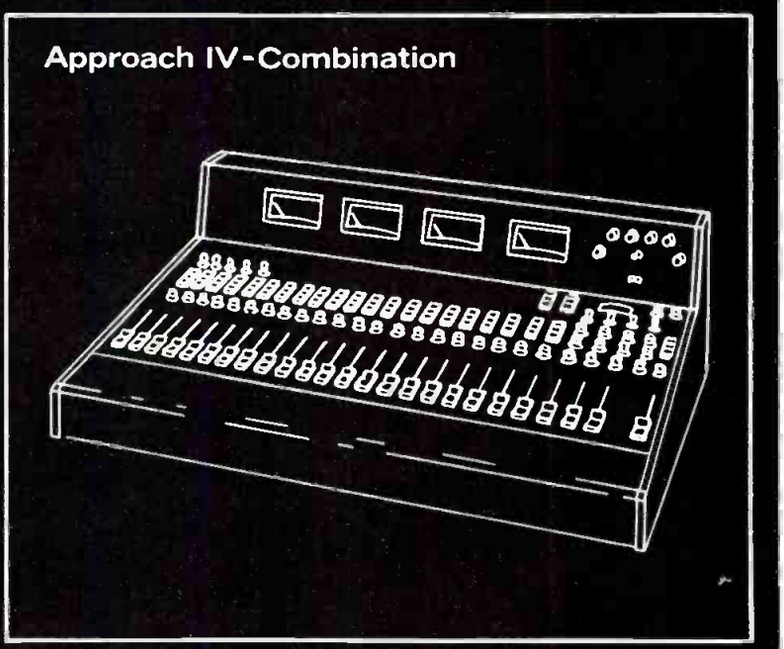
Approach I-Integrated



Approach II-Remote



Approach III-Modular



Approach IV-Combination

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In Langevin's AMIA mixer, two continuous equalizer controls allow adjustment of high and low frequencies.

Each input on Lang's LPM-2 is switchable between mike and line. Internal oscillator facilitates level setting.

Simple DJ remote consolette is RCA BC-10B, with mike switch under VU meter and turntable pots flanking center.

handles two low-impedance mike inputs, while the Unimote 70 handles a single low-impedance mike input, and does not have a VU meter.

Lang. This mixer has a switchable VU meter light and provision for a calibration oscillator. The battery power supply automatically switches on if the power line fails. A separate foam-padded carrying case is used for transport.

Langevin. The AMIA mixer contains plug-in modules which allow you to select low-impedance (150/250 ohms), high-impedance (250 k), RIAA, or bridging inputs (6000 ohms). These modules are applicable to the six regular inputs. Two additional inputs go into the mixing but are not controlled by input faders. An accessory nine-input mixer can feed one of these additional inputs to expand input capability.

At each of the six switchable inputs, a speech-music switch appears. In the music position, the input has flat frequency response. In the speech position, a bass-attenuating capacitor is switched in. Further frequency equalization is provided by high-frequency and low-frequency front-panel pots.

Martin Audio. The mono Sonomix 601A consists of four basic units: line mixer with 117-Vac power supply; preamplifier unit; nickel-cadmium battery pack; and portable case which holds the other elements. The battery pack is good for 30 hours and recharges overnight through the ac power supply.

Martin Audio's stereo 602 Sonomix is similar to the mono version. Aside from two-channel capability, the 602 includes echo facilities. In addition to each input fader, there is an echo-send pot for each input, driving an echo-send bus output of 600 ohms unbalanced. An external stereo echo facility must be used, which feeds two echo-return inputs, controlled by left echo and right echo pots. Cue-pot accessories are available for each input.

Norelco/Philips. The MP 4 mixer has a four-position sensitivity switch at each input to compensate for the various levels it can accommodate, from –71 to +6 dBm. Each input is switchable to a cue bus and an incoming cue signal lights an indicator lamp. A built-in oscillator furnishes 1000 Hz for line testing and level setting.

A front-panel lamp shows ac operation, and the battery voltage can be checked with the VU meter.

Another useful feature of the MP 4 is the insertion points at each input and output, allowing the user to connect equalizers, effects filters, compressors, etc.

Norelco/Philips' Type 5740 mono mixer also has a tone generator for testing.

The Type 5744 mixer is probably the most extensive portable available. Each of the 12 input channels contains a preamplifier and vertical attenuator, switching to group outputs, a prefade switch, external equalization switch, high-low input level selection, input impedance selection, gain balancing control, echo gain control and PA gain control. An echo return is provided, but an external echo facility must be used.

This highly versatile mixer also includes a talkback circuit and microphone, a return talkback circuit, and a tone generator with five switched frequencies. There are three line outputs, but only two VU meters.

RCA. The BC-10B is a mini control room which includes two three-speed turntables with cue facilities (via phones), two mike inputs and one high-level input switchable to one attenuator. Physically, the BC-10B sets up like a table, with four breakdown legs which store on undertable clips for transport and storage, making a compact assembly.

Shure. Smallest of the group, the M67 has a low-cut filter switch on each input which is sometimes useful on speech. The VU meter is switchable to indicate either +4 or +10 dBm, and is illuminated with ac operation. Another switch allows you to use the VU meter to check battery voltage. The first mike input is switchable to an internal tone oscillator for level setting.

Sparta. This company has five portable mixers, two stereo and three mono. The AS-30 is a stereo mixer; the announce mike is switchable between stereo and mono, and an air monitor input is provided so the operator can monitor from a receiver. The AS-30 contains a built-in monitor speaker and level control. Each input attenuator has a cue position, and speaker-muting facilities are provided.

The ASC-305 is the preceding mixer along with two three-speed turntables mounted on a portable knockdown table.

The A-15 is a mono version of the AS-30 with most of the same features, and the AC-155 is the mono mixer with a pair of turntables mounted on a table.

The RA-5 is a compact three-input mixer for small jobs. It contains a built-in test oscillator.

United Radio Industrial. Featuring plug-in circuits on glass epoxy printed boards, the BC-101 has legs to allow it to fit over turntables. Each input has a selector switch to furnish cue through an internal speaker. The speaker mutes when phones are plugged into the front-panel jack. **BM/E**

Line output of EMT 104 appears on panel binding posts to accept bare telco wires if necessary.

Fourteen inputs are switched among five faders, each of which has a cue position, in Sparta's A-15 mixer.

Recommended especially for New York City use, Shure M67 automatically switches over to batteries when ac fails.

See page 46 for mixer chart ▸

← Circle 149 on Reader Service Card for Conrac insert

Portable Audio Mixers

Mfr.	Model	Mode	Inputs	Outputs	Power	Weight	Price	Circle No. on Reader Service Card
Ampex	AM-10	Stereo	4 lo-Z mike, 2 hi-level	2 600-Ω line 2 mon. phone jacks	117 Vac		$717	311
Bogen	MXM-A	Mono	5 lo- or hi-Z mike, 2 hi-level	Line, phone jack	117 Vac	20 lbs	179	312
Collins	212J-1	Mono	4 switchable to lo-Z mike, phono, or hi-level	600-Ω line, PA feed, 8-Ω spkr., 2 phone jacks	117 Vac or batteries	28 lbs		313
EMT (Gotham)	104	Mono	4 switchable to 1k mike or 3k hi-level	2 50-Ω lines, mon. spkr.	117 Vac or batteries	22 lbs	1768	314
Gately	PM-1	Stereo	6 lo-Z mikes, 2 switchable to hi-level	2 600-Ω lines, phone jack	117 Vac	25 lbs		315
Gates	Dynamote 70	Mono	4 lo-Z mikes, 2 switchable to phono or hi-level	600-Ω line, PA feed, mix out, 2 phone jacks	117 Vac or batteries	12¼ lbs		316
Gates	Attache 70	Mono	3 lo-Z mikes, 2 switchable to phono or hi-level	600-Ω line, PA feed, phone jack	117 Vac or batteries	10 lbs		317
Gates	Courier 70	Mono	2 lo-Z mikes	600-Ω line, phone jack	117 Vac or batteries	8¾ lbs		318
Gates	Unimote 70	Mono	1 lo-Z mike	600-Ω line, phone jack	117 Vac or batteries	5 lbs		319
Lang	LPM-2	Mono	4 switchable to mike or hi-level	600-Ω line, phone jack	117 Vac or batteries	14 lbs	560	320
Langevin	AM 1 A	Mono	8, plug-in, lo-Z, hi-level, phono, or bridging	600-Ω line, hi-Z monitor, phone jack	117 Vac			321
Martin Audio	Sonomix 601A	Mono	6 switchable to lo-Z mike or hi-level	600-Ω line, hi-Z monitor	117 Vac or batteries	19 lbs	675	322
Martin Audio	Sonomix 602	Stereo	6 switchable to lo-Z mike or hi-level	2 600-Ω lines	117 Vac or batteries	22 lbs	945	323
Norelco/ Philips	MP-4	Mono	4 switchable to lo-Z mike or hi-level	600, 150, or 37.5 Ω line, hi-Z monitor	117 Vac or batteries	39 lbs	1150	324
Norelco/ Philips	5740	Mono	4 lo-Z mikes	50 or 75-Ω line, hi-Z monitor	117 Vac or batteries	36 lbs		325
Norelco/ Philips	5744	Stereo	12 switchable to lo-Z mike or hi-level	3 600-Ω lines, PA feed	117 Vac		11,500	326
RCA	BC-10B	Mono	2 lo-Z mike, 2 turntable, 1 hi-level	600-Ω line, PA feed, phone jack	117 Vac	68 lbs	940	327
Shure	M67	Mono	4 lo-Z mike, 1 switchable to hi-level	600-Ω line, lo-Z mike level, mix bus, phone jack	117 Vac or batteries	4 lbs	167	328
Sparta	AS-30	Stereo	1 lo-Z mike, 8 hi-level	2 600-Ω lines, 2 monitor, 2 audition, cue, phone jack	117 Vac or batteries	28 lbs		329
Sparta	ASC-305	Stereo	1 lo-Z mike, 2 turntables, 6 hi-level	same as above	117 Vac or batteries	185 lbs		330
Sparta	A-15	Mono	2 lo-Z mikes, 12 hi-level	3 600-Ω lines, PA feed, ext. spkr., phone jack	117 Vac or batteries	26 lbs		331
Sparta	AC-155	Mono	2 lo-Z mikes, 2 turntables, 2 low-level aux., 8 hi-level	same as above	117 Vac or batteries	185 lbs		332
Sparta	RA-5	Mono	3 lo-Z mikes, 1 switchable to hi-level	600-Ω line, PA feed, phone jack	117 Vac or batteries	13 lbs		333
United Radio Industrial	BC-101	Mono	2 lo-Z mikes, 2 turntables, 2 hi-level	600-Ω line, lo-Z monitor, cue, phone jack	117 Vac			334

Eye-Catching Remote Consolette for the Walkaround DJ

Just the thing for discotheque broadcasts or teen hops, this radio remote facility is a self-contained and battery-powered miniature studio and transmitter on wheels.

RADIO REMOTES in restaurants and shopping centers have been popular for years, and probably always will be. Two essential ingredients to such shows are high DJ visibility and audience participation. If he sits in a corner by a portable console, he isn't as visible to people on the scene. But long mike cords are messy for roving DJs.

An ingenious solution is the remote-broadcast facility developed by Takuji Takahashi, director of engineering for Nippon Broadcasting System, Inc. Called the "Satellite Wagon," it has a dummy dish antenna on top to attract attention.

The facility includes a six-input mixer, a turntable and a cartridge-tape player for music. The main announce microphone is mounted next to the turntable for use when operating from that position. Two wireless microphones feed receivers inside the wagon, freeing the DJ for walkaround interviews.

Wagon Wheels

The wagon itself is on wheels and contains a program transmitter and an air monitor, as well as monitor and cue speakers. In the bottom of the wagon are batteries and storage space for records and tapes. Ac power isn't normally used and the wagon can go anywhere.

In practice, a main receiver is connected to ac power and a telco line at the restaurant or shopping center. The Satellite Wagon program transmitter then feeds the receiver at the telco line, and program is sent to the studio. The main receiver is unattended during the broadcast, and one man can operate the wagon for music and interviews. Receive and transmit antennas are whips hidden in the support legs under the fake dish shown in the photos.

For more information, write to Tom T. Saiki, 1223 No. Kingsley Drive, Los Angeles, California 90029. **BM/E**

Japanese radio personalities (above) interview patrons at a Tokyo cafe with wireless mikes feeding receivers in the Satellite Wagon (above and right). Under the control deck, the mixer output goes into a transmitter which sends signal to a receiver at the telco terminal in the restaurant. As shown at right, wagon handles mikes, discs, and cartridge tapes.

Multi-Track Studio

Continued from page 36

built. Compressed air lines interconnect all rooms. This provides cleaning air wherever it's needed, without the need for unhandy hand-blowers.

The finished floor will have nine private engineering offices, four studios, five remix rooms and two cutting rooms.

The complex has 40 audio lines interconnecting each room on a common bus with local patching. There are also nine video and control lines. This permits such niceties as direct connection from A Control to the cutting room, if needed. Because 600-ohm balanced lines are used, line loss is kept to a minimum.

Other special features include a library and a photo lab. The photo lab handles everything from photo-etching control panel escutcheons to shots for record album covers and publicity.

As an example of the kind of versatility Goldman can get from his facilities, he recently recorded a live session direct from a nightclub on a 16-track machine in his studios. He rented 16 high-grade telephone lines, set up the microphones at the club, and ended up cutting an album from the session. A mix was taken off the machine and sent back to the engineer on location via a 17th rented line.

Mirasound has been the front-runner in multitrack. Goldman points out that he was the first to use 16-track recording, has the first 24-track machine delivered, and is very likely the only one currently set up to handle 40 tracks. While there doesn't seem to be an end in sight to this multiplicity of audio tracks, as long as there's a market for this type of recording, Mirasound will do the job. **BM/E**

Importance of Being Biased

Continued from page 38

numerical tradeoffs for four Scotch tapes. Here again, we see the need to pick and choose the just-right operating compromise. Mastering recorders are usually biased to favor low distortion and low hiss level. Consumer tape recorders tend to be biased toward widest frequency response.

Front-Panel Adjustments

Many qualified operators with non-technical backgrounds don't understand the purpose of bias or how to adjust it. Such operators are limited to just one type of tape if they want to get consistent results with no degradation of sound quality. An easy method to overcome this limitation is to have a limited-range front-panel bias adjustment. A chart something like Table 2 can be prepared by a qualified technician and posted on the recorder for operator use.

A range of ±3dB will accommodate all presently available audio tapes. There are some new, high-response tapes being developed. A typical example is Dupont Crolyn, which has the response shown in Figure 5 when 202 equalization and bias are used. To take full advantage of these new tapes, both bias and equalization may need to be adjusted. The results can be greatly expanded dynamic range and response.

Correct bias is essential for optimum performance on any tape but accessible bias adjustment, metering and understanding can provide the operator with greatly expanded flexibility in using the best tape possible for his requirements. **BM/E**

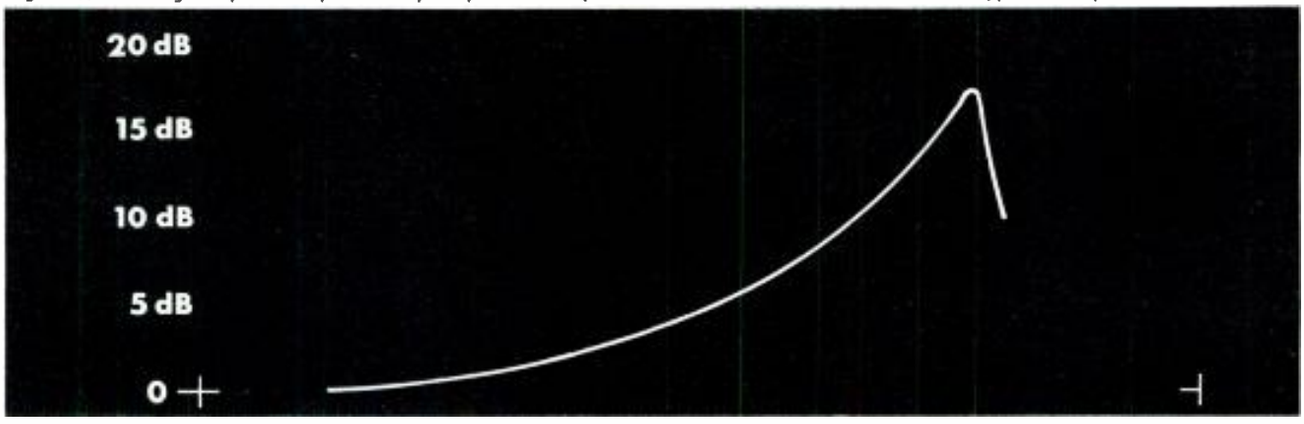
TABLE 1

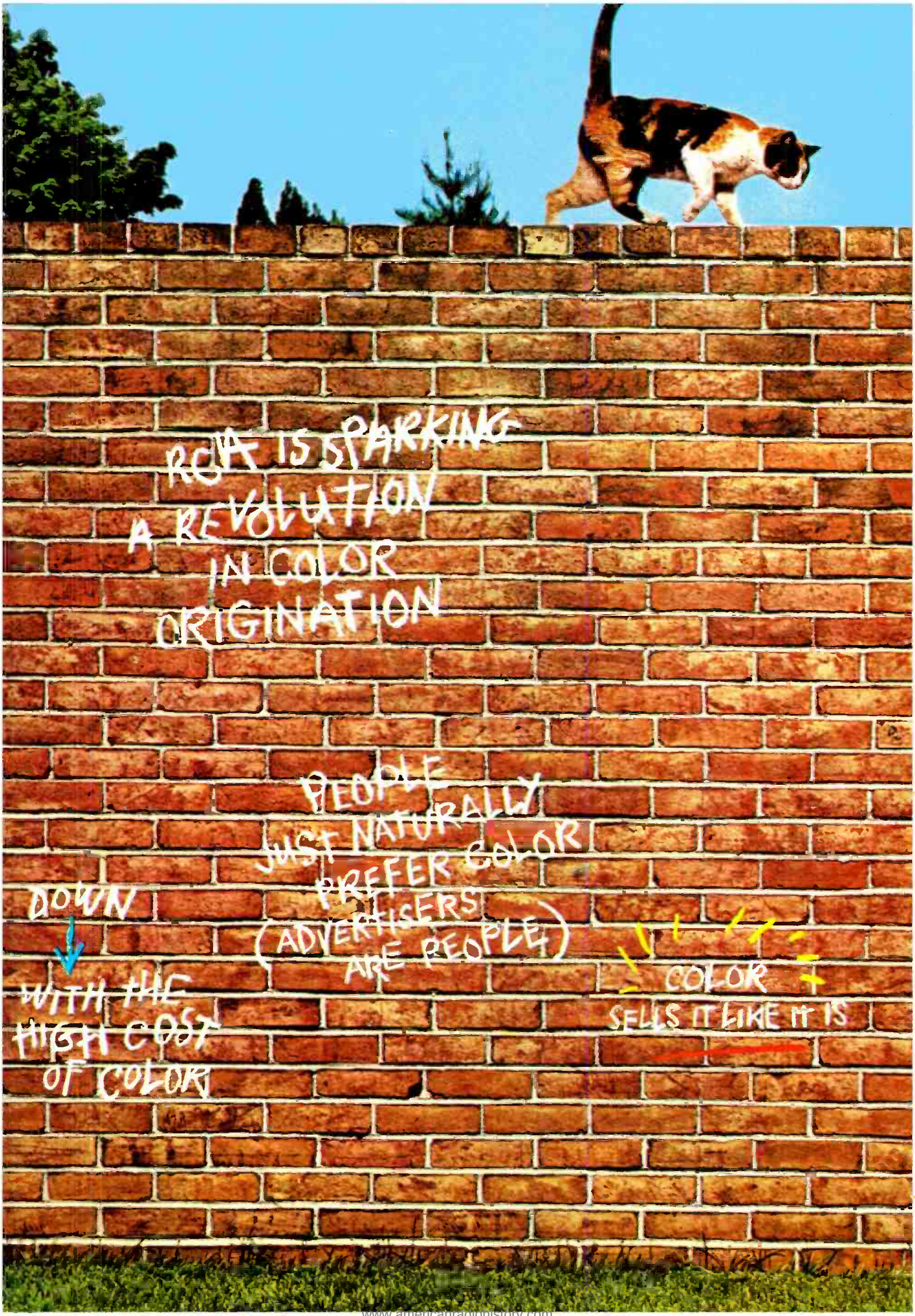
BIAS	SCOTCH 202 dB Output	SCOTCH 202 % Dist.	SCOTCH 111 dB Output	SCOTCH 111 % Dist.	SCOTCH 120 dB Output	SCOTCH 120 % Dist.	SCOTCH 175 dB Output	SCOTCH 175 % Dist.
+3	−2.4	.75	−6	.75	−2.0	.65	−5.	.75
+2	− .8	.75	−3.8	.75	− .8	.65	−2.8	.75
+1	− .2	.75	−2.0	.75	− .4	.70	−1.0	.70
0	0	.85	− .8	.75	− .2	.75	− .6	.65
−1	− .2	1 25	− .2	.75	0	.75	− .2	.70
−2	− .8	1.8	0	.8	− .2	.75	.0	.75
−3	−1.2	2.9	− .2	1.1	− .4	.85	− .2	.90
−4	−2.2	4.2	− .8	1.6	− .8	1.2	− .6	1.4
−5	....	....	−2.0	2.8	−2.0	1.75	−1.4	2.3

TABLE 2

Tape	Bias Set
202	0
111	− 3.½
120	− 3
175	− 2
E	− 3
F	− 1
G	0

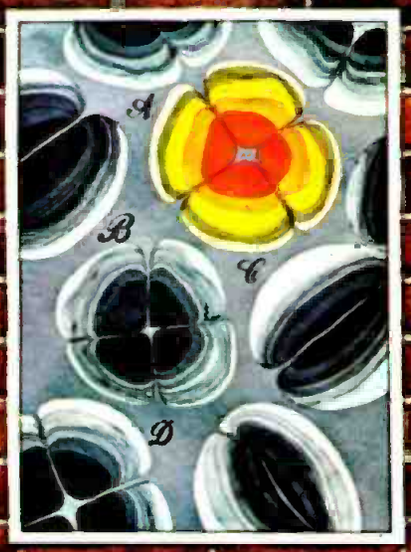
Figure 5. New high-response Dupont Crolyn tape shows a peak when used on machine biased for type 202 tape.





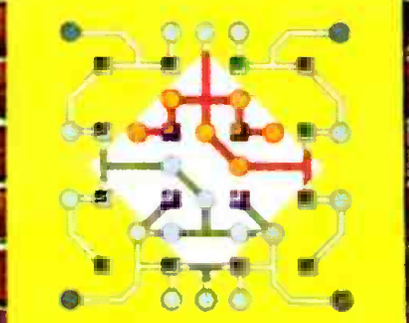
Under $10,000...full-fidelity CATV

COLOR ENHANCES YOUR ADVERTISERS' MESSAGES



The PK-730—smaller, lighter, less expensive than any color studio camera yet available. Unique single tube, solid-state design features full-fidelity color, unsurpassed operating ease. Unskilled operators can handle this camera with ease since only five controls are needed. It weighs less than 50 pounds and is no bigger than conventional monochrome cameras.

Price includes: Camera, Viewfinder 6:1 Zoom Lens for smooth transitions from wide-angle shots to extreme close-ups, NTSC Compatible Encoder, 50' Camera Cable, Remote Control Panel and Cable.



CIRCUIT 'D'

COLOR STIMULATES SALES

NEW LIVE COLOR TV CAMERA ONLY $9,850

color camera systems, live and film.

Now, even the low-budget CATV user can afford to switch from the "gray" world of monochrome to the high-impact, attention-grabbing, "real" world of color! RCA has created color cameras capable of achieving superb color TV performance with non-professional personnel... at the lowest price ever!

Since color is now the accepted means of viewing television, colorful CATV is the trend of the times. And now it's ever-so-easy to be a pacesetter with RCA's new color cameras that topple the cost barriers for local programming in color. Now's the time to join the color revolution. You can "tell it like it is" and save thousands!

The PFS-710, a complete system made especially for color presentations of 16mm sound films and 35mm slides. It includes everything you need—camera, projectors and multiplexer—in a mobile cart just 4 feet long and 2 feet deep.
And it's about as easy to use as showing home movies.

Price includes: Camera, Optical System, NTSC Compatible Encoder, PFP-1600 16mm Film Projector, Slide Projector, Camera Control Panel, Projector Control Panel, Mobile Cart.

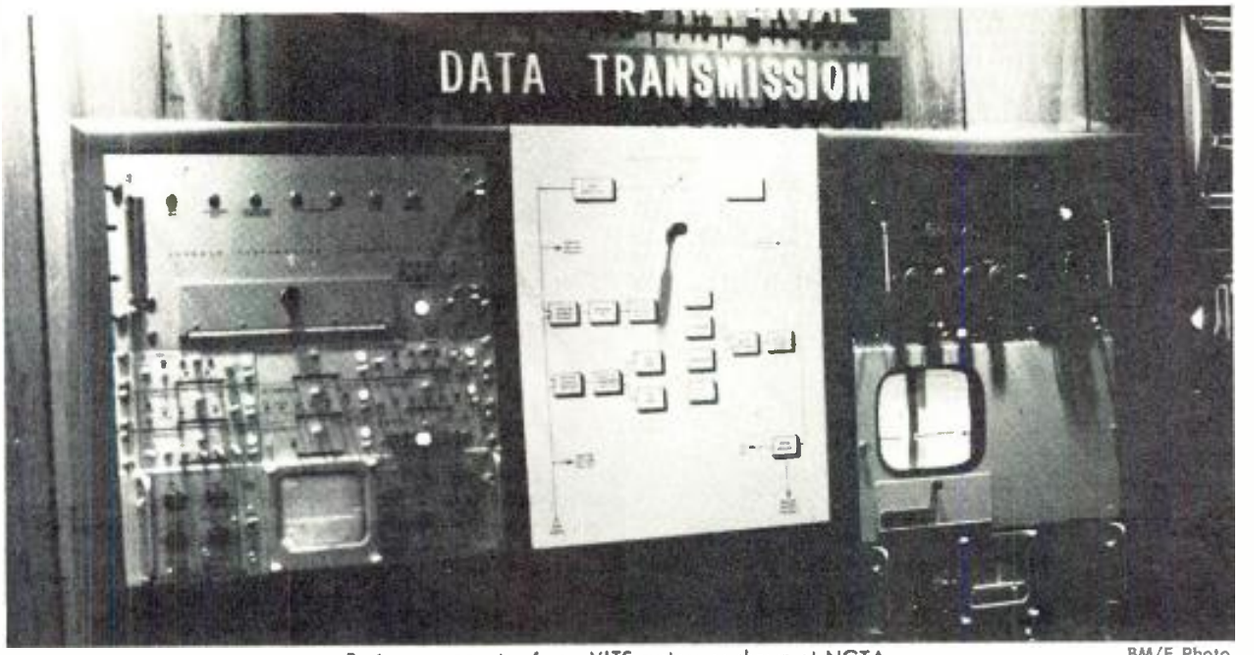
NEW COLOR TV FILM SYSTEM

ONLY $98

RCA 800 Series VTRs have both record and playback capability and produce pleasing high-resolution color pictures. Pushbutton controls and simple threading enhance ease of operation. Use as a portable or rack-mount unit. Can be remote-controlled. Stop motion is standard. Slow motion and electronic editing are also available. One hour of continuous recording can be made on an 8-inch NAB reel, using 1-inch tape.

Price includes tape recorder, complete with color module.

NEW COLOR TV TAPE RECORDER ONLY $4,700



Basic components of new VITS system as shown at NCTA. BM/E Photo

Extra Service from TV's Vertical Retrace Time

Those unused eight lines of vertical interval retrace time have been used by the nets for line-quality testing for several years. But there's lots more information that can be packed into that interval, including some new services for CATV operators.

TELEVISION VERTICAL BLANKING period is equivalent to 21 horizontal lines. Vertical sync and equalization pulses require the first nine lines. The remaining 12 lines are used for blanking only (with burst, if color). Since present-day receivers will do their own retrace blanking, these twelve lines of the vertical blanking period can be modulated to transmit other kinds of information.

The networks and AT&T are using certain lines to transmit video test signals.[1, 2] This same interval has been used by RCA to experiment with delivery of newspapers from New York City to Princeton.[3] At the last NAB convention TeleMation Inc. demonstrated on one rf channel the transmission of a news wire service along with the TV picture.

TeleMation has developed a number of pieces of equipment—encoders, decoders, erase modules and interface devices—to further exploit the vertical interval time period. Many applications will require waivers or changes of FCC rules. But the prospect of getting extra use of the spectrum without interfering with existing services should move the Commission to take a generous attitude toward vertical interval transmission (VITS) systems.

Nevertheless, rule changes and waivers must be preceded by experimentation. TeleMation is interested in working with prospective users on experimental projects. The company feels that industry acceptance will come once additional application data are amassed. Applications envisioned include these CATV, ETV and broadcast uses:

- News wire distribution
- Distribution of program information—to network affiliates or satellite stations
- Communication with mobile units or schoolrooms
- Remote control of switching including CATV & VTRs
- Remote control metering and logging
- Insertion of TV test signals

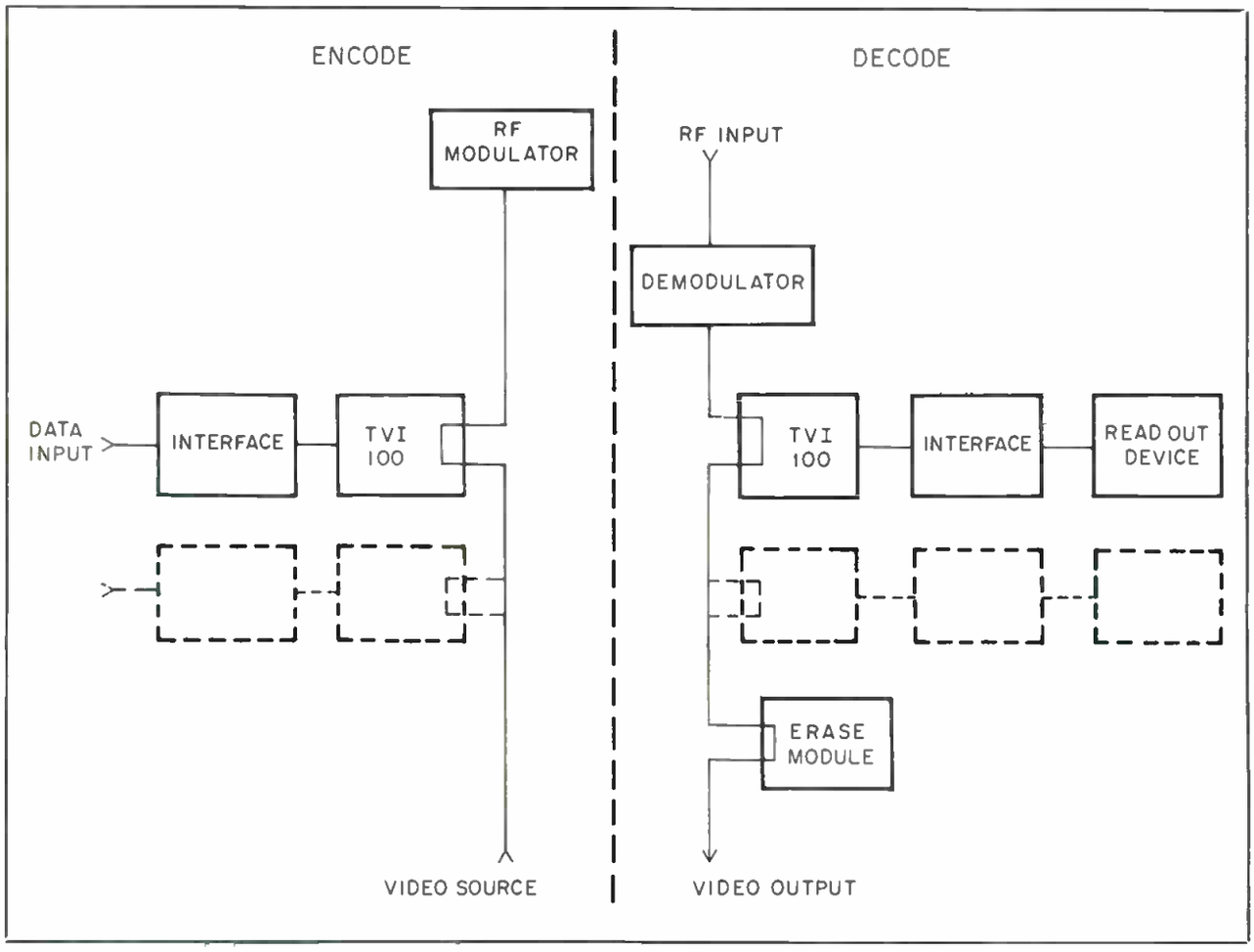
News wire distribution: The bandwidth requirements of a news wire are so low that several hundred circuits can be carried in the vertical interval of a single video signal. TeleMation's NAB demonstration displayed carriage of the AP News Wire over an rf system. In an actual system, the news wire can terminate in a city located on a news wire trunk line where it can then be turned over to a private or common-carrier TV microwave operators. All interconnected TV stations and CATV systems subscribing to the service can be fed directly, while radio stations could receive their feeds via off-air pickups from TV stations (assuming appropriate FCC waivers are obtained). Readout is possible either as hard copy from a printer or via an electronic character generator.

CATV systems can provide a continuous news feed to their subscribers. TV stations and CATV systems equipped with character generators and magnetic storage devices will be able to preview and edit copy, then display the edited copy on a

1. "Hidden Test Signals Boost Color Quality," BM/E, June 1968, page 46.

2. "Report on Vertical Interval Signals for Evaluation of Color Network Facilities in the USA," paper by Warren Phillips, NBC, SMPTE Winter Television Conference, January 17-18, 1969.

3. "Broadcasting Printed Copy to be Tested," BM/E, August 1967, page 6.



Basic VITS system is expandable both at input and output ends.

monitor from which the latter-day "rip-and-read" newscaster reads his news orally.

Distribution of program material: By using an electronic generator at both send and receive locations, a network can establish a continuous communications link to its affiliates. Typically, the affiliate would be equipped with a separate control room monitor where network messages appear. The network, with a selective addressing feature, would be able to address an individual station, group of stations or all stations, transmitting program log information, cueing information, routine messages or news flashes.

Identification and verification: Vertical interval encoded signals can be used to identify the origination point of network programming or can identify the source of video tape production.

A simple data logging recorder can provide confirmation of carriage of all commercial announcements in a market area if such announcements are identified by a vertical code. Time, data, duration and station identification would be simultaneously logged.

Communications with mobile TV units, schools: Messages can be transmitted to mobile units by the station's own transmitter with each mobile equipped with a character generator for readout. Message transmission from the mobile to the control room is handled similarly, via the remote video link.

When the mobile unit sends to the station's transmitter site via microwave, the two-way data circuit could be maintained by using a different horizontal line for each direction. Studio control of the transmitter video input switcher would also be possible for better coordination during remote pickups.

Statewide, regional, or local educational distribution systems can use the addressing flexibility to communicate selectively with individual schools or groups of schools.

Remote control switching: Cable systems, by having appropriate arrangements with a local or distant broadcast station, can provide remote manual or automatic control of non-duplication switchers. Since the broadcast station is manned during programming hours, schedule changes can easily be accommodated.

Remote control of video input switching of intercity microwave systems can be handled with a high degree of reliability with vertical interval signals. Control can be either from the origination point or from the destination—assuming the destination is a TV station whose signal can be picked up at the switching site. Similarly, ETV systems

can route their programming through remote switching sites.

One of the most important potential applications of vertical interval control is in accessing remotely located video recorders. Typically, an ETV network or system would be able to multiply its capacity without expanding distribution facilities simply by transmitting prerecorded programming during otherwise dark periods. Recorders located at individual schools would be preloaded each evening. A vertical interval code would selectively start and stop the machines at the appropriate times. The system could be further sophisticated by encoding the vertical interval identification at the point-of-origin of the lesson material.

Another application involving remote VTRs is distribution of CATV "software." Cable systems receiving service from regional microwave systems could record feature films and other program material at night, using the same microwave facilities that are used for daytime carriage of regular programs. Where available facilities permitted, this would solve two of the most vexing problems in CATV program distribution—dubbing and bicycling.

Remote control of metering and logging: Remote supervisory control of transmitter adjustments using vertical interval signals transmitted over the station's regular STL facilities is possible. Remote metering can be handled by digitally-encoded vertical interval signals sent by the transmitter itself. Meter readout at the studio would require a character generator and TV monitor. More sophisticated systems could provide for go/no-go limits of readings with any out-of-limits reading encoded to "blink," thus attracting the operator's attention. Automatic logging at the studio location could also be possible with the digital signals transmitted. Major benefits are reliability, reduced cost and spectrum space conservation.

Insertion of test signals: Vertical interval equipment can be used to gate in test signals at the point-of-origin of a microwave or other distribution facility. A typical application would be where a multi-channel, multi-hop microwave system uses electronic sequential programming (such as the one recently introduced by TeleMation) to insert various test signals sequencing between generators and microwave channels. In this application, test equipment is synchronously driven from pulses stripped from the video source to which the vertical interval signals are added. With this technique, microwave system performance can be critically evaluated for each channel at each hop during regular program hours. Since the test signals originate at the microwave headend, they don't suffer from prior degradation on telco or other network loops.

A simple expansion of the microwave test signal system would include fault alarm codes as one of the sequential signals. All of the usual system alarm functions could be handled with the data capacity of a one-line encoding system. Readout would be via a fail-safe panel alarm which would provide a continuous fault indication until corrected.

Other possibilities: TV stations can be maintained in perfect time synchronization with VITS codes distributed from a network source. Each station would use an electronic clock system controlled by a crystal oscillator. The local system would be reset periodically by the network source which could be referenced to a primary time standard.

ETV systems with origination points on various campuses can simply and inexpensively establish two-way communications with a central computer facility. Since the TeleMation character generation equipment uses standard USASCII code, interfacing with computer becomes simple.

The data transmission capability of the VITS system permits economical distribution of regional weather and news information. Because of the selective address feature, localized forecasting and local sponsor identification is displayed automatically over participating cable systems. Similarly, radio and TV stations can receive localized forecasts from a centralized meteorological facility.

The vertical interval system's ability to transmit analog as well as digital information lets it transmit news slides and weather maps in addition to the normal alphanumeric codes. This is easily handled by a TV camera or scanner at the origination point synchronized to operate at a one-line per field "slip" rate. A complete frame can thus be transmitted in about 8½ seconds. The signal after transmission is recorded in proper sequence on a magnetic disc recorder.

Color pictures can be transmitted without degradation by sequentially scanning the three chrominance channels and recording each on a separate track of a three-channel disc recorder. NTSC color for transmission is then obtained by simulataneous playback of all three channels through a color encoder.

The principal equipment item needed is the encoder/decoder. The device selects any one of eight lines in the vertical interval of a video signal "looped" through the input. In the "encode" module, information is added to the selected line. A built-in clock source permits the data to be transferred from the input storage device in sync to the "decode" clock at the receiving end. The encoder/decoder module provides both a one-line gate pulse and a 48-bit clock pulse train at 75-ohm outputs. The encoder/decoder is a passive device as far as the video signal is concerned. It therefore introduces no distortion or reliability problems.

Test signal generators, which have all presently used signals as outputs are being developed to operate during one line of the vertical interval.

Available now is a sequential programmer and switch which sequentially select video from up to five different sources. Other available devices interface news wire and Teletype machines to encoders. **BM/E**

The switch-hitters

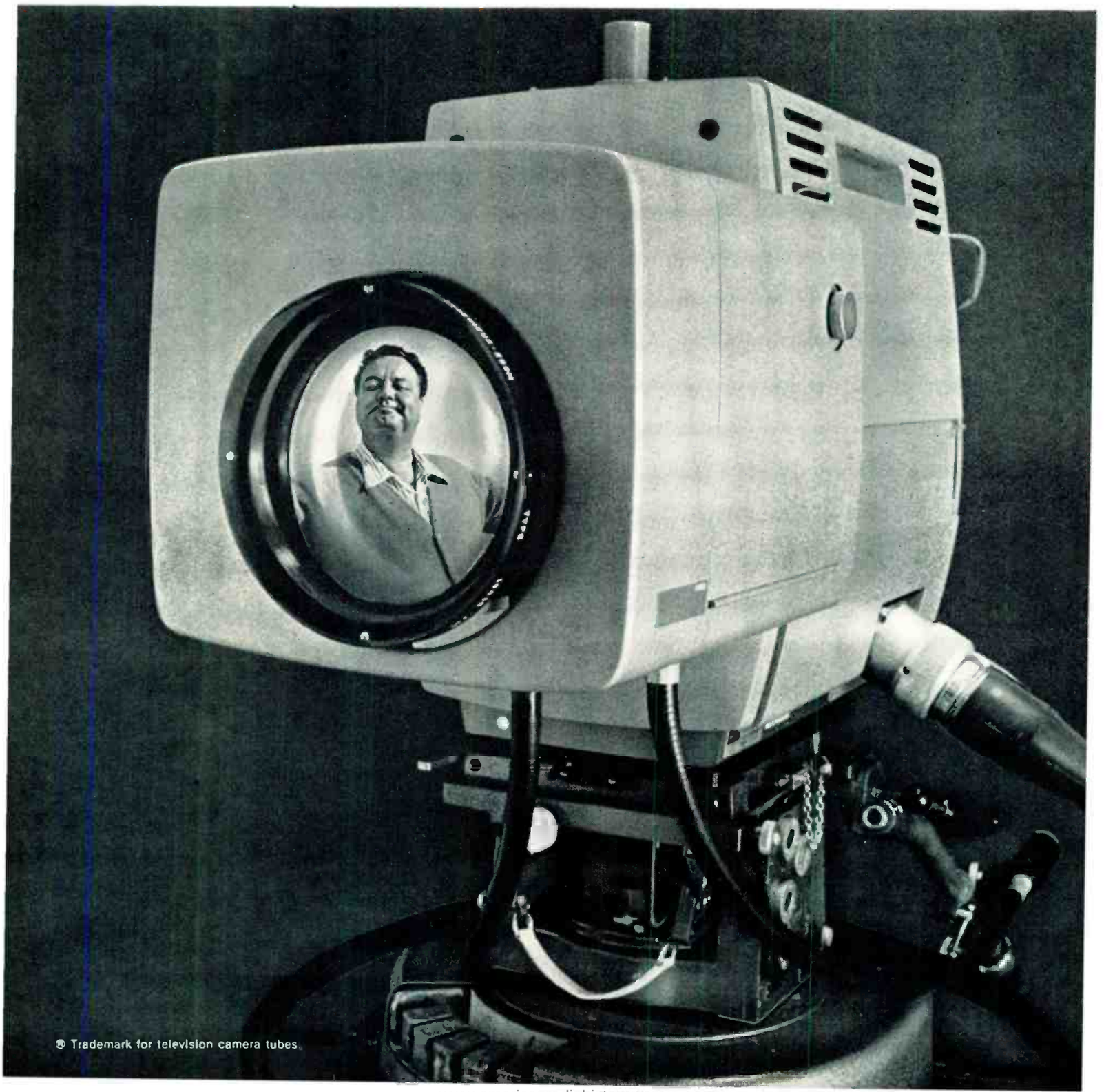
THE PHILIPS PC-70 ... the prime time king of color cameras ... serves on more live and taped studio color shows, by far, than any other camera.

And it's a fantastic switch-hitter. If the PC-70 is a winner in studio work, in the field it's no contest. For major outdoor news and sports events, the PC-70 consistently takes the most valuable player award.

Why? Its unsurpassed color picture, faithful and sharp. There are over 700 Philips 3-Plumbicon® cameras in use worldwide. A videoman's dream. The cameraman's camera. Management's assurance of the best, most reliable, and most economical performance.

When a better camera is built, Philips will build it.* In the meantime, the PC-70 is the ticket.

*The Philips PC-100, announced at NAB '69, will be available early in 1970.



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THE PHILIPS PCP-90 digitally controlled "Minicam" takes the field alongside the PC-70 as the most mobile and versatile of portables. Operating wireless or on small, cost-reducing triax, the 3-Plumbicon Minicam brings total flexibility to broadcast-quality telecasting.

The PCP-90 is designed basically as a field camera. Controls may be beamed from as far away as 30 miles. Signal processing is done in the backpack. The Minicam produces a real-time color-composite signal for direct broadcast. Or it can go into the field with a portable recorder to tape interviews or other action—totally unencumbered.

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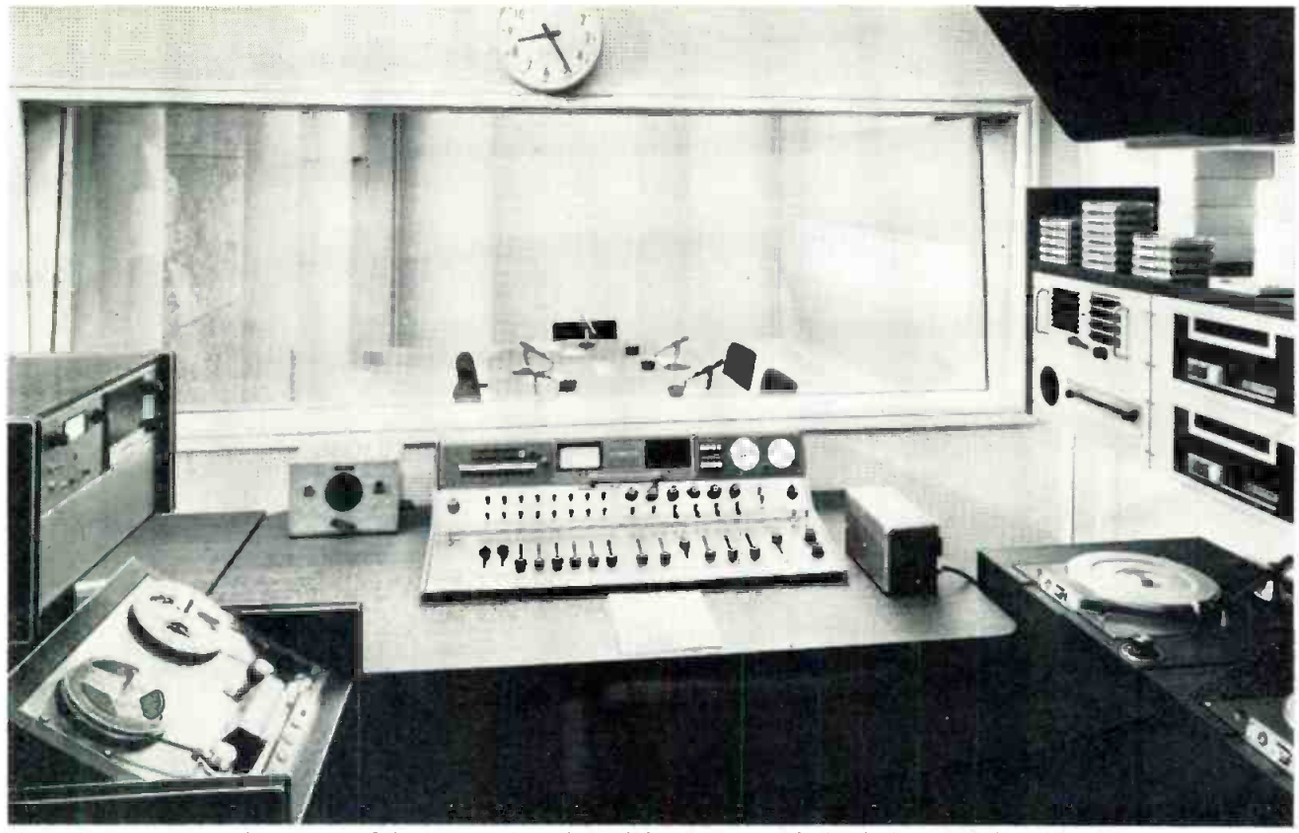
A NORTH AMERICAN PHILIPS COMPANY



This radio control room has a state-of-the-art console with 15 slide-wire pots, inbuilt clock, and dial-remote system.

WHAS: Neo-Classical Gas

Part radio, television, art gallery, America and Greece. That's what the $5.5 million, Louisville home of WHAS is made of. As if these ingredients weren't enough to assure at least an interesting communications set-up, someone went and plopped ginkgo bilobas around the neo-classical edifice. Lots of luck.

WHAS' TWO-STORY broadcast facility started happening in 1965. It began with excavating enough dirt to cover 18.36 acres; then enough concrete was poured to pave a sidewalk six feet wide and 20 miles long. On May 13, 1968 (and 346.5 miles of cable and wire later), WHAS radio and Television began operations from its $5.5 million, neo-classical structure that architects have called "one of the five best" buildings in Louisville. We'd like to see the other four.

The exterior is a combination of two-story-high windows recessed behind modern classical columns and a white quartz and blue-green aggregate facing. Lining three sides of the building are five ginkgo trees—prehistoric conifers known as "good luck trees"—and 15 London Plane trees.

Lobby is an Art Gallery

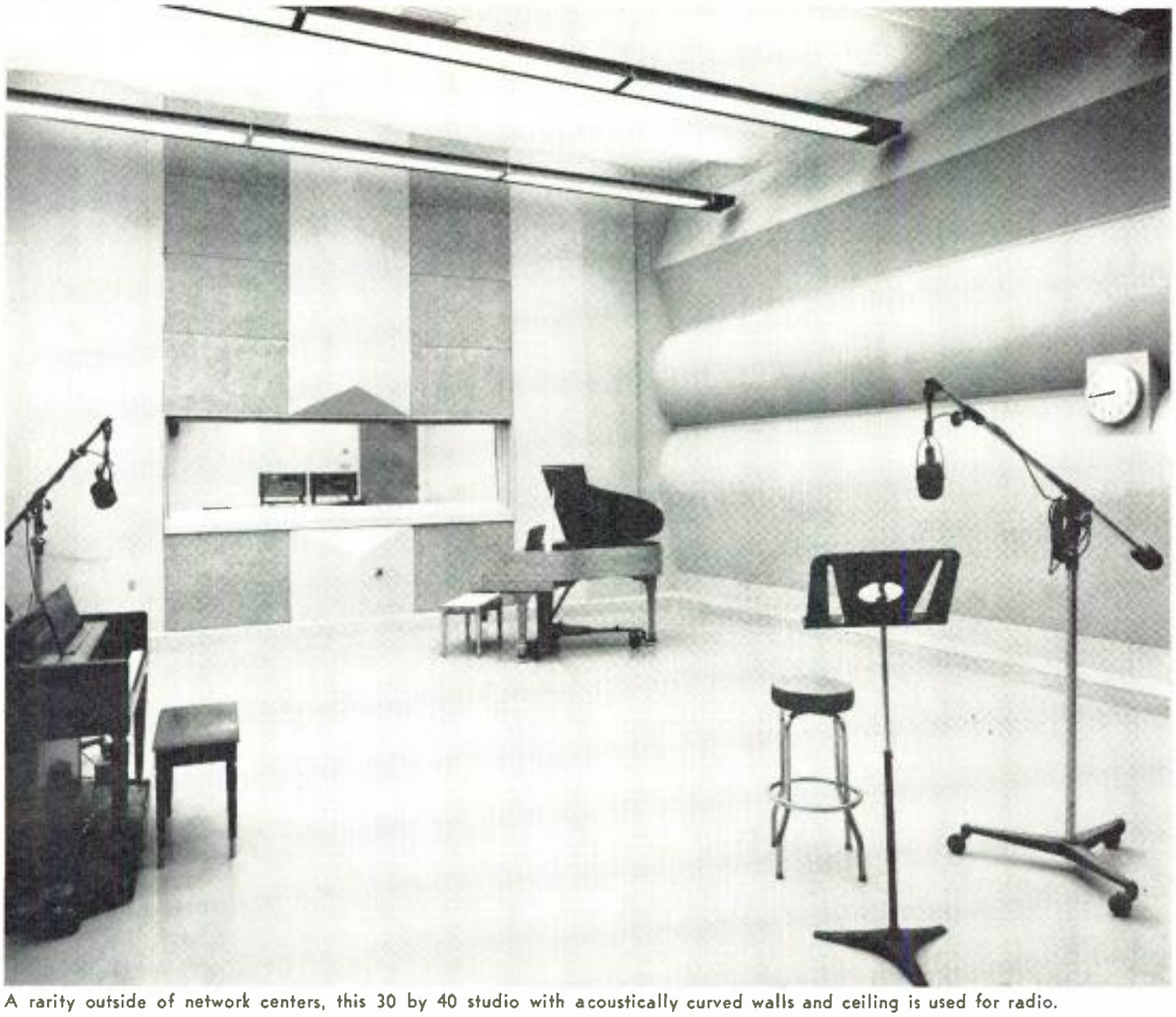
The 44 × 48 ft lobby doesn't exactly communicate "broadcasting" to the visitor. That figures, because it's an art gallery. Featuring monthly exhibitions by Kentucky and southern Indiana artists, the WHAS Gallery fancies everything from wildlife paintings to abstract sculpture.

Soon after its opening in June, 1968, the Gallery acquired a bronze fountain designed by locally well-known Kentucky artist Barney Bright. Standing three ft high and 4 ft, 4 in. wide, the fountain manages to hold up under the flow of 90 gallons of water a minute; the pool around the base usually contains about 100 gallons of water and three coins. Large windows at the rear throw open to public view the radio master control room and transcription room; other first-floor rooms include office for radio personnel, news, sports and farm departments.

Besides the more than 100 offices and utility rooms, the WHAS building houses 10 "floating" studios—twin 60 × 40 ft television studios and eight radio studios ranging from 30 × 40 to 10 × 10 ft. In all studios, the poured concrete walls are finished with a coat of plaster, ⅛-inch felt and sound insulation; all points of contact are isolated with felt to reduce vibration influences.

In the television studios on the second floor, wood displays disperse the sound into panels of Tectum—wood fiber material manufactured by National Gypsum Company. WHAS uses 24,000 square feet of the stuff in three-inch thickness on the walls and ceilings to prevent abrasion and impact damage. Each studio has a sound lock; TV studio main doors, for instance, are 10 ft wide, 12 ft, 4 in. high and four ft thick. One door is four ft wide and weighs 400 lb; the other is six ft wide and weighs 600 lb.

Both television studios have provisions for 24 microphones and 78 inputs for videotapes, the network remotes (WHAS is a CBS affiliate) and the like. Studio lights are controlled by a 250-kW, 60-position solid-state dimmer. Usually on the



A rarity outside of network centers, this 30 by 40 studio with acoustically curved walls and ceiling is used for radio.

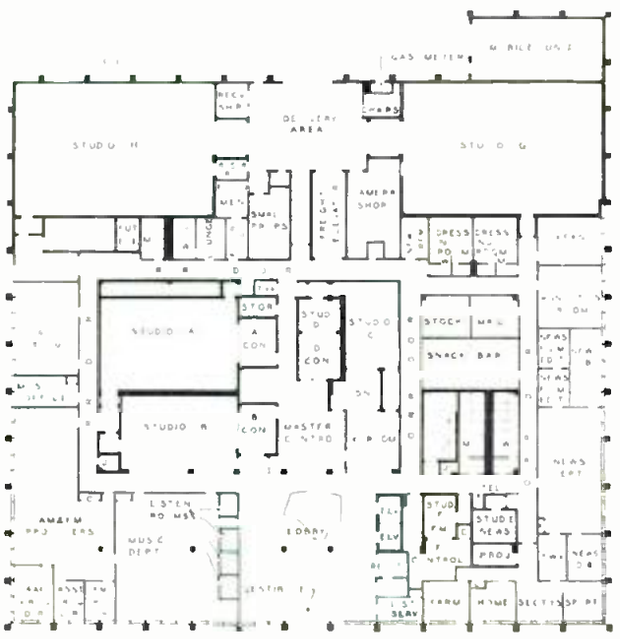
scene are six new G.E. color TV cameras and three film color cameras with six projectors.

Of the radio studios, the largest accommodates 16 mikes, six-channel tape bank and has inputs for cart tapes, reel tapes, discs, etc. Each studio can handle its own shows; three of the stereo consoles available to WHAS-FM are in the largest radio studio. The smallest studio, across the hall, is used exclusively for news. But don't judge performance by the size of the news facility: nearly 500,000 ft of film are shot each year—all in color—and are developed in the processing room below the newsroom.

Interior decorating covers lots of territory: 29,500 square feet of studio and shop are topped with vinyl tile. Only the offices are carpeted. The building's 11,000 square feet of window space is framed by 1222 square yards of drapery. WHAS required 119 tons of galvanized iron for its air-conditioning ducts, and the system capacity could heat or cool 150 three-bedroom homes. Other WHAS features include a freight elevator big enough to carry a mobile home, transistorized clocks, emergency power system, a sound-proof boiler room, a full-sized basement housing shop and storage areas, and the film archives.

WHAS isn't loath to mention that in 1950 it became the first television facility in Kentucky to offer an hour-long, locally-originated newscast—covering City Hall, county courthouses and state legislative events. WHAS has covered national political conventions since 1948, as well.

Any pennies tossed into the fountain contribute to the station's annual Crusade for Children, which raises money for mentally and physically handicapped youngsters in the area. But don't be surprised if the building seems more than two stories high; it was built with additions in mind—with the luck of the ginkgo biloba. **BM/E**



First floor studio complex. Offices are upstairs.

ENGINEERING
CASEBOOK

Simple Proof-of-Performance Tests for Station Quality Control

By Carl E. Roliff

WHY IS IT that a radio station can have excellent proof-of-performance measurements and still sound so terrible? The fact is that the measurements taken did not measure what you're listening to.

In making proof-of-performance measurements, an audio signal is injected at the announce microphone input terminals. Measurements of frequency response, noise and distortion are made at the output terminals of the station modulation monitors. Trouble here is that the announce microphone in most radio stations is used less than five percent of the total air time. The other 95 percent of the time the station will be airing records, cartridges or tapes. A sad truism is that most phono preamps in broadcast use simply are not properly equalized and have excessive hum and distortion.

When was the last time a good RIAA test record was run on your turntables? Six months ago? A year ago? If you're really interested in your station's sound, you'll run a proof-of-performance on your turntables and tape equipment, and do it often enough to maintain good broadcast standards.

Penny Pinching

A recent publication carried an advertisement for a broadcast phono preamplifier with published signal-to-noise specifications of 45 dB. Elsewhere in the same publication, another phono preamp had signal-to-noise specs of 65 dB. The price tag for this one was slightly higher. A low price tag unfortunately appeals to many station owners—people who should be stepping up their responsibility as broadcasters and should be bending every effort to provide the listener with good quality sound.

But the problem doesn't end there. A station may put in good preamp, tone arms and phono cartridges. Before the day is over, that brand-new stylus is bent, crooked as a dog's hind leg, and the operator *doesn't even hear* the difference in sound. What's the problem? Too many station monitors that consist of $2.98 speakers in 12-inch paging type wall baffles driven by small monitor amplifier, where the tubes had not been checked or changed in five years.

The same situation is true for tape and cartridge machines. The attitude seems to be as long as it produces sound, don't bother to clean or service any piece of equipment. Such an attitude is a disgrace to the broadcasting profession.

Today, the various kits available and most home radio equipment all have excellent frequency response and very low distortion. Yet most broadcasters are still back in the 40's when it comes to the sound quality that they broadcast. The same is true for many fm and fm-stereo broadcasters. The overall broadcast sound quality astonishingly does not equal the quality of the receivers in the listeners' homes.

One station manager complained recently that he had just bought all new equipment and his competitor still sounded so much better. His problem was obvious at a glance: The VU meter seldom came off the pin. Spots on cartridges were overcut and distorted. This is a situation where perhaps a hatchet held over the operator's head is the only thing that will work.

We've also heard several supposedly good engineers say, "I don't care how it measures, as long as it sounds good to me . . ." Nonsense! I have never yet had any broadcast equipment measure good and then sound bad, and I have never had any equipment measure bad and sound good. The performance specifications of all broadcast equipment can be measured, and the equipment restored to original specifications and performance.

How Much Profit?

Is an overall proof from the turntable or tape equipment through the console and transmitter necessary? No! An individual check or proof-of-performance on each item of equipment is all that's necessary. A good tape machine meeting specifications connected properly to a good audio console will provide excellent sound—provided the equipment is operated within a normal range on the VU meters.

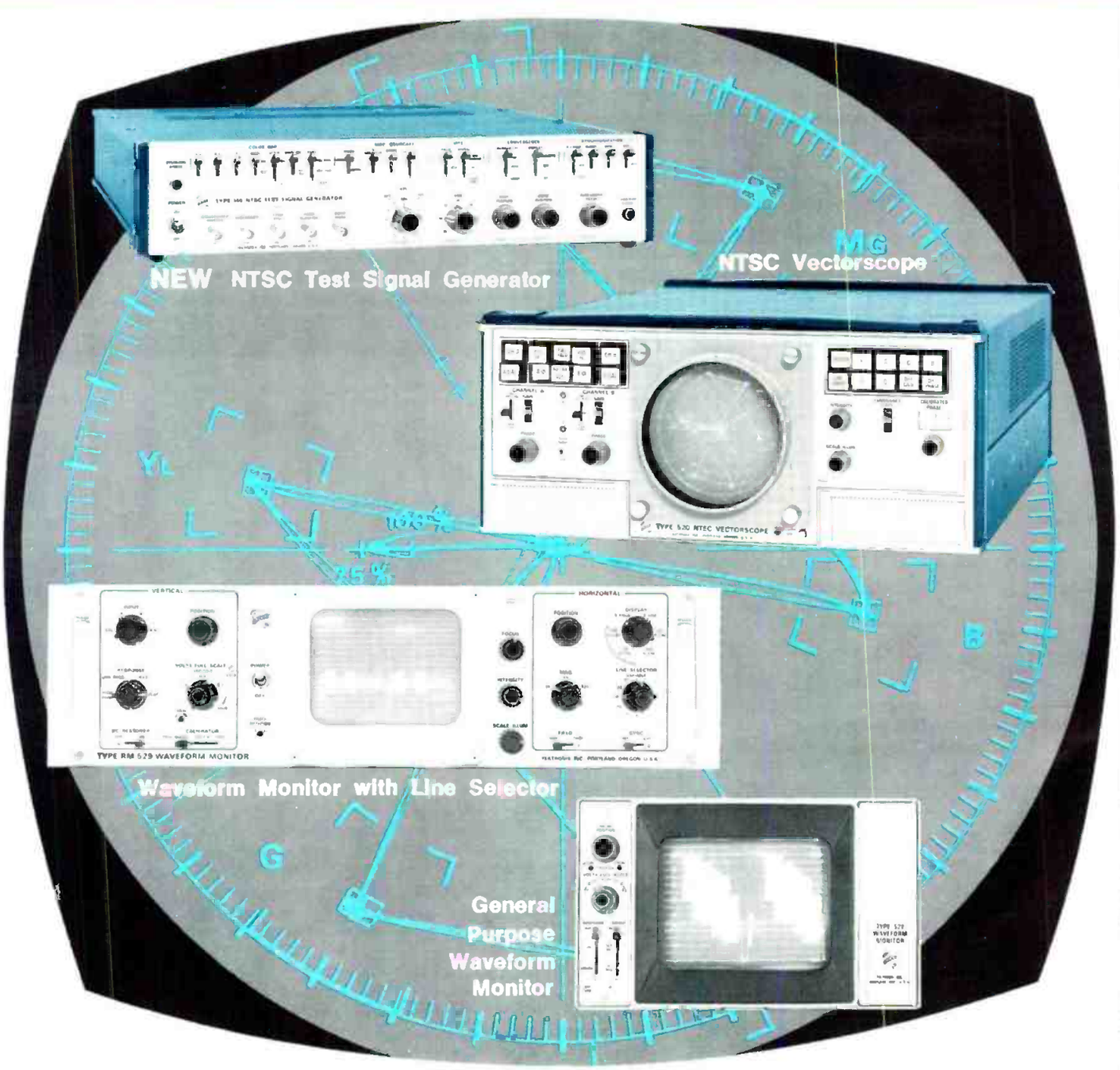
How often should a proof be conducted on tape or phono equipment? For tube equipment, at least once a year. Some professional studios make checks once a month.

Continued on page 86

Carl Roliff is general manager of station KSRN-FM, Reno, Nevada.

product report
television instruments

Total Measurement Capability for NTSC Systems



■ With the introduction of the NEW TYPE 140 NTSC Test Signal Generator, Tektronix now provides measurement capability from signal source to waveform display. ■ Each instrument in the Tektronix television family is designed to satisfy a specific portion of your video measurement requirement — with performance to spare! ■ All of these units provide long-term stability and reliable performance through use of solid-state circuitry and state-of-the-art engineering techniques. ■ Mechanical configurations include rack-mount, cabinet and portable units.

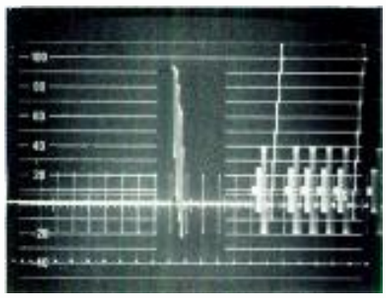
please turn page for additional information

MAKING THE MEASUREMENT

A complete family of television test instruments from Tektronix.

THE TYPE 140 NTSC TEST SIGNAL GENERATOR is a compact, solid-state source of high-quality television test signals for 525-line, 60-cycle field NTSC color TV systems. Combined in one compact unit are: ■ NTSC ENCODED COLOR BARS with 75% and 100% amplitude, full-field or split-field bars at 10%, 7 1/2% or 0% setup level. ■ MODULATED STAIRCASE providing variable APL, 10% to 90% and fixed APL, 50%. The test signal contains 5 steps plus blanking level with subcarrier phase locked to burst. A new signal capability provides a means to check luminance signal distortion caused by rectification of the subcarrier signal. ■ CONVERGENCE CROSSHATCH provided for picture monitor linearity evaluation in accord with IRE specification 54 IRE 23.S1 and color picture monitor convergence adjustment. ■ VERTICAL INTERVAL TEST SIGNALS, staircase or color bars can be applied to lines 15 through 21 of either or both fields. ■ EIA COLOR STANDARD AND SYNC GENERATOR include a temperature controlled color standard with excellent frequency stability. Digital integrated circuits are extensively used to achieve stability, accuracy, and reliability. Outputs are provided of subcarrier frequency, composite sync and blanking, vertical and horizontal drive, burst, composite video and the convergence pattern signal.

140 NTSC Test Signal Generator $1800
R140 NTSC Test Signal Generator (includes rackmounting hardware) $1800



Color bars inserted during vertical interval. The full field signal is a modulated staircase, variable APL, 90% modulated subcarrier inserted.

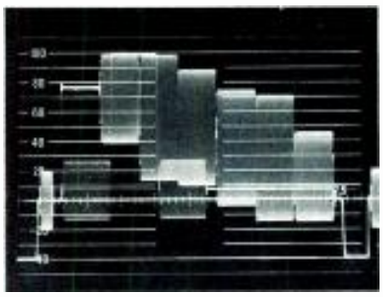
THE TYPE 529 AND RM529 WAVEFORM MONITORS are general-purpose video monitors with VITS measurement capability. ■ Vertical response characteristics are HIGH-PASS, LOW-PASS, IEEE and FLAT (8 MHz). Vertical sensitivity range is 0.12 V to 1.5 V for full-scale deflection. Full-scale calibration at 0.714 V or 1.00 V is provided. ■ A VIDEO-OUTPUT AMPLIFIER supplies video and a brightening pulse to a picture monitor, intensifying the same line(s) displayed on the instrument when using the LINE SELECTOR. ■ DC RESTORATION maintains the back porch at a constant level and may be turned off for viewing other than video signals. The circuit can easily be modified for sync-tip restoration. ■ HORIZONTAL SELECTION provides 2-field or 2-line displays, plus calibrated sweep rates of 0.125 H/cm or 0.25 H/cm. Either calibrated rate may be delayed for line selection. SWEEP MAGNIFICATION extends the sweep rate by X5 or X25. POSITIVE FIELD SELECTION in the LINE SELECTOR mode permits detailed study of any desired line(s), and a front-panel switch selects line 16 through 21 for viewing VIT signals.

Type 529 Waveform Monitor $1200
Type RM529 Waveform Monitor . $1250

Type 520 Vector Display of VITS color bars conforms to EIA Spec. RS189. Signal Source — Type 140 NTSC Test Signal Generator.

THE ALL SOLID-STATE TEKTRONIX TYPE 520 VECTORSCOPE is designed to measure luminance, hue and saturation of the NTSC composite color television signal. ■ PUSHBUTTON SWITCHES permit rapid selection of displays for quick analysis of VIDEO signal characteristics. ■ DUAL INPUTS provide time-shared displays for comparison of input-output signal phase and gain distortion. ■ A CHROMINANCE CHANNEL demodulates the chrominance signal for use in VECTOR, LINE SWEEP, R, G, B, I, Q, Differential Gain (dA) and Differential Phase (dϕ) displays. ■ A LUMINANCE CHANNEL separates and displays the luminance (Y) component of the composite color signal. The Y component is combined with the output of the chrominance demodulators for R, G, and B displays at a line rate. ■ A DIGITAL LINE SELECTOR permits positive selection of Vertical Interval Test Signals from lines 7 through 22 of either field.

Type 520 NTSC Vectorscope ... $2150
Rackmount Type R520 ..... $2175



Type 528 Waveform Monitor Display of split-field color bars per EIA Spec. RS189. Signal source — Type 140 NTSC Test Signal Generator.

THE TYPE 528 SOLID-STATE WAVEFORM MONITOR is ideally suited for monitoring waveforms from camera outputs, system output lines, transmitter input lines, closed-circuit and educational TV systems. ■ This COMPACT INSTRUMENT requires only 5 1/4-inches x 8 1/2-inches mounting space. ■ Either of TWO VIDEO INPUTS may be viewed on the 8 x 10-cm screen. The signal being displayed is provided at the rear-panel connector for viewing on a picture monitor. ■ Calibrated 1 V and 4 V full-scale deflection factors provide convenient displays of typical video and sync signal levels. A variable control provides uncalibrated full-scale deflection factors from 0.25 V to 4.0 V. FLAT, IRE, CHROMA, and DIFF GAIN vertical amplifier response positions permit rapid measurement of waveform characteristics. ■ A SLOW-ACTING DC RESTORER maintains a constant back porch level despite changes in signal amplitude, APL, or color burst, and may be turned off when not needed. ■ Sweep modes are: 2-V SWEEP (two field), 2-V MAG-SWEEP (expanded two field), 2-H SWEEP (two line), and 1-μs/div SWEEP (calibrated sweep with accuracy within 3%). Internal or external sync is selectable. ■ Provision is made for YRGB and RGB displays. ■ This lightweight waveform monitor converts to a portable unit for field service by adding an optional protective cabinet. An optional Rack Adapter permits side-by-side mounting of two Type 528's.

Type 528 Waveform Monitor $890

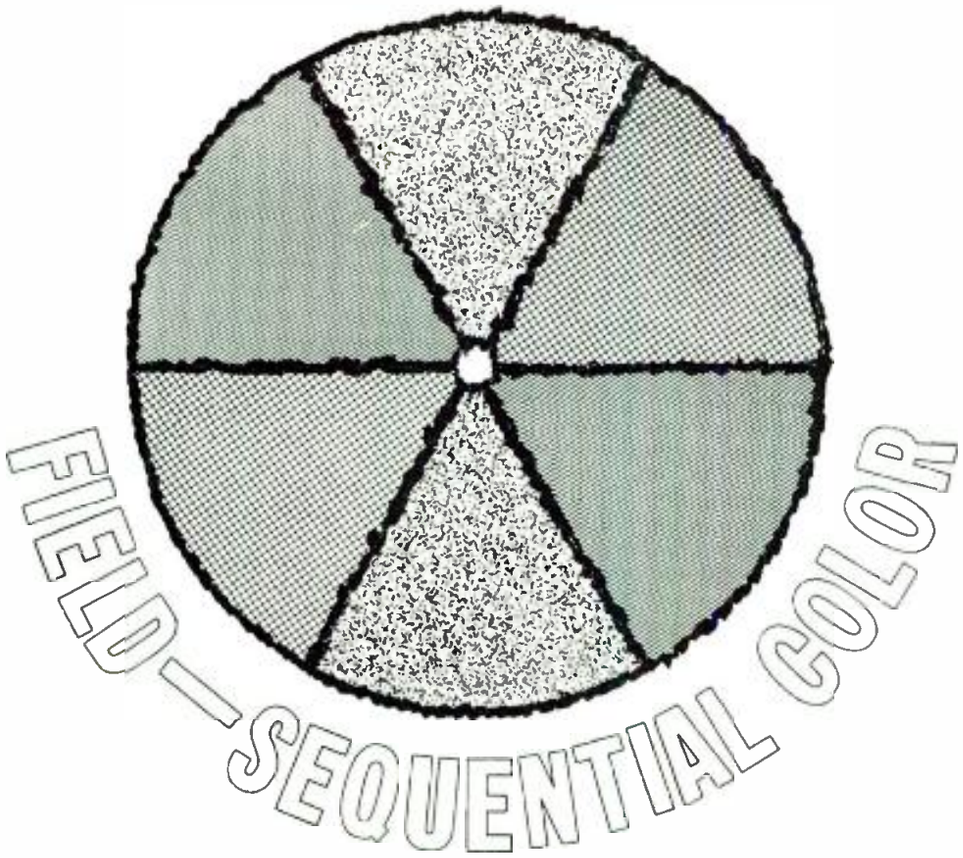
For a demonstration call your local Tektronix field engineer or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

U.S. Sales Prices FOB Beaverton, Oregon

Tektronix, Inc.

committed to progress in waveform measurement

TEKTRONIX PRODUCT REPORT — TELEVISION INSTRUMENTS



REINCARNATED

It's been around since 1940, this CBS color TV system. Now the sometimes-forgotten color system is making news with its spectacular color transmissions from outer space; it's making medical history and may soon be in the hands of every TV newsman in the country.

THE LATEST "breakthrough" in color TV transmission is a camera system that was first publicly demonstrated 29 years ago. The minuscule field-sequential color camera, carried into deep space by both Apollo 10 and 11 and due to touch down on the moon's surface with Apollo 12, is a direct descendent of the field-sequential camera developed in 1940 by CBS Lab's Dr. Peter Goldmark. Used as a program source for experimental TV station W2XAB, America's first successful colorcast was beamed over New York City from the top of the Chrysler Building.

A decade later, CBS got the nod from the FCC to begin colorcasting with its field-sequential camera. In the meantime, RCA was busily readying its all-electronic color transmission system which was ultimately adopted by the FCC, supplanting the field-sequential technique. The RCA or NTSC system was chosen mainly because it is compatible for both color and monochrome reception. Also, screen size isn't limited by the physical size of a spinning disc.

But the CBS system, even though it was rejected by FCC reversal in 1953, it never gave up the ghost. The Labs kept it alive and refined it to the point where cameras were small and light enough to mount in otherwise inaccessible hospital operating and examining rooms. The medical version of this camera, with its extreme light sensitivity (it actually shows good color rendering in deep shadows), has become an important tool for diagnosis and instruction.

System Conversion

A major technological advance was scored when CBS developed a conversion system so that field-sequential programs could be viewed on NTSC receivers. This technique was adapted for use in the Apollo 10 flight (see July, 1969 *BM/E*, pages 35-37) along with some other video legerdemain needed because of the spacecraft's high velocity.

The tiny camera, made by Westinghouse to CBS specs, was also lofted to the moon aboard Apollo 11. It couldn't be used on the moon's

surface, since an environment-proof case wasn't ready in time. Here was an instance of a camera working so far beyond expectations, that no one thought to get a vacuum box ready for it. But chances are, Apollo 12 will be completely outfitted for live color TV from the moon.

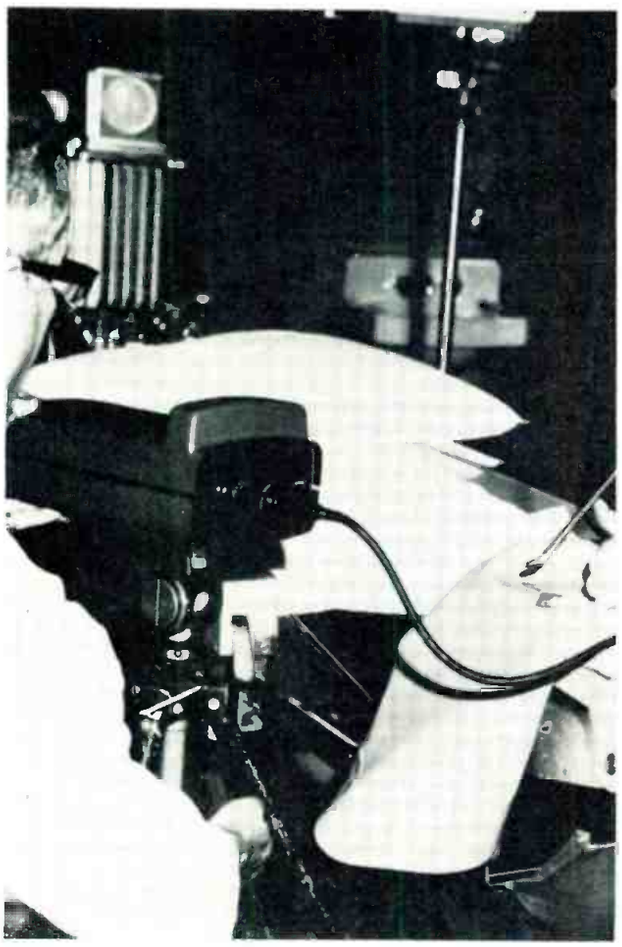
One of the keys to the success of this camera is its extremely small size, weight and simplicity of operation. True, the conversion equipment needed to provide NTSC output is still a little hairy. But in future versions this gear could easily be housed in a mobile van while roving newsmen cover important events and news live with a six-pound color camera. The 1940 version of this camera weighed more than 100 pounds and is now enshrined at the Smithsonian Institution.

This, then may be the next giant step for the field-sequential camera—news and special events coverage in the field. The tiny camera may also hold the key to low-cost, flexible color systems for educational television, once the conversion equipment is standardized and produced.

The converter used at NASA's Houston Space Center was built by NASA to CBS specifications, almost at the last possible moment. Presumably, the CBS-built converter, if and when available, will provide even better performance. A single CBS converter will be capable of handling two or three cameras simultaneously.

In its medical version, a single non-NTSC system, using one camera, a CCU and spinning-disc monitor, is priced at about $25,000. Medical systems using a converter and NTSC monitors will no doubt be next on the agenda. No timetable has been set for converter manufacture, possibly because its patent is still pending. Medical camera size is 12 x 6 x 6 inches without lens.

In any event, the first TV camera on the moon's surface sending back color pictures will be a field-sequential system—a color system that was invented before some of the NASA technicians were born! **BM/E**



Medical version of CBS camera (above) is used with bioscope probe of fiber optic material, can be used in extremely low light level situations. Tiny field-sequential camera is examined by its inventor, Dr. Peter Goldmark (right), president of CBS Laboratories, and Renville McMann, vice president for engineering.

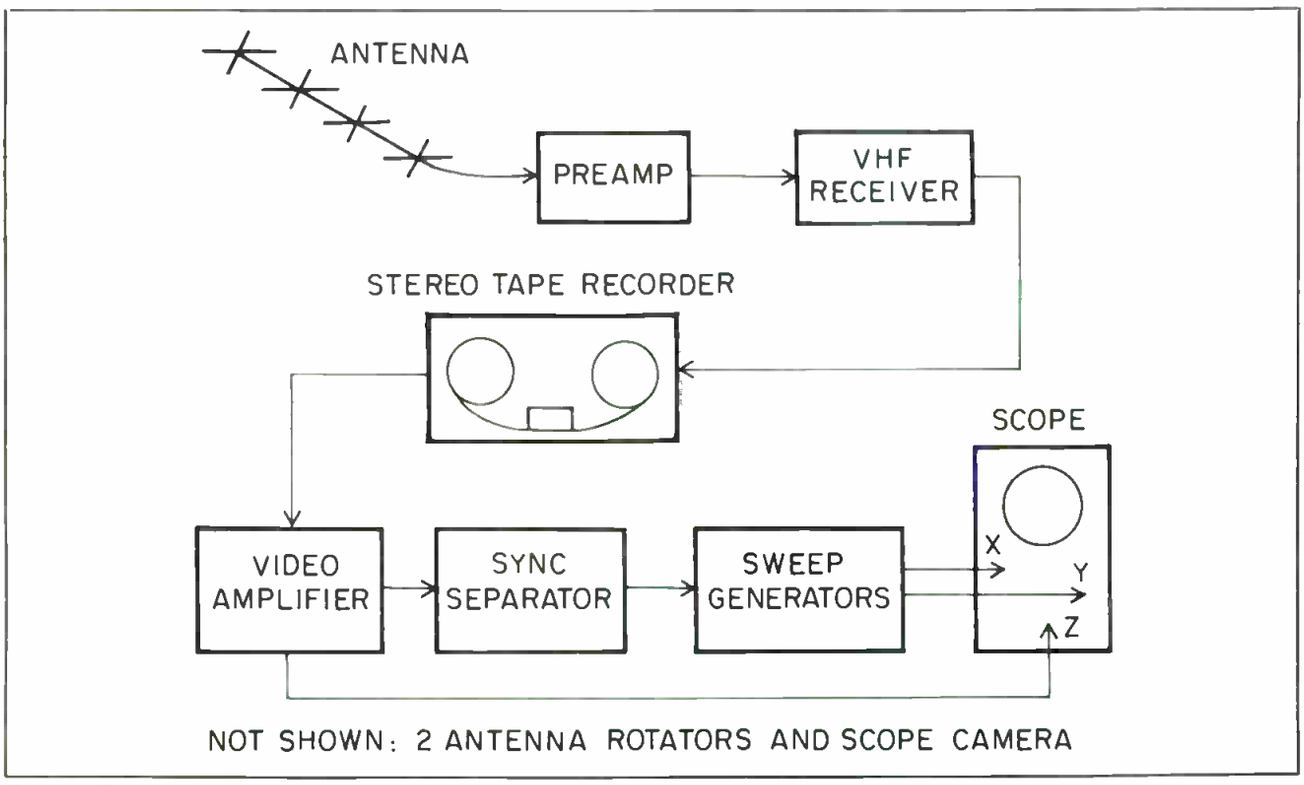


Figure 1. This is equipment needed to receive and process weather picture signals from orbiting satellites.

Do-it-yourself Weather Satellite Photos

Here's how independent stations can copy their own weather pictures from space.

FOR A TOTAL cost of $500 to $5000 (depending on whether you build or buy) your station can get free daily cloud cover pictures from ESSA and Nimbus weather satellites equipped with APT (Automatic Picture Transmission). Each satellite carries an earth-scanning 800-line vidicon camera, transmitting slow-scan high-resolution pictures at about 136 MHz. A picture is complete in about 200 seconds, and covers an earth area of 1200-1700 square miles. Transmissions are continuous and about five good pictures are obtainable from each satellite pass.

Receiving Equipment

Figure 1 shows the basic equipment required to pick up the weather photos. The antenna must have 9 to 11 dB gain at 136 MHz, 45° beamwidth, and circular polarization. Since the antenna must track the satellite both horizontally and vertically, two heavy-duty rotators are needed.

The satellite transmitters put out only 5 watts, so an antenna preamplifier is a must.

You will need a narrow-band telemetry receiver which should be crystal-controlled and switchable between the four frequencies used: 135.6, 136.95, 137.5 and 137.62 MHz. The receiver should have afc, age, and a tuning meter to aid in antenna tracking.

It is possible to use the received video information directly, but much safer to tape it for reference. Use a stereo (two-channel) tape recorder, one track for the slow-scan narrow-band video, the other for the aural cue from the satellites—a 300-Hz pulse is transmitted between pictures.

The video and sync circuits are not available commercially and must be built. However, they are not complex.

The oscilloscope must have a flat-face, short-persistence crt. P11 phosphor is ideal. It should have identical X and Y amplifiers and a Z-axis input for the video.

It is preferable to use a scope camera, bezel-mounted in front of the crt face. But other types of camera will do in many instances. Polaroid film is best as you get instant prints.

More Information

Detailed instructions on building the equipment, setting up the station, and copying the pictures are found in a 98-page NASA booklet: "Weather Satellite Picture Receiving Stations" (NASA SP-5080). It's available for $3.00 from Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151. **BM/E**

3M HAS FORTY-FIVE MAJOR
THESE ARE SOME

EBR-100 Electron Beam Recorder Now you can transfer live or tape TV to 16mm film electronically and get prints with 1000-line resolution. This is the first system to produce monochrome film copies comparable to the original live or video tape original. It has no optical components. Direct electron bombardment transfers image to film without faceplate halation or camera-lens light losses. Uses low-cost, fine grain film that can be projected after processing on any 16mm projector. Far superior to kinescope techniques. Opens new horizons for mass distribution of TV training and educational footage. Write for brochure.

Dropout Compensator (DOC) for Color Video This is where hi-band color dropouts get turned off, and clarity and sparkle restored to damaged tape content. The 3M Brand DOC detects the dropouts as they occur, replaces the "lost" signal with stored information from the previous scan line of the same field. Provides precise color match and complete freedom from switching transients. Disturbance to time correction unit is eliminated. Proc amp and servo stability allow tape to play in full intersync or pixloc mode. Write for booklet.

Dropout Profile Recorder (DPR) for Color Video RIGHT: The logical companion to the DOC (above). The 3M Brand DPR produces a permanent strip chart showing the dropout rate and dropout annoyance factor during normal on-line video tape playback. It performs this evaluation electronically while the 3M DOC is compensating the dropouts. The DPR indicates when a tape is too degraded to commit to valuable programming. Five inches of chart reads one hour. Chart can be torn off and stored with video tape. Write for brochure.

PRODUCT LINES ON THE WING. OF OUR VIDEO PRODUCTS.

The Mincom Division of 3M is deeply involved in sophisticated hardware like telemetry recorders and digital test systems. The same 3M technology and research brings you these four video products. Each pioneers new levels of performance. If you are interested in one or all, call our Video Products Information Phone at (805) 482-1911, Ext. 216, or write for brochures.

Color Video Encoder Has two unique features not obtainable elsewhere: 1) The color bar generator is completely (not partially) digital. When you get a reading you know it is accurate—needs no adjustments. Simpler to use and maintain than analog encoders. 2) Input clamping of video signals eliminates low frequency hum, noise and other unwanted effects on the matrix. *Works with smaller, less expensive cameras as well as large ones.* Give it the SMPTE color test and see the proof. The 3M Brand Color Encoder meets all FCC and EIA specs. Has monochrome switching. Meets or beats anything on the market, yet costs less. Write for a brochure.

THERE'S MORE COMING!
Watch our advertisements for announcements of new video products.

Mincom Division 3M COMPANY
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Circle 118 on Reader Service Card

Antenna/Transmitter

A-m stations that switch antenna patterns and transmitters during the operating day all too often use horse-and-buggy era controls. Today's sophisticated needs demand a foolproof system that won't cause off air time or disruptive arcovers.

FROM THE EARLIEST DAYS of directional a-m antennas, switching antennas and transmitters to change patterns and modes of operation has been needed. At first, simple spring-loaded pushbuttons were used. The operator would remove the transmitter carrier, then push and hold the switches until the relays or contactors had switched. Sometimes pilot lights were added to tell the operator that all contactors had transferred positions.

Today, many stations use remote control, several patterns and/or powers, and auxiliary or alternate main transmitters. In addition, automation is coming into widespread use. All these conditions require more sophisticated control-circuit designs.

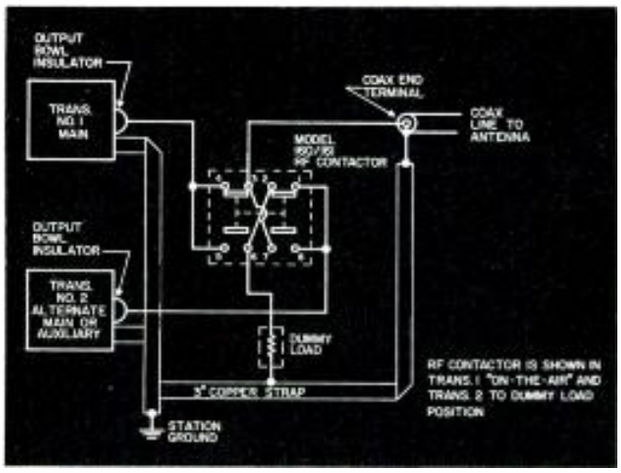


Figure 1. Basic two-transmitter switching arrangement drives antenna and dummy load (which could be a second antenna).

Switching Categories

Omitting stations that have just a single transmitter and a single pattern, a-m stations can be classified according to the complexity of their switching requirements:

- Two-mode systems:

A. Two transmitters (main and alternate main, or main and auxiliary, or day main and night main), and single pattern (non-D, DA-D, or DA-1).

B. Single transmitter and two patterns (DA-N, DA-CH, or DA-2).

- Four-mode system:

Two transmitters and two patterns.

- Complex systems:

One or two transmitters, DA-3 (day, CH and night) and two or more powers.

The switcher must be designed to handle the number of modes each station uses.

It's good engineering practice to kill the rf carrier before switching and to restore it only after the switching cycle is complete. Hot switching draws arcs which damage contactors. Furthermore, arcing produces rf harmonics which cause interference with other stations. The operator can kill the carrier manually, but in doing so, may waste air time. Most stations use a carrier-interrupt circuit slaved to the rf transfer switches.

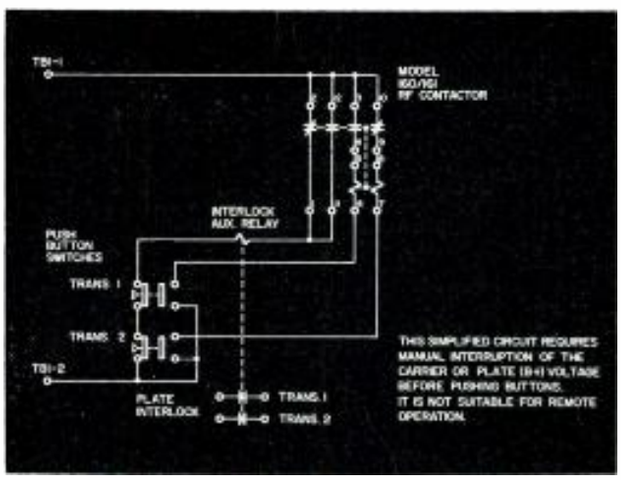


Figure 2. This control circuit operates the rf switch shown above, and is the basis for more advanced circuits.

System Requirements

To be compatible with today's equipment and the typical remote-control installation, a switching system should include these features:

- Remote control by a momentary-contact pushbutton, paralleled by pushbuttons at transmitter for local control.
- Carrier interruption circuit, which usually opens the transmitter interlock circuit.
- Memory or latching-relay circuit to keep the carrier off until all switching is done.
- Feedback from rf contactors to furnish information for carrier restoration. (May trigger a carrier-restore relay, if used, or light a go-ahead lamp, telling the operator to restore carrier manually.)
- Automatic release of latching relays when

James Pinkham is manager of product planning for Multronics, Inc., Rockville, Md.

Switching that Works

By James F. Pinkham

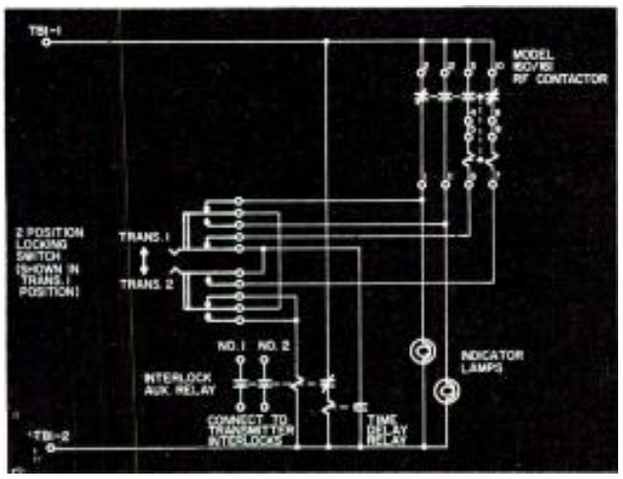


Figure 3. In this control circuit, the pushbutton operated switches have been replaced by a two-position lever switch.

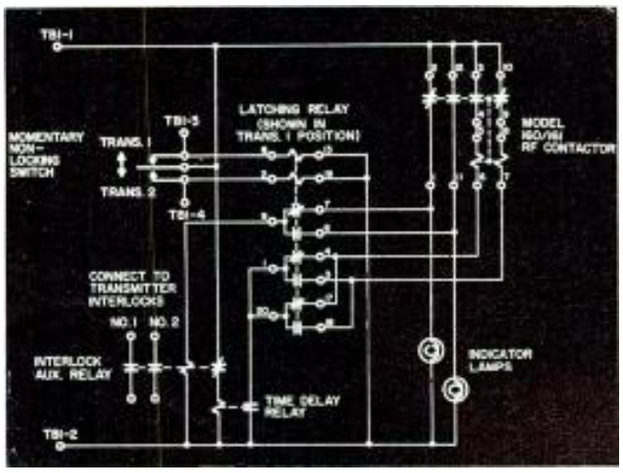


Figure 4. Most efficient transmitter control circuit uses remotable latching relays tripped by a spring-return switch.

switching is complete.

- Mode selector interlock, which prevents accidental selection of more than one mode of operation, until selection memory has cleared.
- Function indicator lamps, to show status of contactors and indicate mode change. Such lamps also indicate any contactor malfunction.

Only rugged, reliable rf contactors and control-circuit components should be used. If the switching system fails, the station is off the air.

When soliciting bids for transmitters, phasors, branching and switching equipment, it's wise to ask the bidder to include all the required features. If you don't specify, he may give you a low bid by furnishing only pushbuttons, but the system will be less efficient and easier for less competent employees to misoperate.

Typical Circuits

Figure 1 shows the basic rf switching contactors used with two transmitters, an antenna and a dummy load. The off-antenna transmitter is always connected to the dummy load.

Figure 2 shows the most elementary type of contactor control for Fig. 1's rf circuit. The control circuit has two disadvantages: carrier or plate power must be interrupted manually by the operator before switching rf, and the operator must keep the switch depressed until contactors have transferred. The circuit does provide some protection against contactor hangup through the interlock auxiliary relay. The circuit in Fig. 2 is useful for local control, where an operator is at the transmitter site, but the circuit is unsuitable for remote control.

Figure 3 illustrates a more sophisticated control circuit. A two-position, locking lever switch selects transmitters. Before power is applied to the rf contactor solenoids, a built-in time-delay circuit removes carrier power. Indicator lamps tell the operator when the contactor has switched positions. Excellent for local control, the Fig. 3 circuit is unsuitable for remote control since the two-position locking lever switch can't be remoted.

In Figure 4, a latching relay has replaced the locking-type lever switch of Fig. 3. Pushbuttons, a momentary contact lever switch, or remote-control equipment may be connected to the latching relay to operate it. When the latching relay is switched, the interlock auxiliary relay opens the transmitter plate interlocks (removing the carrier) and starts the time delay relay.

After the delay period, power is applied to the rf contactor, which switches transmitter rf output. At this time, the control path to the interlock auxiliary relay is restored, the time-delay relay releases, and the transmitter plate interlocks are released. If the transmitter has an automatic plate restore circuit, it comes on again. If not, the operator must manually turn on the plate circuit.

This is a basic arrangement suitable for a two-mode system. With additional rf contactors and control circuits, the system will handle four-mode and complex systems. **BM/E**

FOCUS ON
CATV

Still no CATV in Trenton

The U.S. District Court for New Jersey has dismissed a request by the City of Trenton, N.J., and TelePrompTer Corp. for declaratory and injunctive relief from FCC regulations limiting Trenton CATV to carriage of local stations. The City and TelePrompTer had asked to carry New York City signals (Grade B in Trenton) and Philadelphia signals (Grade A in Trenton). Because of the 35-mile rule, the Commission refused that request, allowing CATV to carry local signals only. There are no on-air or CP stations in the Trenton metro area. Channel 52 is assigned, but not used, as educational.

INI develops new info concept

Information Network Inc. of San Francisco has developed a new programmed information service that may represent a new concept in information communications for the CATV industry.

Consisting of six, separate and continuous channels of visual information (i.e., news, sports and weather), the display has a TV screen moving vertically; any one of the channels may be viewed in three minutes or less and provide up-dated information at any hour of the day.

Meant to supplement regular entertainment channels, the complete service should be available soon to CATV systems throughout the U.S.

RAND Corp. to do CATV study for Ford

As a result of the Commission's proposed new rules, the Ford Foundation has commissioned RAND Corporation to study the cable television industry for $165,000. Dr. Leland Johnson—key researcher for the President's Task Force on Communications Policy—will head the one-year project.

It is said the staff hopes to have the program origination study phase completed by this fall. Subsequent phases are to consider signal importation, impact on over-the-air broadcasting, new network possibilities and division of regulatory functions among federal, state and local governments.

Many study results will be submitted to the public and the FCC as soon as they are completed.

Warner Brothers to enter cable?

While speaking on behalf of GenCoE at a franchise meeting in Stillwater, Oklahoma, David Hunt, Warner Brothers-7 Arts vice president, recently stressed the motion picture producer's interest the future of CATV.

Predicting that "in every way cable television will be bigger than broadcast TV in three and one-half years," Hunt said that his firm is "interested in the possibility" of seeking cable system franchises in the nation's top 25 markets.

Warner Brothers and GenCoE have signed an agreement making some 40 percent of Warner Brothers' library (including movies, cartoons and syndicated features) available to GenCoE systems.

NAB-NCTA stop talking and turn to government

The National Association of Broadcasters and the National Cable Television Association have stopped trying to compromise on CATV regulation; by cutting off more than three months of talks in early September, both organizations have apparently opted for the decisions of Congress and the FCC on copyright revision and cable policy.

Each group blamed the other for the impasse. The NAB said: "Upon receipt of . . . proposals . . . designed to give relief and provide for orderly growth and maintenance of free broadcasting service in small and medium markets . . . the NCTA Committee Chairman, Robert Beisswenger, declared these proposals unacceptable to his committee, and the NCTA group thereupon broke off negotiations." The organization also said that "certain concessions were also offered to benefit smaller CATV systems. . . ."

The NCTA interpreted its walkout differently by saying that "although the NAB couched its proposals . . . in terms of protecting the small broadcaster, such protection is not needed. Cable television was born and has grown in areas served by the small broadcaster and CATV has never had a harmful effect on radio and television stations in these areas . . . The series of fruitless meetings ended after the broadcasters, departing entirely from the earlier compromise proposals, laid down terms which would cripple the young cable . . . industry. This left the NCTA with no choice but to terminate the discussions. . . ."

The Last Straw

What was said to have assured the NCTA move toward the door was a "modification" of the adequate-television-service concept in the staff compromise. The NAB, is said to have proposed carriage of three full network stations plus three commercial independents plus one educational station in the top-20 TV markets, a three-plus-two-plus-one formula in the 21st to 50th TV markets, and a three-plus-one-plus-one formula in markits 51 to 224. The broadcasters were also said to have proposed that CATVs in all markets could only originate public-affairs programming. Also, NAB is said to have called for retention of the overlap rule where a central metropolitan area of one market falls within the predicted contours of stations in other major markets, and for protection of construction permits for "some period of time."

The compromise NAB referred to was probably its offer of relief to small CATV operators from technical standards and reports like that on fairness-doctrine compliance to the FCC.

The original NAB/NCTA staff agreement, including proposals on issues like copyright, exclusivity, grandfathering, regulatory considerations, and interconnections, was endorsed "in principle" by the NCTA Board of Directors on May 28; and the NAB Board rejected it on June 20. Consequently, the NCTA made it clear that it didn't consider the original compromise a stepping-off point for further negotiations, but was willing to work with the broadcasters. The next—and final step—was a series of four meetings between a five-man, NAB committee and NCTA leaders. Any further mutual steps are not foreseen by NAB and NCTA at this time.

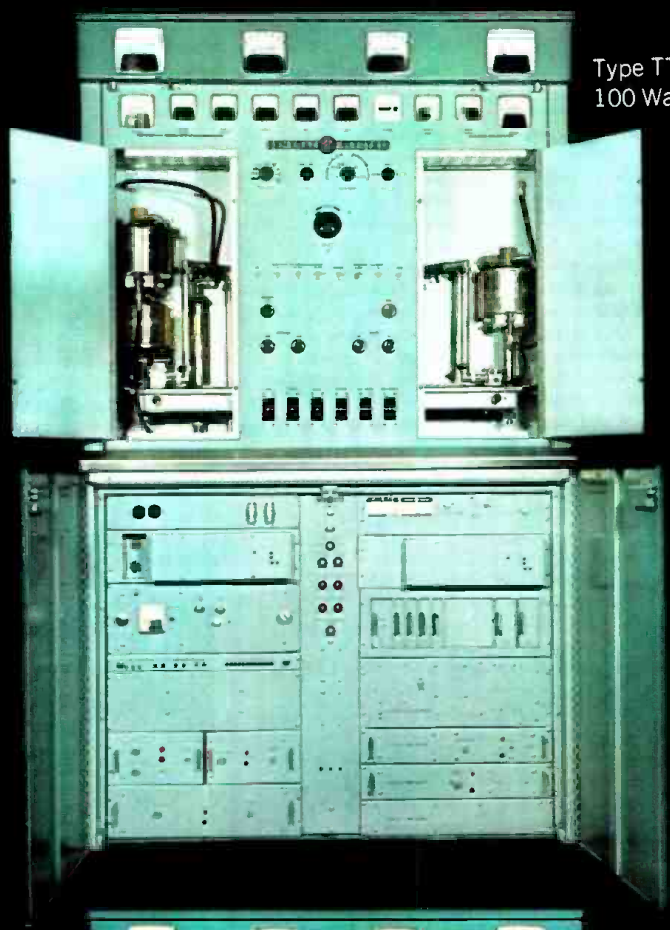
Kliewer joins NCTA Board

The board of directors of the NCTA has chosen Lawrence W. Kliewer to fill the vacancy created by G. R. Gamble's resignation until the next general membership meeting in June, 1970.

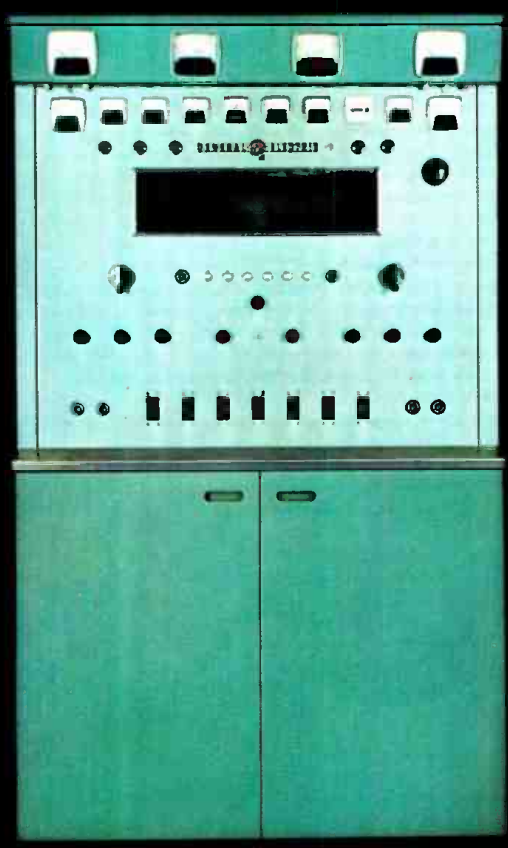
Kliewer is presently vice president of Penninsula Broadcasting, Peninsula Radio and Peninsula Cable, Hampton, Va.

GENERAL ELECTRIC

The General Electric guide to explaining your unfair advantages over competition



Type TT-55-B
100 Watt UHF Driver



Type TT-49-C/D
1 KW VHF Driver

Part 2: transmitters

At the next cocktail party, when you rub elbows with your fellow broadcaster, he's going to want some information. Like why you never miss a minute of air time. Why you're sending crisper color. Why your color-signal transmissions are so stable.

Be cool. Be casual. Tell too much about your General Electric transmitter and your unfair advantage could be gone. But because you're a customer, here are our suggestions on how to parry.

QUESTION: What do you know about this new solid-state stuff?

ANSWER: "Well, it's still pretty new. A lot of companies don't even have it." No need to rub it in by adding ". . . but everyone will eventually." Don't even tell him that GE has replaced 34 out of 40 tubes in its UHF driver and 57 out of 63 in its VHF driver. Or that every one of its 12 VHF packages has a solid-state driver. *Above all,* don't stress the savings to be had in maintenance and reliability.

QUESTION: You probably had to do a lot of rebuilding when you boosted power, huh?

ANSWER: "Oh, about what you'd expect." A good, incomplete answer. Why add ". . . with GE"? That might tip him off to our standardized cubicles that let you buy what you need now, uprate later at low cost without a major rebuilding. Skip the cubicles and you don't have to go into their features like complete prewiring, or built-in blowers that eliminate ductwork.

QUESTION: You been having a lot of trouble with phase and gain distortion?

ANSWER: "Boy, can't that be a problem!" This is the old reverse-question ploy. Chances are he'll just nod sadly and go on. Then you won't have to talk about the new GE Differential Phase and Gain Correction Unit that gives you brighter colors, better hues, and more uniform color transmission. Or about the total of 15° of differential phase compensation in three steps. If you don't talk, he might never know he could have had a unit installed with his present transmitter. And if he doesn't know—your point, advantage in.

If by some chance it's *you* who're asking the questions, get with it. We've got a lot more answers to questions such as how our conservative power ratings mean economy and give you added protection at minimum cost.

Your General Electric Broadcast Sales Representative will give you straight answers. And he might make it possible for you to pick up an unfair advantage of your own. Call him. Or write for brochure GEA-8058 (VHF) or GEA-8721 (UHF).

General Electric Company, Visual Communication Products Department, Electronics Park, Syracuse, New York 13201.

GENERAL ELECTRIC

58

Circle 119 on Reader Service Card

the end of the pregnant pause

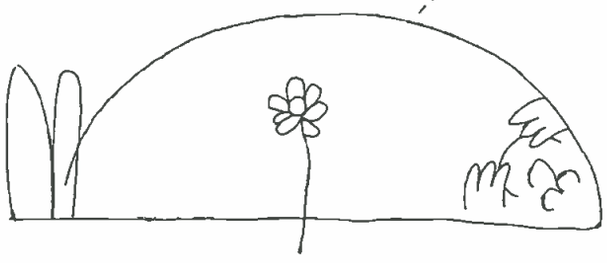
The Rapid-Q cartridge tape unit: It has done away with the corpulent chunk of time that lays there between the end of one recorded message and the beginning of the next.

Rapid-Q, in fact, gets there better than 100% faster. Automatically. Without relays, mechanical engagements, switching, or fat packages. And it always stays very cool.

The quick and the slim also has a few more firsts going for you: Like doing all of this for the price of most inexpensive tape units . . . while sacrificing nothing in playback quality, versatility, and reliability.

And it comes ready for rack mounting or desk-top operation. It can even be remoted.

To find out how Rapid-Q can keep the pregnant pause off your station's signal, write **Visual Electronics Corporation,** 356 West 40th Street, New York, N.Y. 10018. Or call your local Visual representative today.



Circle 120 on Reader Service Card

BROADCAST EQUIPMENT

TV viewfinder camera

Model PK-530 monochrome viewfinder camera was designed especially for cable and small TV studio program originations. Measuring 11× 15× 6½ inches, it weighs less than 25 lb and costs less than $2000. It is said that automatic target control compensates for light level changes as great as 4000:1. RCA.

Circle 275 on Reader Service Card

Fm channel governors

Models 8710 and 8711 crystal-controlled fm levellers make fm band reception on CATV possible with as little station separation as 400kHz. The former model was designed for use where broadcast frequency is maintained in the system; the latter converts the frequency to another

specified one before feeding it to the system. The governor can operate on input signals as low as −30 dBmV. Band width: 250 kHz; input levels: from minimum of 30 microvolts to maximum of 3 millivolts (there is no maximum when fm pads are used). Shipping weight is six lb; mounting requires 19-in. rack and 3½-in. panel. Anaconda Electronics, Ltd.

Circle 280 on Reader Service Card

Film processor

ColorMate ME-4 16/30 processor is for the Eastman Kodak 16mm Ektachrome color film. Operating at 30

feet per minute, it has a stainless steel frame and corrosion resistant PVC tanks. 79 inches long. Terminal Data Corporation.

Circle 277 on Reader Service Card

Artificial reverberator

Reverbertron 659 replaces the 658A and features: full range equalization, S/N ratio of 10dB minimum, operation from input levels as low as −30 dBm, complete metering of all signals, continuous mix controls, transformer isolated input and output of 600 ohms, (or 150 balanced or un-

balanced) and patented selection of short, medium or long decay times. Space requirements have been reduced to 3½ inches in height. Fairchild Recording Equipment Company.

Circle 282 on Reader Service Card

Mixer system

AM3A mixer system consists of three related systems and housings: AM307A program output metering and monitor system with outputs up to +30 dBm, $475; AM301A unit with eight microphone or line inputs,

two outputs to +4dBm, pan pots and reverberation send circuits, $1450; and EQ304 or EQ308 accessory for the AM301A (available in December 1969), which allows four or eight-track recorder mixdown equalization. The former model costs $475, the latter $840. Langevin.

Circle 278 on Reader Service Card

ITFS test set

Model TTC-1A test set for 2.5 GHz ITFS transmitters makes all necessary FCC periodic checks when used with a small oscilloscope. Equipment

checks include transmitter frequency, power output and modulation. $4100. Also available in a modified Telequipment S-54 oscilloscope for $450. Micro-Link Systems/Varian Associates.

Circle 281 on Reader Service Card

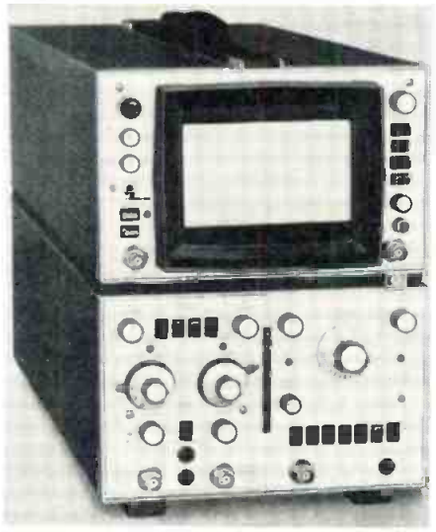
Cable layer

CL-15 portable service line cable layer buries cable about 15 inches deep. A 12 h.p. machine, it is said to be easily transported to and from

job sites by a pickup, trailer or van. High flotation tires, individual drive wheel control and variable speed hydraulic power featured. Vermeer Manufacturing Co.
Circle 279 on Reader Service Card

Oscilloscope

Model 183A oscilloscope with real-time response to 250 MHz can be operated with either of two input signals displayed singly on the 6 × 10 cm viewing area, with both displayed alternately on successive



sweeps, or at the same time in a time-shared mode. It can present the sum or difference of two input signals. Calibrated deflection factors are switch-selected from 10 mV/div to 1 V/div. Mainframe works with all plugins already designed for HP 180-series oscilloscopes; and the mainframe's calibrating waveform has risetime specified, as well as amplitude and frequency. Oscilloscope with 250 MHz Dual-Trace Amplifier and high-speed Time Base plugins is tentatively priced at $3150. Deliveries scheduled for November. Hewlett-Packard Company.
Circle 283 on Reader Service Card

Storage for tapes

Complete line of custom designed storage and service units for tapes and audio-visual supplies is available. Construction is of 18-gauge steel, finished in baked enamel. Sizes can range from Tape Storette for seven-inch sound tape to a cabinet for 14-inch instrumentation tape. Winsted Corp.
Circle 290 on Reader Service Card

WWV/CHU receiver

Model GSP-3 battery-powered WWV/CHU receiver is said to bring in exact time and radio or audio frequency standards. Uses include cal-

ibration of radio or audio frequency measuring devices. Wisconsin Electronics Corp.
Circle 288 on Reader Service Card

Transistorized TV demodulator

Type AMF fully transistorized TV demodulator demodulates mono-

chrome and color TV signals with color subcarriers as well as TV sound signals in lower vhf, upper vhf and uhf. When the sound trap preceding the video demodulation is switched off, it has a constant amplitude and group delay time up to 5 MHz. Rohde and Schwarz.
Circle 286 on Reader Service Card

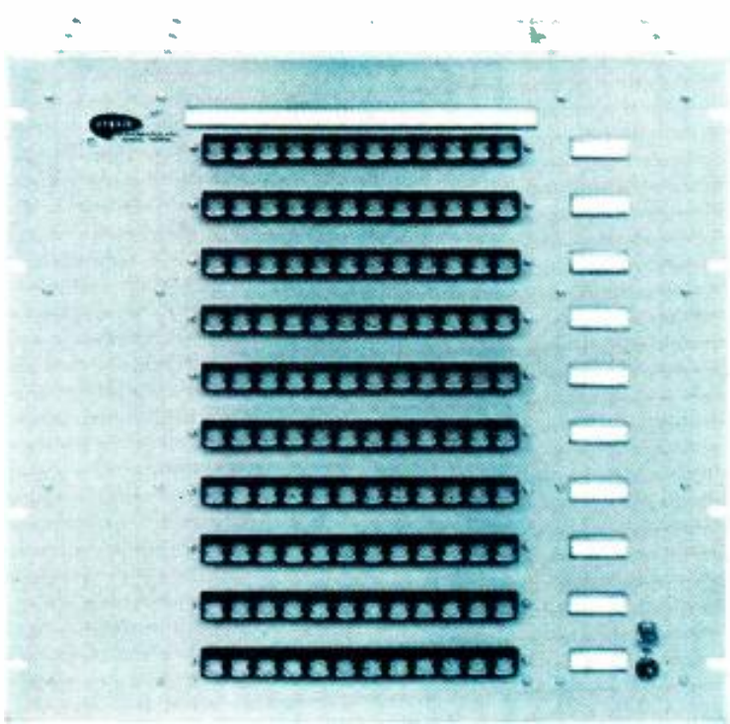
Coaxial cable

Heliax foam dielectric coaxial cable is said to offer flexibility and lower attenuation, 35 percent less than RG213/U (RG8A/U). Ideal for short-length applications where repeated flexing is prime consideration, and in long lengths for temporary tactical or restoration systems where cable must be handled quickly. Andrew Corporation.
Circle 289 on Reader Service Card

TV transmitter modulator

Model SE-1 2.5 GHz instructional television transmitter modulator includes both audio and video processing, plus differential phase and

gain controls to optimize color transmission. Available in one, two, three



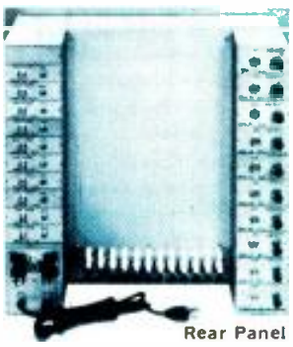
(Patch Cable Eliminator)

Now you can forget about messy patch cables and the tedious task of re-patching to change distribution. DYNAIR's Series-X Switchers provide pushbutton distribution of either 6 or 12 inputs to as many as 12 outputs. A high degree of input-to-output isolation allows any input to be switched to any or all outputs without loading the source.

Series-X Switchers are also available for simultaneous switching of video and audio, further simplifying distribution. All isolation amplifiers are silicon solid-state and full-broadcast quality. The audio and video amplifiers and the power supply are all plug-in modules which may be easily removed from the switcher for maintenance. A 12-MHz bandwidth and excellent differential gain and phase characteristics assure quality color performance.

TYPICAL BASE PRICES			
Capacity	Video Only (Base Price)	Video and Audio	Panel Height
6 in, 3 out	800.00	1,520.00	7.0
12 in, 3 out	900.00	1,620.00	7.0
6 in, 6 out	1,400.00	2,540.00	12.25
12 in, 6 out	1,575.00	2,715.00	12.25
6 in, 9 out	2,000.00	3,560.00	15.75
12 in, 9 out	2,250.00	3,810.00	15.75
6 in, 12 out	2,600.00	4,580.00	21.0
12 in, 12 out	2,925.00	4,905.00	21.0

Other input/output configurations available. Options include lighted pushbuttons, bridging inputs, and sync-mixing.



Rear Panel

Wouldn't a Series-X Switcher solve some of your distribution problems? Write today for full details.

DYNAIR Electronics, Inc.
6360 Federal Blvd., San Diego, Calif. 92114
Telephone (714) 582-9211

Have you seen "Video Switching Techniques"? ☐ Yes ☐ No
Have you seen "Video Transmission Techniques" ☐ Yes ☐ No
Please send information concerning Series-X Switchers ☐

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

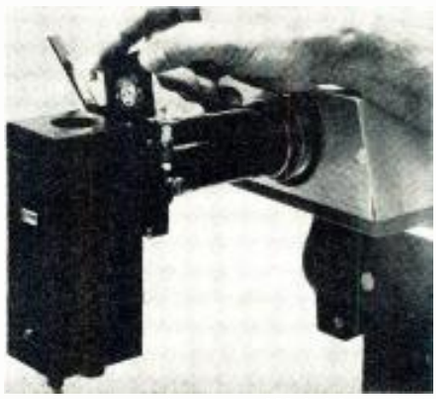
Circle 122 on Reader Service Card

or four-channel configurations. Micro-Link Systems/Varian Associates.

Circle 287 on Reader Service Card

Test slide projector

Test slide projector is said to simplify testing and adjusting of Plumbicon and Vidicon type camera chains as well as complete closed circuit TV systems. Since it operates on local power supply, it doesn't



need a transformer. Weighing 2¾ lb, it has built-in light level control which illuminates an opal glass plate between the lamp and the slide: because of its diffusing properties, the glass plate becomes a secondary light source. $285.00. Philips Broadcast Equipment Corp.

Circle 285 on Reader Service Card

Microwave spectrum analyzer

Model 8011B spectrum analyzer covers in one sweep frequency range of 0.7 to 18.0 GHz. Flatness across the 1-14 GHz band is ±2 dB, with a 60 dB dynamic range from –45 to +15 dBm. The 8011B analyzer doesn't produce harmonics, cross modulation products or images confusing for wide band presentation. Useful as logarithmic receiver for antenna pattern display. $4080. NYTEK Electronics.

Circle 276 on Reader Service Card

Fm antenna

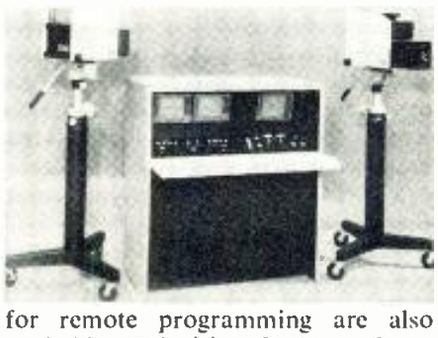
Circularly-polarized fm antenna was designed to handle low power inputs for less cost to Class "A" fm stations. Constructed of brass elements, the Class "A" antenna is available in configurations up to and including six bays, at power inputs up to five kW. It can also be supplied with null fill and beam tilt used mostly on higher power installations. It is pretuned to the station's operating frequency before

shipping. For de-icing, two stainless steel elements per bay are available. Gates Radio Company.

Circle 284 on Reader Service Card

CATV "mini-stations"

Prepackaged "mini-stations" for CATV operators interested in program origination include four basic packages. The EIA studio package contains two viewfinder cameras, a console with two seven-inch camera preview monitors, a line monitor, separate camera controls, EIA RS-170 sync generator, switcher-fader and special effects generator. A budget package includes a 2:1 random interlace system; two packages



for remote programming are also available. Television Utilities Corp.

Circle 291 on Reader Service Card

Circle 124 on Reader Service Card →

The Communication Revolution is here!

Make Comm/Scope® Extended Spectrum Coaxials your first line of defense.

Protect your present and future revenues. Specify Comm/Scope Extended Spectrum Coaxials. The ones that provide continuous transmission to 300 MHz and beyond, with no discontinuities.

They're the revolutionary new generation of coaxials that expand your application horizons. With plenty of room for additional CATV channels. Broader ETV and ITV programming. More CCTV for business and industry. Data transmission. Remote control telemetering. Alert and alarm systems. Traffic and highway control networks.

Exclusive Alumagard® and Coppergard® Extended Spectrum Coaxials are available now, for aerial or direct burial installations.

Comm/Scope Extended Spectrum Coaxials are from the same people who engineer, furnish and install the nation's leading CATV, carrier, data transmission and communications systems.

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Phone 704/328-5271

A SUPERIOR CONTINENTAL COMPANY

NAMES IN THE NEWS

Robert Curran

Yves Vezina

Bill Stokes Associates has announced two recent promotions—**Robert D. Curran,** vice president and executive producer, audio visual design and services, and **Yves Vezina,** video tape producer and production manager, audio visual design and services.

International Video Corp.'s vice president, marketing, Ronald H. Fried, has announced the appointment of **Eugene D. Warren** as manager, technical services.

Malcolm Reader has joined ComputerPix Corp. as vice president.

Bert Rosenberg has been named president of Innovative Television Equipment, a new Los Angeles manufacturing and marketing organization.

Frank P. Giglio has been appointed president of Garrett Electronics & Cable Co.

Joel Samuelsohn has been promoted to the newly-created post of vice president and general manager, Stereo WMMR, WIP's Metromedia sister station in Philadelphia.

The appointment of **Leonard Gillon** as division vice president and general manager, RCA Television Picture Tube Division, has been announced.

Preformed Line Products' board of directors has elected **James C. Poffenberger** vice president, research and engineering.

John J. Kramer has joined Memorex Corporation as vice president, International Division.

G. William Lang, who retired in May 1967 as chief engineer of radio with WGN Continental Broadcasting Company and is presently an engineering consultant to the WGN president and vice president, has accepted an assignment with the International Executive Service Corps to serve as a volunteer executive in Manila, Philippine Islands.

Robert O. Donahue has joined WJZ-TV, channel 13, Maryland, as chief engineer.

Ken F. Winslow has been appointed director of educational services at Reeves/Actron.

Bill Strube has been named chief engineer, WNEM-TV, serving Flint, Saginaw and Bay City, Michigan.

Arthur F. Jennings has been appointed plant manager, EVR cartridge products manufacturing, CBS Electronic Video Recording Division.

Paul Steele, producer/director at WBZ-TV, Boston, joins Kaiser-Globe Broadcasting's WKBG-TV in a similar capacity.

Ralph J. Swett has joined Times Mirror as a vice president of the Cable Television Division.

Harry R. Seelen has been named to the newly-created position of division vice president, International Development and Glass Operations.

Thomas E. Scholten has been named marketing manager for the Ampex professional audio products division.

Executive Director of The National Academy of Television Arts and Sciences since 1962, **Pete Cott** has resigned. He has agreed to remain with the Academy until January 1, 1970.

Gerald Jankowitz

Kenneth Petersen

Gerald Jankowitz has joined the engineering staff of the Government Systems Division, Philips Broadcast Equipment Corp., as manager of an advanced system development group.

Kenneth F. Petersen has been named vice president, product development, for Cohu Electronics.

KORK-TV bet on a sure thing when it went to color for local news.

"The mechanics of our switch to the Kodak ME-4 Process weren't very spectacular, but that just goes to show how easy the whole thing was," says Herb Herpolsheimer, Photo Chief for the Las Vegas station. "But when we presented B&W local news one day and color local news the next—now *that* got a reaction from viewers, advertisers, and competition.

"Speaking of advertisers, we got a lot of local advertiser interest when we went full color. It's a lot easier for us and the advertiser now that we can shoot color film commercials at his business.

"We've got a new mini-ME-4 processor which we were able to put into a small lab room because it was so compact. It processes 20 feet of color film per minute, and we're doing about 10,000 feet per month for news, sports, and advertising.

"We haven't had any trouble with the ME-4 Process. A Kodak representative helped us mix our first packaged chemicals, and we haven't had any bad film yet.

"Management is very pleased with the change to full color. It reinforced our number-one spot in the market. It gave us increased viewer and advertiser interest. It saved us lab space. And it's even paying us back something through the Kodak Silver Recovery System. We hit the jackpot!"

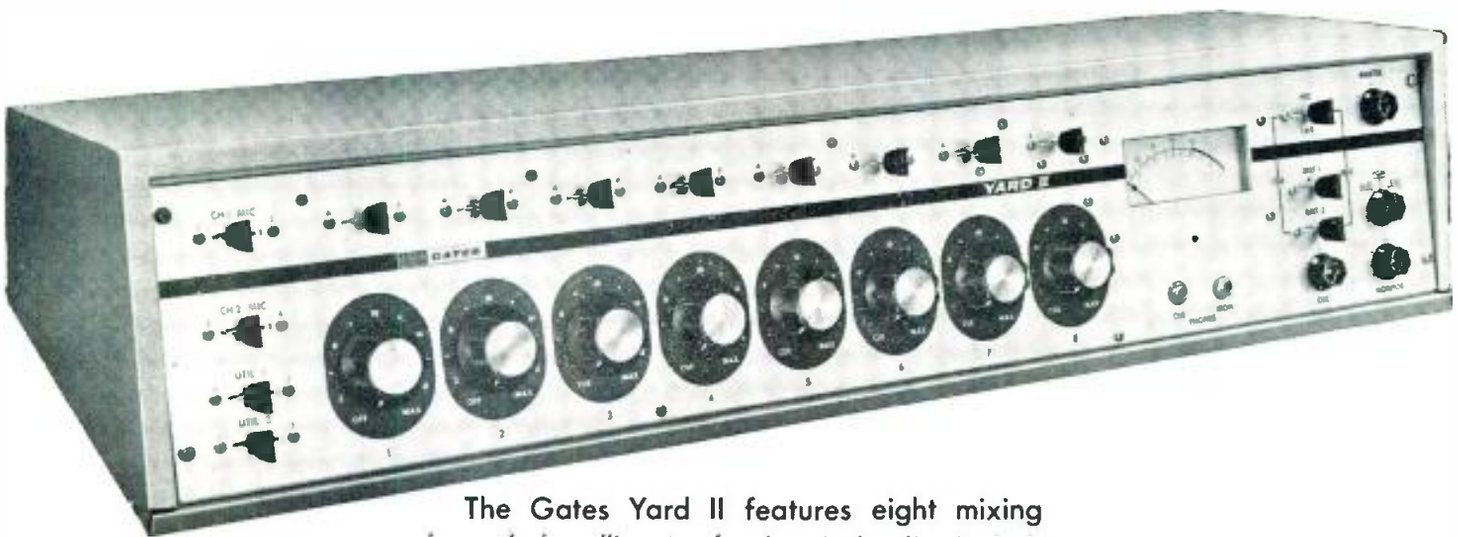
Color for your station now comes in small, less expensive processors. Packaged chemicals keep it easy. Kodak help is a call away. Find out how easily you can get into full color by calling a Kodak Regional Chief Engineer. Call John Waner in Hollywood. Dick Potter, Chicago. Ray Wulf, New York. Go!

EASTMAN KODAK COMPANY

ATLANTA: 404/351-6510 CHICAGO: 312/654-0200
DALLAS: 214/FL 1-3221 HOLLYWOOD: 213/464-6131
NEW YORK: 212/MU 7-7080 SAN FRANCISCO: 415/776-6055

Kodak

New from Gates... the Yard II eight channel all silicon transistorized audio console.



The Gates Yard II features eight mixing channels handling twelve input circuits, including four microphones, five medium level inputs and three external lines. Plus, two unwired utility keys for unsurpassed versatility. Faders are the reliable open-type step attenuators that can be easily serviced.

The Yard II's wide range of facilities in a compact size (38" wide, 8½" high) makes it excellent as a submaster control or production console in large operations.

And its 100% silicon solid-state design makes it the most economical, reliable, dependable monophonic audio control board you can own!

Let us tell you more about the Yard II. Write or call Gates Radio Company, Quincy, Illinois 62301. Telephone (217) 222-8200.

HARRIS INTERTYPE CORPORATION

GATES

A DIVISION OF HARRIS-INTERTYPE

Circle 126 on Reader Service Card

FCC ACTIONS

Application for Review by WPIX Inc. of an Order by the chief, Broadcast Bureau, setting aside the renewal grant for WPIX-TV, New York, has been denied. Forum Communications' letter request for withdrawal of its petition for reconsideration (it had applied for WPIX-TV facilities) has been granted.

Voluntary assignment of the licenses of WONS, WBGM-FM and remote pickup mobile station KH-5088, Tallahassee, Fla., from Donald C. Price to Publishers Broadcasting Corporation for a consideration of $350,000 has been granted.

Apparent liability for forfeiture of $1000 for repeated failure to observe provisions of Section 73.93(b) of the Rules has been charged against WXOK, Inc., licensee of WXOK, Baton Rouge. Besides finding that the a-m station was often operated by employees without requisite class of operator license, the Commission also found that WXOK actions hadn't been "adequate to assure that matter broadcast . . . as a result of the payment of consideration, is identified as having been paid for by the person soliciting its broadcast."

Sections 74.735(b) and 74.750(a) of the Rules have been waived and authority has been granted to Central Virginia to increase output power of its uhf TV translator station W81AG from 100 W to 1 kW.

Application by KADA Broadcasting, Inc. to change power of its station KADA, Ada, Oklahoma, from 250 W to 250 W night and 1 kW to local sunset, has been granted.

Forfeiture proceeding involving United Broadcasting Company, former licensee of KOLR, Sterling, Colorado, has been terminated. The action was based on United's request to surrender the license and failure to prosecute its renewal applications and the station's silence for extended period of time.

Application of KCMC, Inc. for renewal of license of KTAL-TV, Texarkana, Texas, has been granted for the period ending August 1, 1971.

Renewal applications of Trans-America Broadcasting Corp. for licenses of KTYM AM and FM, Inglewood, Calif., have been designated for hearing. Issues include determination as to whether the corporation submitted to the FCC the original or exact copies of the program logs as an attachment to Section IV-A, Part II of the applications, as required by the Rules, whether the applicant misrepresented or sought to conceal information about the programming and commercial practices of the stations, and whether the applicant made misrepresentations to or sought to conceal information from members of the Commission during investigation.

Proposal to assign a uhf TV broadcast channel to Oxnard, Calif., has been adopted.

Apparent forfeiture liability for $1500 for rule violations has been charged against Puritan Broadcasting Service, Inc., licensee of WLYN, Lynn, Mass. Rule violation charges include power in excess of five percent above licensed power, third class operators not properly instructed so as to be able to perform first class radiotelephone operator's job, and for failure to make weekly entries in maintenance log showing results of calibration of remote/base antenna ammeters.

That forced combination rate sales practices are "anticompetitive in nature and against the public interest," has been written in a letter to Plains Television Corporation, Springfield, Ill., owners and operators of WICS, Springfield, and WICD, Champaign-Danville, Ill.

Application of New Boston Television, Inc., licensee of station WSBK-TV, channel 38, Boston, for construction permit to move its transmitter and antenna to nearby Boston antenna farm has been granted.

Request by Amite Broadcasting Service for waiver of Section 73.-203(b), which limits assignment of a channel to an unlisted community where it is assigned, has been denied and the ABS application for a new Class A fm station has been returned. ABS had requested Channel 296, assigned to Ham-

mond, La., for use in Amite. It had said that Amite has only one daytime a-m station while Hammond has two unlimited time broadcast stations—one a-m and one fm. The Commission responded that the proper approach to having a channel assigned to Amite is by rulemaking proceeding.

Construction permit to Tappahannock Broadcasting Corp. of Tappahannock, Virginia, to operate a new a-m station on 1000 kHz, 500W, daytime only, has been granted.

Application for transfer of control of the Wichita-Hutchinson Co., license of KTVH-TV, Hutchinson, Kansas, from the Minneapolis Star & Tribune Co. to WXY Television System, has been designated for hearing on issues dealing with concentration of control of mass media and the effects of family trusts as corporate licensees.

Transfer of control of Medallion Broadcasters, Inc., licensee of uhf KMEG-TV, Sioux City, Iowa, from Edgar F. Pechacek and other owners to Fetzer Broadcasting Co., has been granted. Consideration for the transfer was $930,065.26.

To keep WKMC, the only station in Roaring Spring, Pa., from going off the air, the Commission granted Louis J. Maierhofer on August 18 a 90-day temporary authority for control and operation.

There appears to be no information that three Washington stations —WTTG, WMAL-TV and WTOP-TV —had "discriminated against any candidate," said the Commission to W. Roy Smith, campaign chairman for Lt. Governor Fred G. Pollard, candidate for Governor of Virginia. Smith had alleged that the stations had refused to sell time for a half-hour program supporting Lt. Governor Pollard's candidacy in the July 15 Virginia primary.

Request by Christian Services, Inc., licensee of KCFA-FM, Spokane, Washington, for waiver of nonduplication requirement to permit its station to duplicate its all daytime a-m station KCFA through the period ending Feb. 1, 1972, has been denied.

Petition by Metromedia, Inc., to rescind the order refusing its petition to deny an application by TV Cable of Waynesboro, Inc., has been dismissed.

Collins FM transmitters have the best record for uninterrupted service.

Meet our newest: the 20-kw 831G–1

Collins' new 831G–1 FM Transmitter gives the quality- and economy-minded broadcaster uninterrupted, dependable performance.

The 831G–1 uses solid-state on-off switching and is equipped with automatic power output control. It offers front panel tuning, with complete metering and control facilities on the extended control panel. The direct FM all-solid-state exciter offers such options as stereo multiplex and an SCA generator.

For more information, contact your Collins representative or write to Broadcast Sales, Collins Radio Company, Dallas, Texas 75207.

COLLINS

COMMUNICATION / COMPUTATION / CONTROL

Circle 129 on Reader Service Card

Engineering Casebook

Continued from page 60

For transistorized equipment, once the equalization is set, such as on phono preamps, it should be good until the cartridge is changed to a different type—perhaps five or ten years.

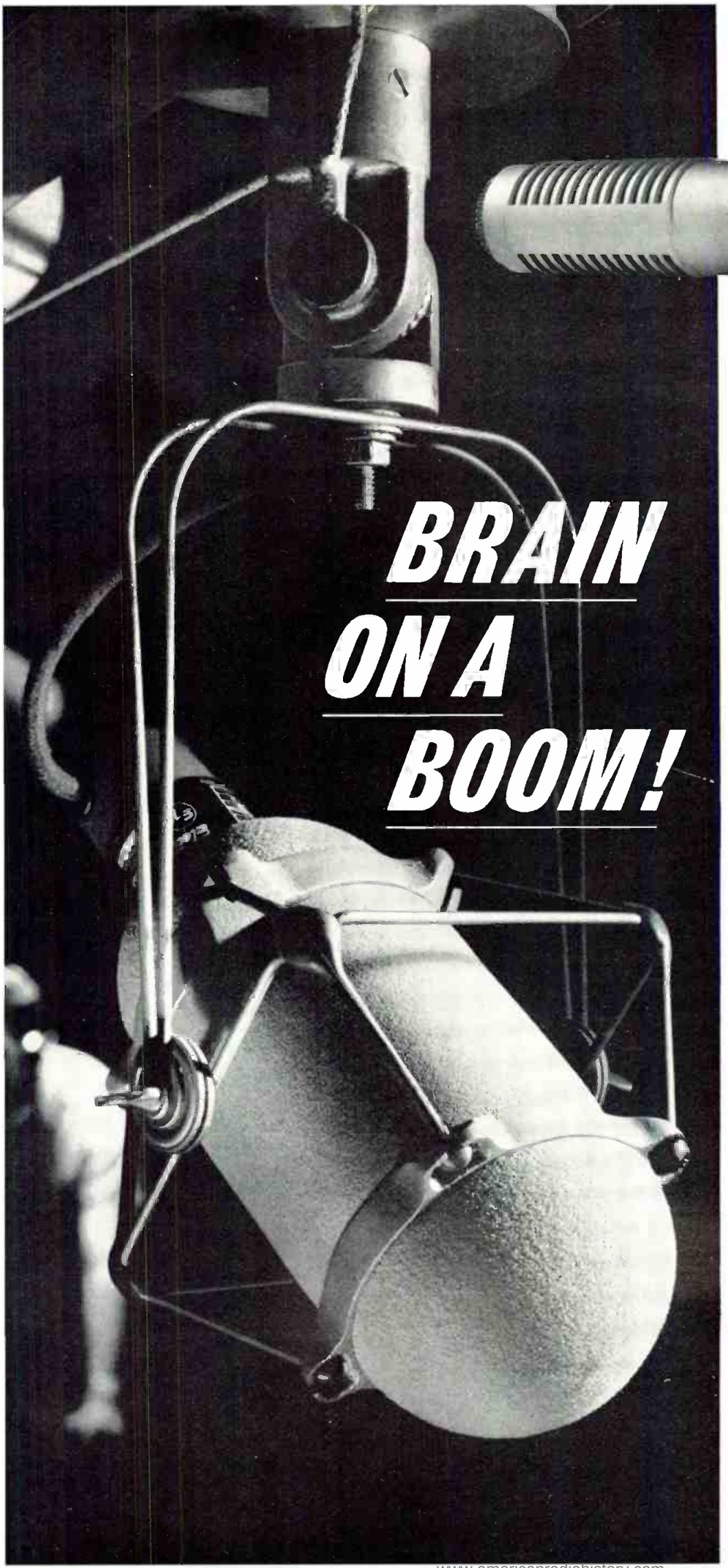
The most important test of the phono system is the stylus. This should be done daily. The stylus check is even more important for stereo stations, where channel balance and separation are affected by stylus condition. A complete frequency run is not necessary daily, but it only takes a few seconds to check the stylus and cartridge for channel balance and separation.

Let's consider what happens to a spot commercial in a medium-to-small market. A small, one-man advertising agency has a few local clients; he makes his own spot on a home machine and overdrives and distorts the original. Now he makes copies for distribution to four or five stations and the copies are overdriven and distorted even more. The station gets one of the copies and then makes a transfer to a cartridge. By now the sound is totally unfit for broadcast, but the station needs the revenue, so the spot is run anyhow.

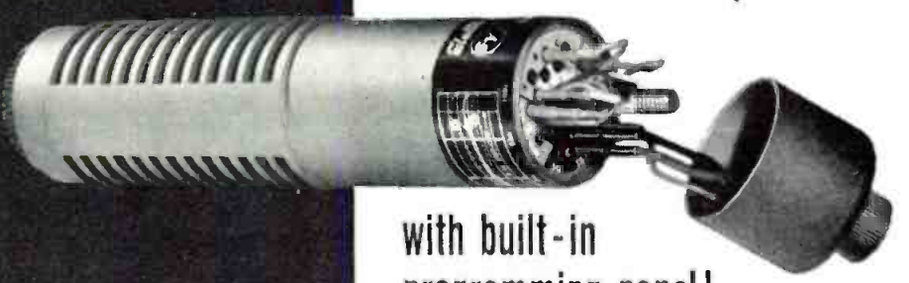
This very same equipment, properly maintained and operated, would have produced an acceptable spot. Why should so much conversation be necessary when the solution is merely one of a little maintenance and setting the controls at proper levels? Why? Because most broadcasters simply don't care.

Most cities of 50,000 population or more have at least one stereo/Hi-Fi store which can use some advertising in return for good studio monitor speakers, phono cartridges and needles. I am sure every station manager who has been in the business six weeks or longer is familiar with trade-outs.

From that starting point, build an awareness among your engineers—an awareness that people out there in the audience notice every little thing that's wrong with a station. Make the desk man aware that better sound can be had simply by keeping both ears open and by riding those VU meters. Then conduct those proof-of-performance measurements on all station audio equipment, and be sure to check that stylus daily. **BM/E**



New E-V Model 668 Dynamic Cardioid Boom Microphone



with built-in programming panel!

It's just like having 36 microphones in one, at the end of your boom! Simply match the computer-style programming pins to the color-coded jack field inside the new E-V668. You'll get any combination of flat response (40 to 12,000 cps), bass and/or treble rolloff, treble rise, and 80 or 8,000 cps cutoff. The 668 built-in passive equalizer matches response to need precisely without loss in output level—mixes perfectly with any other microphone.

The 668 cardioid pattern is symmetrical in every plane with excellent rear cancellation at every program setting. Two independent Continuously Variable-D* systems provide this uniformity, yet permit high output (—51 dbm) for distant pickup without added equipment or special cables.

Light in weight and small in size, the 668 with integral Acoustifoam™ windscreen and shock mount minimizes shadow problems while allowing noise-free fast panning, indoors and out. Its 1 lb., 11 oz. weight eliminates "fishpole fatigue" and counterbalancing problems.

The 668 is guaranteed UNCONDITIONALLY against malfunction of any kind—even if caused by accident or abuse—for two years. And, like all E-V Professional microphones, it's guaranteed for life against failure of materials or workmanship.

The E-V 668 is the result of a three year intensive field testing program in movie and TV studios from coast to coast. It has proved itself superior to every other boom microphone available. Find out why with a no cost, no obligation trial in your studio. Call your E-V Professional microphone distributor today, or write us direct for complete specifications.

NEW! MODEL 667 identical to Model 668 except sharp cutoff filters and HF-rolloff eliminated. List price: Model 667, $345.00; Model 668, $495.00 (less normal trade discounts).

Patent No. 3115207 covers the exclusive E-V Continuously Variable-D design.

ELECTRO-VOICE, INC., Dept. 1091EM
614 Cecil Street, Buchanan, Michigan 49107

Electro-Voice®
A SUBSIDIARY OF GULTON INDUSTRIES, INC.

Circle 132 on Reader Service Card

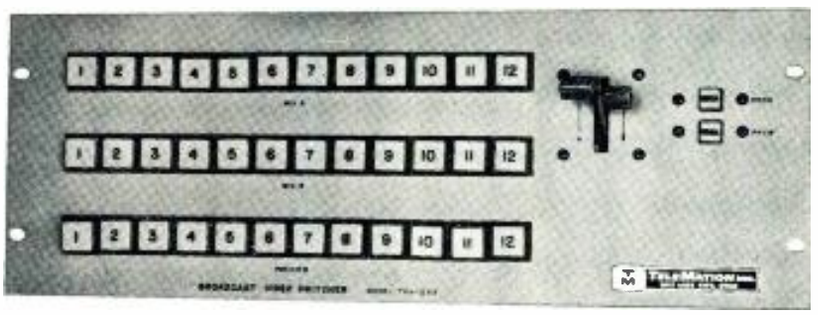
Propheteers

Generations ahead. Not just on the drawing board or in papers for seminars, but production. We apply IC technology for high performance, low maintenance.

Our concepts have caught on, because they're production oriented to make results better, work easier and costs a lot lower initially and in operation.

That's propheteering for us. Profiteering for you.

For example, our switchers. We have broadcast video switchers, video distribution switchers, audio distribution switchers, passive video switchers. They're compact. Full broadcast quality. Low in price.

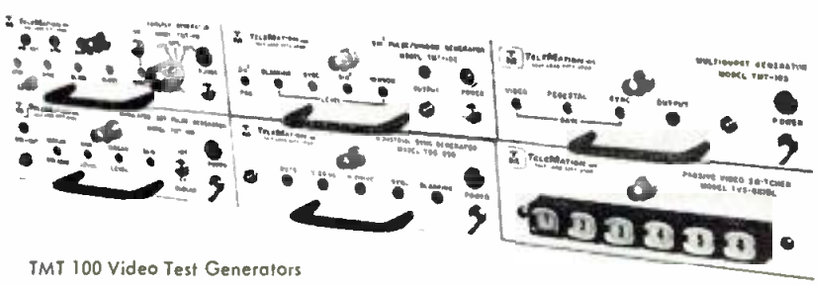


TPS 12x3 Video Switcher

The TPS-12X3 is a broadcast production switcher for monochrome or color. Solid-state crosspoints are controlled by IC logic for precise vertical interval timing. The integral video processor with average picture level compensation eliminates switching transients and bounce. Professional mixer/fader gives you smooth

fades or super impositions between video sources. Our other switchers are equally sophisticated.

Then there's our test equipment. We have the industry's lowest priced, most complete line of video test generators. They're EIA/NTSC/VIT Compatible. •Stairstep •Multiburst •Sin^2 Pulse & Window •Color Bar •20T Modulated Pulse. They can be used singly or with our all-electronic sequential switcher/programmer to provide continuous switching of up to five inputs into a single output. They can be driven compatibly with an external EIA sync generator or with our TSG-551 2:1 Interlace Sync & Dot Linearity Generator. They're modular–5" wide x 11¼" deep x 1¾" high. They contain internal power supplies and feature TeleMation IC reliability.



TMT 100 Video Test Generators

Our line is the most complete. The furthest ahead. As for what's on the board now, we'll tell you that in the next few months. **TALK TO TELEMATION. (The Propheteers)**

TELEMATION, INC.

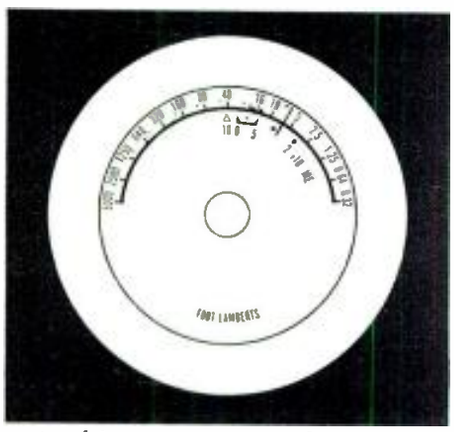
The Total System Supplier

2275 South West Temple
Salt Lake City, Utah 84115
(801) 486-7564

Talk to us at booth number 76 NAEB

Circle 133 on Reader Service Card

The TV spot meter that never was.



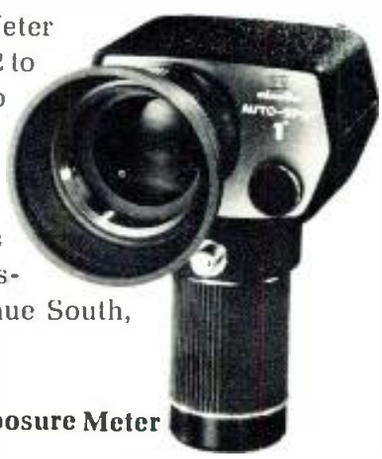
It's called the Minolta Auto-Spot 1° TV Exposure Meter. And it's the only spot meter in the world with illuminated, continuous and motorized IRE and foot-lambert scales in the viewfinder.

It'll give you quick, precise 1° readings that speak your language. Just aim, squeeze the button and watch the scales turn. Without taking your eye off your subject or switching from low to high brightness ranges, you're getting a perfect 1° reading. And the IRE scale makes it easy to keep the right balance between skin tones and the brightest area of your subject. This makes color work a snap.

Your subject is magnified 4x with focusing from 3.3 feet to infinity. And because of the 1° angle of measurement, you can pick out details for tight shots or long telephoto work without leaving your camera position. (This came in handy when the Apollo 8 astronauts took a version of the Auto-Spot 1° along for measuring moon and earth light.)

So thanks to Minolta, TV work will never be the same. After all, just because something never was is no reason to think it can never be.

The Minolta Auto-Spot 1° TV Meter with IRE and foot-lambert scales (.32 to 5000), under $250 with wrist strap and hard leather, velvet-lined case. (Also available with shutter speed, lens opening, and EV scales for still and cine uses.) For details write Minolta Corporation, Industrial Sales Division, 200 Park Avenue South, New York, N.Y. 10003.



Minolta Auto-Spot 1° TV Exposure Meter

Circle 134 on Reader Service Card

NEW LIT

Log periodic antenna—Model LP-213—is delineated in data sheet by RF Systems, Inc. **200**

Low voltage power and control cables are described in 16-page brochure published by Rome Cable. **201**

Microwave fm transmitters, receivers and components are detailed (over 300 of them) in catalog 70A from RHG Electronics Laboratory. **202**

Automatic program controller Model 726 is presented in four-page information folder by Sparta Electronic Corp. **203**

"Usage of Instructional Television with the Classroom Teacher" is the title of 3M's booklet cataloging more than 350 suggestions of using ITFS in 17 areas of teaching. **204**

Video and pulse distribution amplifiers, their specs and "mix or match" features, are the subjects of data sheet from Cohu Electronics. **205**

Audio, video and rf attenuators are described in Shalleo's 12-page catalog. **206**

Video equipment—Model EV-320 video tape recording system and Model SEG-1 special effects generator—is presented in two data sheets by Sony Corp. of America. **207**

Mikes—cardioids, omnidirectional probes and lavaliers—are the subject of The Astatic Corporation's 20-page catalog. **208**

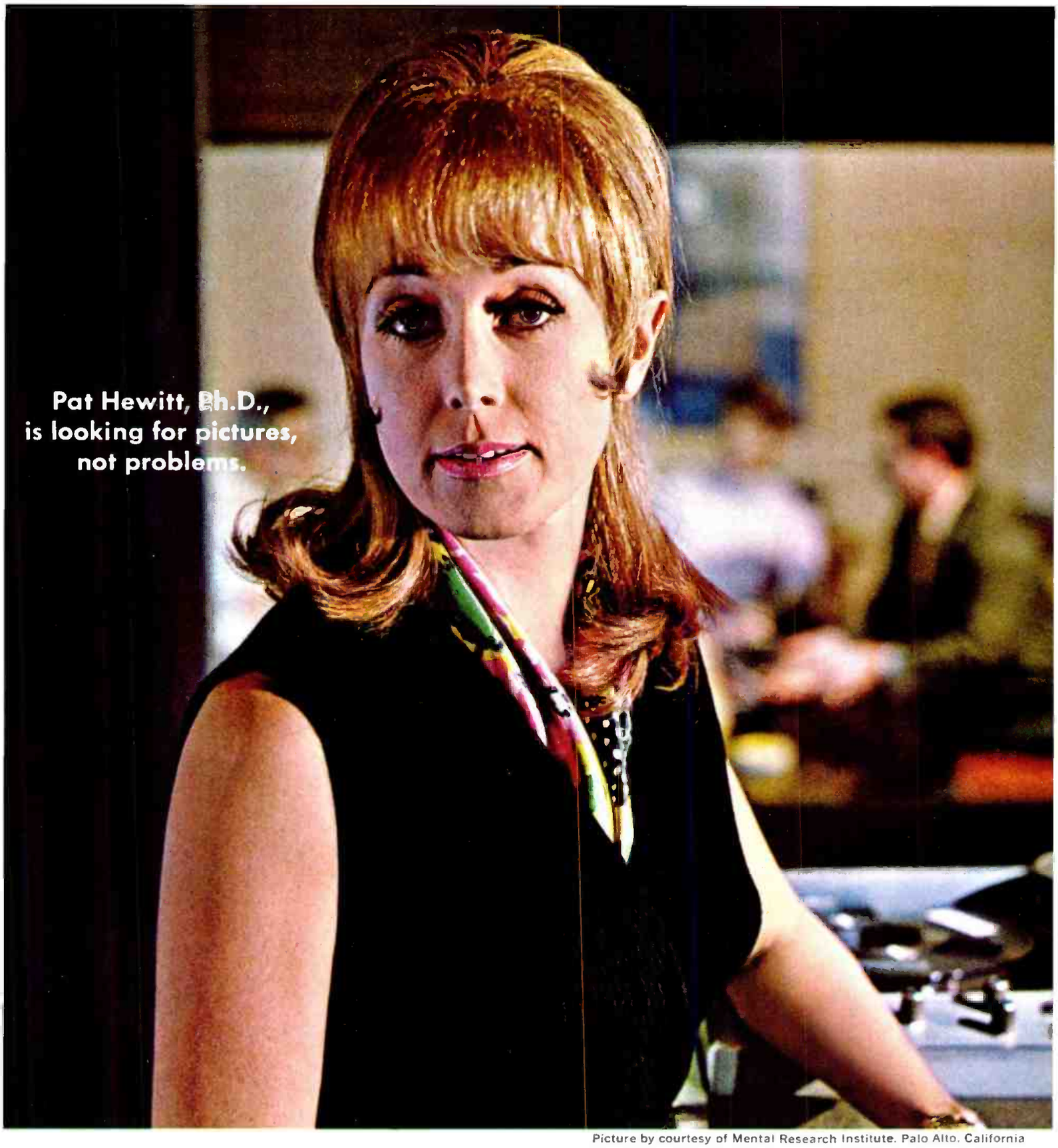
Helical scan videotape recorders, CCTV cameras, monitors, lenses and accessories are discussed in brochure V69-5 from Ampex Corp. **209**

Telecommunications Engineering Information, 34-page booklet by Collins Radio, contains 66 comparative performance tables, curves and graphs for network configurations and antenna design data. **210**

Electronics Catalog, 1970 Allied Industrial, is 600 pages long, contains over 50,000 stock items from more than 500 manufacturers. **211**

Cable accessories catalog by Smith Co. division of Preformed covers splicing and termination items. **212**

Circle 135 on Reader Service Card →



Picture by courtesy of Mental Research Institute, Palo Alto, California

When psychologist Pat Hewitt is studying recorded interviews on closed-circuit television, she wants to concentrate on the patient, not the tape. It stands to reason that she looks to Ampex, the company that pioneered videotape recording, for the most trouble-free video tape.

Our Ampex helical scan tape is produced in the most modern, surgically clean facility the state-of-the-art permits. Here we give meticulous attention to formulation and tape coating to bring you excellent drop-out performance, high frequency response, unparalleled picture clarity.

To assure continued high performance, Ampex smooths every reel of Ferrosheen® tape with an exclusive finishing process. This allows you to rerun tape many times without head clogging, tape wear or head wear.

So, if you're too busy to bother with tape, come to the people whose number one business is tape recording. Call or write: Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, Calif. 94063.

AMPEX

TAPES FOR EVERY NEED

INSTRUMENTATION • COMPUTER • AUDIO • CCTV • VIDEO • STEREO

CROSS-TALK

Dear BM/E:

The article, "What's Happening to Educational FM?" in your April issue, does not reflect what is actually happening in non-commercial radio broadcasting.

In April, 1968, the Ford Foundation announced its support of educational radio with a grant of $500,000. The Foundation also granted $5000 for reprinting "The Hidden Medium," the Herman W. Land Associates status report on educational radio.

The Ford Foundation and the Corporation for Public Broadcasting jointly sponsored a two-day conference in October, 1968 at Suffern, N.Y., to discuss the future of educational radio. The CPB also commissioned a statistical study of educational radio stations which has resulted in detailed information on station budgets and programming.

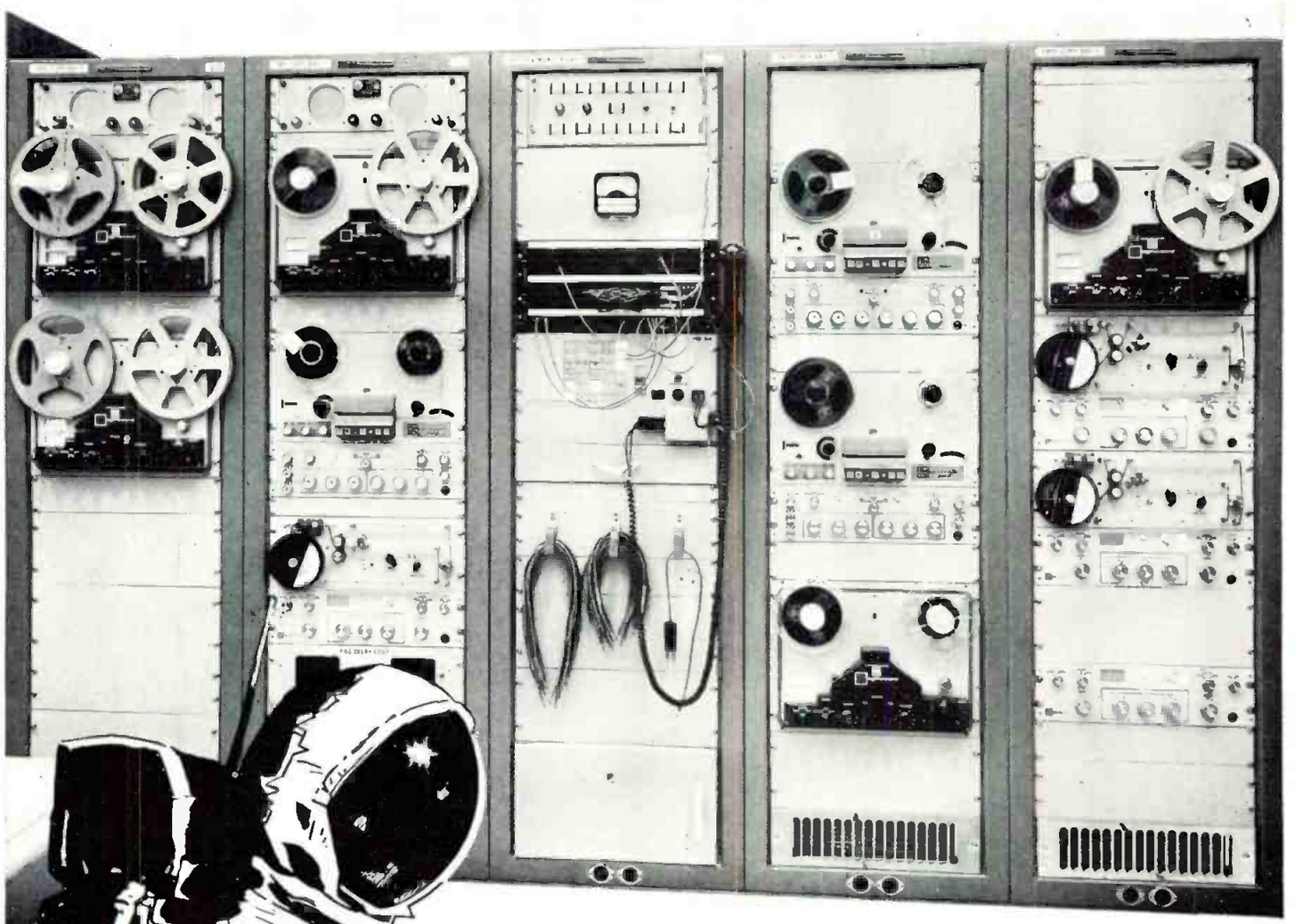
The number of educational radio stations in the U.S. is at an all-time high. As of April 1, 1969 (when the article appeared in *BM/E*), the FCC reported 367 fm stations on the air and 38 CPs granted. In addition, 25 a-m non-commercial stations are in operation. Membership in National Educational Radio, the radio division of the National Association of Educational Broadcasters, is at an all-time high.

The Department of Health, Education and Welfare has screened applications from 35 non-commercial radio stations for Title I to activate new or expand existing radio stations. More than $400,000 will be granted for educational radio station facilities construction. Some 31 educational stations have indicated they will file for Title I funds during fiscal 1970, requesting more than $1 million for expansion of present facilities.

For the fiscal period ending June 30, 1969, the CPB alloted $387,500 for public radio. Grants included: $100,000 direct grants for program production; $65,000 to the National Educational Radio Network to upgrade quality and increase quantity of programs distributed to NERN-affiliated stations; $50,000 to the University of Wisconsin for a one-year study of audio in a National Audio Center project; $22,610 to the NERN to relocate the network's duplicating facility in Washington, D.C.

The CPB has established a radio advisory committee made up of 12 managers of outstanding educational radio stations.

The National Home Library Foundation has made a grant of $20,000



NASA Manned Spacecraft Center, Houston, Texas

WHEN MAN CLIMBED DOWN ONTO THE MOON'S SURFACE, THESE MAGNECORDS RECORDED HIS HEARTBEAT, HIS BLOOD PRESSURE, AND CONVERSATION

While the men of Apollo were off making history, NASA sound engineers were back in Houston getting it all down on tape. Biomedical information on each of the three astronauts. Voice communications to and from the lunar module. And all other pertinent data that passed through NASA's world-wide network of communications during the flight of Apollo.

Magnecord Tape Recorders have been following our astronauts around the world since the early days of the Gemini program. Recording space flight history as it happens, the way it happens. If you've got recording history of your own to make, do it on the most reliable equipment available — do it on a Magnecord.

PRODUCTS OF SOUND RESEARCH

TELEX®

COMMUNICATIONS DIVISION

9600 Aldrich Avenue South
Minneapolis, Minnesota 55420

Circle 138 on Reader Service Card

to NERN. New equipment was installed September of last year.

Legislation has been introduced to establish the Florida educational Radio Network. The network would interconnect all the Florida community junior colleges, would cover 100 percent of the state's land area and would be funded with appropriations totaling $200,000 for administrative and operational expenses and $3 millions for capital outlay in fiscal 1969-70.

WHA's School of the Air from the University of Wisconsin at Madison found that 80.6 percent of schools responding to its survey were using instructional radio programming. A telephone check of schools that did not return the survey showed that WHA programming was being used by about four out of every five schools called.

Legislation has been introduced in both houses of Congress calling for all-channel (both a-m and fm) receiver production in the United States. If passed, this law would provide a major boost for educational fm stations.

The Corporation for Public Broadcasting has established four radio scholarships valued at $10,000 each plus two international fellowships—one with the CBC and one with the BBC—valued at $15,000.

That's what's really happening in educational radio!

One thing's happening that shouldn't be—too many people are sending too many questionnaires to educational radio station managers.

Robert A. Mott
National Educational Radio
Washington, D.C.

Certainly the nation's educators and some legislators are beginning to wake up to the crying need for educational radio. The sad fact of the matter is that the very impressive grants and programs delineated by Mr. Mott are only a beginning. Much more money, community interest and total involvement are needed to make educational fm fulfill its early promise.

Dear BM/E:

Your article "Radio Formatting in New York" was great! Please keep on running articles like this.

John R. Jolly
KWGS
Tulsa, Okla.

Dear BM/E:

Seldom Do I get upset by an article; almost never am I upset by a feature in a trade journal. But radio formats as presented in "Radio Formatting in New York—Part 1" did the trick.

In brief, the author demonstrates little knowledge of existing formats, trends, or their appeal. His generalizations are exceeded only by his errors in fact. His use of "stuff" for music makes me even doubt his sincerity.

The article states that "The Top-40 audience seems composed chiefly of nine-through-15-year olds." I disagree. If you check ARB ratings and audience figures for WABC and WMCA, you'll find that this isn't so.

Other generalizations: "WHN's listeners are from about 35 to 50 and live in the suburbs . . . The key to chicken rock is that you never hear a rock tune done by the group which made it a hit, but only a watered-down copy." That's hardly a 'key.' Chicken rock is simply the use of contemporary material showcased in appealing adult arrangements. Often, the hit version of a record has wide adult appeal and it is used. Thus you can hear a 'hit' tune although not a 'rock' tune . . . the author doesn't say what a 'rock' tune is.

The author says that the MOR audience is dwindling with age and death. MOR is not dwindling or dying; it's changing. It is the very flexibility of radio and its formats that keeps the industry alive.

Jay Williams
Broadcasting Unlimited
Indianapolis, Indiana

The "Radio Formatting" series was written after the author had spent over a year listening carefully to the

The SM60 cannot be stereotyped—is equally at home in the studio or in the field—stand-mounted or hand-held—in uses as diverse as outdoor sporting events and elaborate variety shows. Small wonder that audio engineers have called it one of the most versatile omni-directional dynamics they've ever encountered, for the SM60 is a unique combination of good looks, strength, performance and economy.

The smooth, wide-range response provides cleanest, natural reproduction of both speech and music. A very effective built-in wind and "pop" filter protects against undesirable effects of close-talking.

Lustrous, non-glare metallic finish and tailored-to-the-hand dimensions provide striking on-camera appearance and superior handability. Specially reinforced machined-steel case front is designed to take abuse that would ruin other microphones—you can drop it on its nose without damage to the internal structure! Efficient windscreen and front end are *quickly* and *easily* removable for cleaning.

Best of all, it is priced competitively with conventional "workhorse" microphones. Why not check out an SM60 now? See your Shure Professional Products Distributor, or contact Shure Brothers Inc., 222 Hartrey Ave., Evanston, Ill. 60204—Phone 312 - 328-9000.

SHURE SM60

VERSATILE OMNIDIRECTIONAL DYNAMIC MICROPHONE

SHURE PROFESSIONAL MICROPHONES . . . FOR BETTER AUDIO

MODEL SM56
CARDIOID
DYNAMIC

Extremely versatile in studio, control room, and remote use. Also widely acclaimed for rhythm recording. Bright, clean sound. Exceptionally uniform cardioid pattern gives optimum control of environment.

MODEL SM33
UNIDIRECTIONAL
RIBBON

Warm, smooth sound for studio, control room, and scoring stage. Super-cardioid directional pattern. Compact, yet rugged.

MODEL SM76
¾" OMNIDIRECTIONAL
DYNAMIC

Ideal for interviews and audience participation, yet unusually smooth wide range response (40-20 KC) for critical music reproduction. Instantly detachable from stand. Steel case with Cannon connector.

MODEL SM50
OMNIDIRECTIONAL
DYNAMIC

Self-windscreened and pop-free for news, sports, remotes, and interviews. Also ideal for many studio and control room applications. Comfortably balanced for hand or stand use. Natural response.

Circle 140 on Reader Service Card

47 New York stations mentioned. The comments were based on what went over the air, not on what some stations may have claimed that they do. A detailed report of such a large grouping of stations was clearly impossible in the limited space available. The object was to generalize, pointing out the apparent similarities and differences among the New York stations.

The assignment of age ranges was a subjective one made by the author. Naturally such an estimate can vary markedly with the listener. Certainly there must be exceptions to many of the generalizations used, and certain stations even changed formats between the time the article was written (in April) and the publication date. Our industry never seems to stand still long enough to have a detailed picture taken of it.

Dear BM/E:

A constant source of annoyance to me is the number of ads that don't contain equipment prices. This is especially bad where TV cameras are concerned.

Can anything be done about this?

Thomas Buyea
WAJA-TV
Coral Gables, Fla.

As a publication, we have no more control over the content of advertisements than you have over the content of spot commercials. We can refuse to accept an ad if we feel it's objectionable or offensive (just as you can refuse a spot), and that's the extent of it. We certainly can't tell the advertiser that he must include prices, especially since many manufacturers will divulge prices only in the midst of a personal sales pitch. Besides, almost no broadcast equipment—especially color TV cameras—has a single price. The ultimate dollar value depends on many available options and configuration variations.

Dear BM/E:

The article on New York radio formating was excellent. We're eagerly looking forward to Part 2.

Denny Widmer
KLBM Radio
La Grande, Oregon

Dear BM/E:

I have been reading magazines of your type for 35 years.

Your July, 1969 issue gave me more articles that were of first interest and usefulness to me than any other magazine has over this whole period.

Harry R. Lubcke
Consulting Engineer
Hollywood, Calif.

Dear BM/E:

I want to register complete agreement with your July editorial, "A Little Competition," dealing with CATV.

CATV certainly won't have the sweeping ill effects some people fear. The same was said about the survival of newspapers after radio broadcasting started up. Then radio was "threatened" by TV. CATV is simply the latest fearsome ogre.

J. Ray Gilbert
WCLU
Covington, Ky.

Dear BM/E:

A product announcement which appeared on page 48 of your August issue is in error. The item states that Memorex's Chroma video tape is a chromium dioxide (Crolyn) formulation licensed by DuPont.

Such is not the case. Chroma is a CCTV recording tape that offers the same professional performance as broadcast tape. It's the first high-sensitivity tape made specifically for CCTV recording and can be used in color or monochrome.

Jerome M. Kelly
Memorex Corp.
Santa Clara, Calif.

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FROM THE EDITOR

Another Step Backward

Last spring, negotiating committees representing both the NAB and the NCTA hammered out a compromise program of cable regulation that looked like the end of this classic fraternal struggle. The compromise contained some pills bitter to both the NAB and the NCTA, but it represented a possible *modus vivendi*. When the compromise went back to the NAB executive board for approval, it was summarily turned down.

Far from creating an impasse, this very action by the NAB may actually harm its members in the long haul, because now a compromise seems hopeless and the next action will probably be taken either by Congress or the FCC. The Commission may be reluctant to take any definitive action without congressional direction, especially since it has come under so much fire for the highly arbitrary Third Report and Order. Plus there's the still-unresolved question of utility status and local regulation for CATV. For that matter, many cable interests have raised the question of whether or not the FCC has any business at all regulating the cable industry.

Last year's Presidential Task Force Report leans very heavily in favor of the developing cable industry. Added to this is the already rampant predisposition of the Justice Department to encourage CATV as a necessary element of our free enterprise system. Broadcast industry regulation of CATV would be monopolistic, says JD.

Obviously the cable industry can't just keep growing helter-skelter with no regulation of any kind. Just as obviously, the Third Report and Order—a notice of *proposed* rulemaking—should no longer be applied in its present form without adequate hearings and a solidification as *rules,* not as *proposals*. The effect of the Friday the Thirteenth Proposals has been a strangling freeze on many segments of the CATV industry. Some equipment suppliers have been hurt badly, while others continue to exist on orders from grandfathered systems.

If the Presidential Task Force Report and Justice Department are indeed factors to be contended with, new legislation that may ultimately get through Congress could well contain provisions that could hurt the broadcast industry. Certainly, the NAB-rejected compromise would have been far more palatible and more considerate of the small broadcaster than the course that may now be shaping up. In its intransigence, the NAB may have done a gross disservice and perhaps irreparable harm to the broadcaster. Up to a point, the NCTA had been willing to live with the compromise—even though member cablecasters were grumbling all the way—but willing nonetheless. Not so now.

Tired of beating their collective heads against a brick wall, the NCTA negotiating committee members walked out of the last meeting with the NAB, and will very likely be unwilling to enter into new talks. After all, the Justice Department and Task Force Report both favor cable. Pressure is now building to insure maximum spectrum use for communications and other vital services. Cable is seen as the answer to many industry problems; if industry barometers are to be believed, cable is indeed the wave of the future. In its holding action, the NAB, instead of buying more time for its members, may have hastened the day when new legislation will severely restrict the broadcaster.

Walter G. Salm
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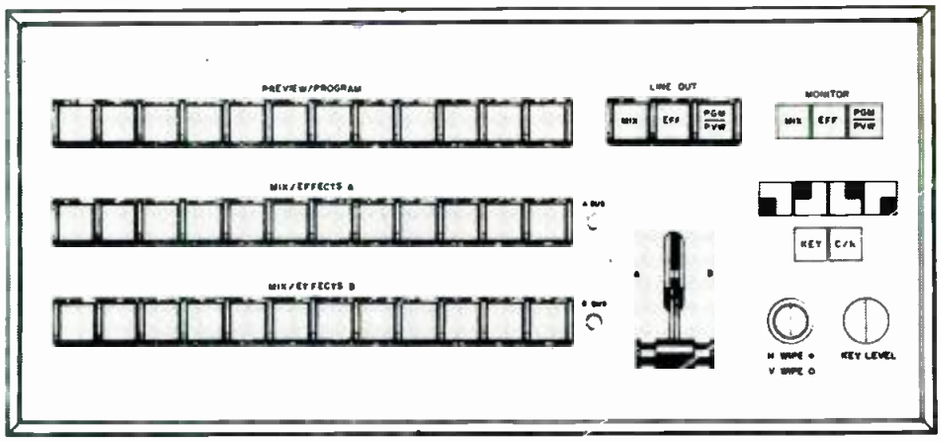

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