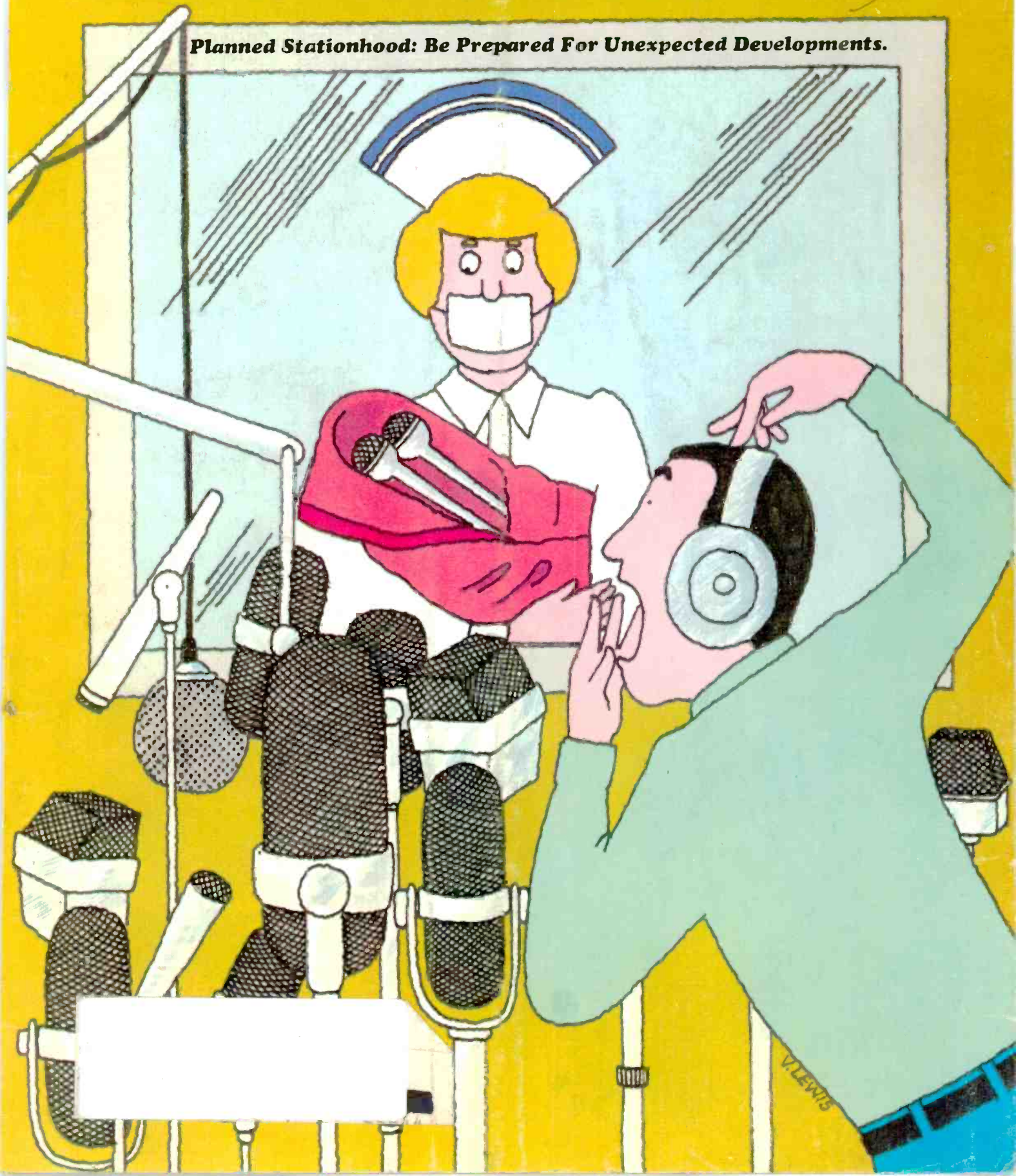
A MACTIER PUBLICATION AUGUST 1970

BME

BROADCAST MANAGEMENT/ENGINEERING

Planned Stationhood: Be Prepared For Unexpected Developments.



Comm/Scope Coaxials have an unlimited future.

We guarantee the first five years of it!

The first year of a cable's life is the roughest. If anything is going to go wrong, this is the period of greatest probability.

But when you install Comm/Scope Extended Spectrum Coaxials, we see you through that critical year. Should they fail to perform as specified (which rarely happens), we'll give you new cable, and even pay the labor costs for putting it in.

Chances are, your Comm/Scope Extended Spectrum Coaxials will exceed all of your performance and reliability requirements. But we guarantee them for the first five years anyway–and we're the only ones who do.

That's how sure we are that Comm/Scope Extended Spectrum Coaxials are the finest you can buy, at any price.

They give you the expanded transmission range you'll need tomorrow. Full coverage to 300 MHz and beyond. With full frequency utilization, top to bottom.

They're available now in Alumagard® and Coppergard® constructions for aerial or direct burial installations.

For assured performance, specify Comm/Scope Extended Spectrum Coaxials, the ones with the unlimited future–the ones that are guaranteed!

For information and prices, write or call:

COMM/SCOPE CORPORATION

P. O. Box 2406 Hickory, North Carolina 28601
Phone 704/328-5271

A SUPERIOR CONTINENTAL COMPANY

Circle 100 on Reader Service Card

They laughed when he sat down at the typewriter. They didn't know he was programming the station for a week in advance!

We don't recommend that the night maintenance man program your station.

But he could—with just a few hours of training on the new Schafer 8000 Automation System.

Imagine. A system that gives you 21 times more walk-away—that can increase "people utilization" by 100% or more—that automatically types the program log. A system which you can't possibly outgrow.

Mind boggling but true. Because with the Schafer 8000 you can individually program each day of the week up to 7 days in advance. Then, without disturbing the basic structure, you can add, delete or change segments at will. Merely by typing a few simple commands on the system typewriter.

And don't let the word "computer" shake you. Ours is the size of a stereo receiver. It's about as simple to use as your office calculator. Simple yes. But far more flexible and expandable than any other system.

Our new 16-page brochure is must reading for everyone in AM and FM radio. Just mail the coupon.

schafer

Schafer Electronics, 9119 De Soto Avenue,
Chatsworth, California 91311 (213) 882-2000
A division of Applied Magnetics Corporation

Send me the new brochure describing the Schafer 8000

name _____ title _____

station _____ phone _____

address _____

city _____ state _____ zip _____

Circle 101 on Reader Service Card

AUGUST 1970/VOLUME 6/NUMBER 8

BM/E

BROADCAST MANAGEMENT/ ENGINEERING

This month's cover: Be prepared for unexpected developments—Radio WAAX was (see page 24)—or you'll find yourself a victim of Unplanned Stationhood, as artist Vince Lewis sees it.

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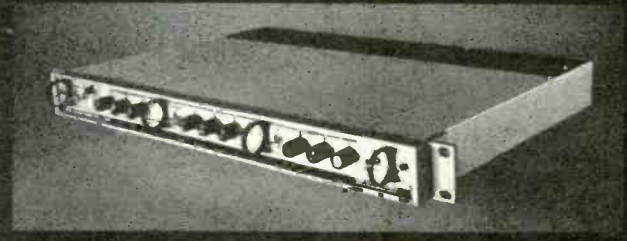
Controlled Circulation postage paid at Duluth, Minn.

Color Calisthenics?

Up Down, Up Down . . . despite all the advances in color receivers and broadcasting techniques, the only way the viewer can cope with color variations from one program segment to the next is to keep adjusting the hue control on his set. Even an athlete can't keep up with it! Now, the CBS Laboratories' Color Corrector changes all that. For the first time the broadcaster can correct encoded signals at a single viewing point to achieve consistent color values from a variety of signal sources. Program material from cameras, tapes and film with wide ranging color values can be matched to each other to reduce the viewer's subjective shock from one program segment to the next. The Color Corrector can be installed with cameras or VTR's or film chains or in the program line.

Let your audience relax.

Write or call collect. 203-327-2000.



PROFESSIONAL PRODUCTS

CBS LABORATORIES

A Division of Columbia Broadcasting System, Inc., 227 High Ridge Road, Stamford, Connecticut 06905

BROADCAST INDUSTRY NEWS

Broadcast tab: $9.6M

Here's a rundown of the FCC's new fee schedule, going into effect August 1, 1970. For the fiscal year beginning July 1, the Commission expects these charges to contribute about $25 million ($9.6 million from broadcasters) to the treasury. Last year the total was $4.5 M.

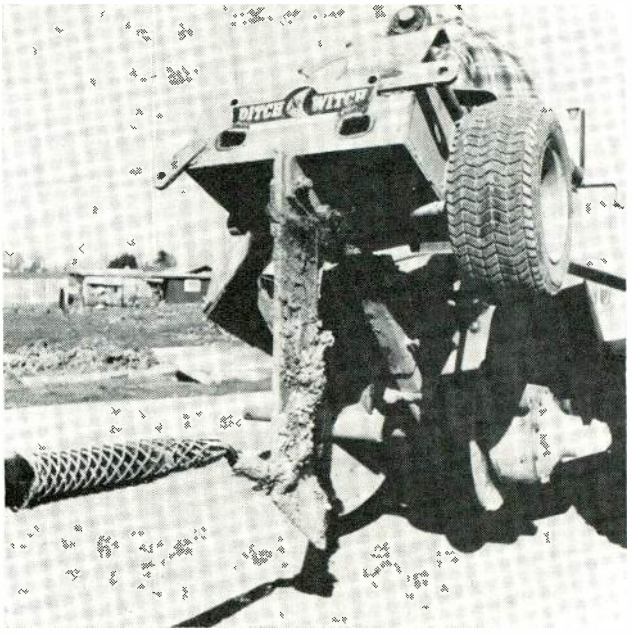
Annual operating fees: Radio—24 times the highest rate for a single one-minute spot (minimum of $52). TV—12 times highest 30-second spot (minimum $144). CATV—$0.30 per subscriber.

Renewal fees have been abolished for all broadcast services; noncommercial educational broadcasters will pay no fees at all.

Construction permits: TV—Filing fee of $500 to $5000 depending on service and market; grant fee of $4500 to $45,000. Radio—$25 to $1000 filing, $225 to $9000 grant.

Other fees: Pay-TV application filing—$1000. Assignments and transfers—$1000 filing plus 2% of price paid upon FCC consent.

Cable burial: All you should see is the programming



Pole attachment headaches? Weather hassles? Community eyesore complaints? The always-growing cable TV industry has already started beating these problems by putting its conduits underground. It might not work in New York, but in Naples, Florida, Cable Vision Inc. is using Davis Company equipment to lay 150 miles of cable—most of the city's 6000 residents have already signed up. One selling point: Once the cable is planted you won't see a thing except what it brings to your TV receiver. Equipment like the Davis Hydra-Borer (left), which roots underneath obstructions like streets and driveways, does the job quickly and neatly. Cable can also be buried without a trench. In fact, Tri-way Construction Company (Salem, Oregon) has even buried mainline conduit without a trench—at ten feet a minute, or so, with a modified Ditch Witch vibratory plow blade (right). Its wake is an easy-to-repair cut in the turf.

FCC makes cable move just about as expected

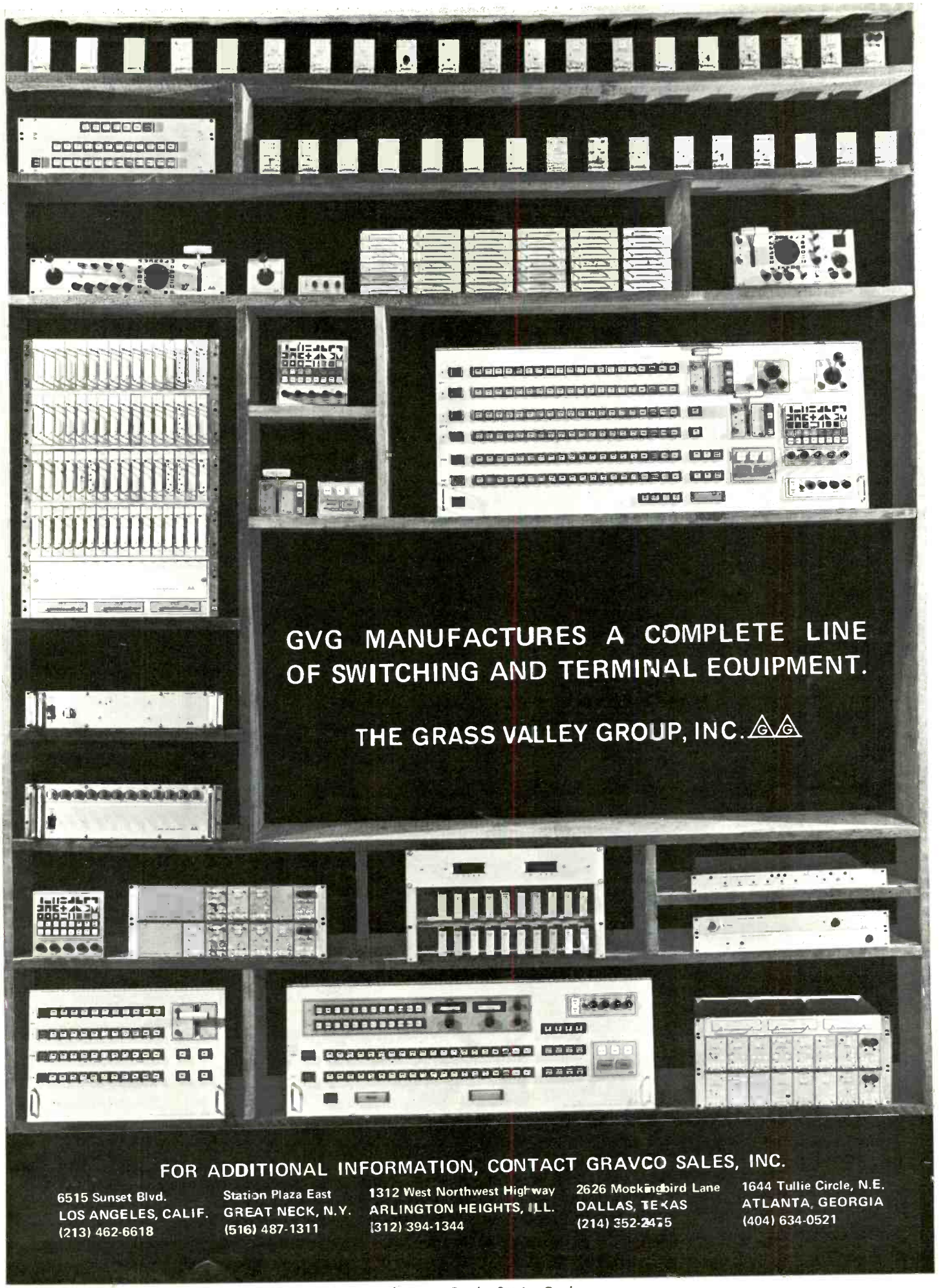
The only surprise in the Commission's action and proposals to "unfreeze" cable television was the postponement of the local origination deadline. Now, cablecasting need not begin until April 1, 1971, which gives stations with over 3500 subscribers another three months to gear for their own programming.

Other CATV actions from the Commission:

- Distant signal importation proposed for stations in the top 100 markets; limit of four independents would be allowed and local ads would be substituted from U's (independents getting first crack, then network affiliates) and from "any local station able to demonstrate that its ability to serve the public has been threatened."

Copyright fees (to be fixed by Congress, but at a recommended rate of 0.7%) would be paid; also, a five percent of gross revenues contribution to public broadcasting would be required.

An unlimited number of ETVs could be imported, if they gave permission and if the local ETV did not object. Local ETVs could substitute their own fund appeals for those of the imported ETVs.



Circle 103 on Reader Service Card

- Local cross ownership of CATVs by TVs prohibited.
- Technical standards for CATV proposed, with a request for comments on capacity for 20- or 40-channel minimum service, two-way communication accommodation, and service to each distinct community within the franchised area.
- Comments invited on federal-state-local relationships as to CATV.
- Increase from two to five years suggested for the length of time sports programs must be off the air before eligible for pay-TV over cable.
- Anti-siphoning rules proposed to prevent cable from turning free-TV signals into pay-TV.

IN BRIEF . . .

FCC approves Laser Link for LDS. The Commission has amended its rules concerning Community Antenna Relay Services, to authorize use of an 18-channel system in the 12.7-12.95 GHz band for Local Distribution Service. The Quasi-Laser Airlink System was developed by Dr. Joseph H. Vogelman of Chromalloy American Corp. and Ira Kamen of Laser Link Corp. Heart of the system is filtered pulse width modulation, which transmits only one sideband, thereby conserving bandwidth. This makes possible simultaneous transmission of 18 TV channels through a single microwave transmitter-receiver link. The system is also immune to weather effects. Quasi-Laser can handle 32 TV channels in 2-GHz bandwidth, and seems a breakthrough which will reduce CATV cost and widen its appeal. For more details, see "Cabling Without Cable," *BM/E*, June 1969.

Big Brother might not be watching you after all. That TV scanner over the door at your neighborhood drug store could be a Javelin DM 500, first-generation bogus electronic surveillance device. It has an "authentic lens with actual lens opening," a light up front "which actually lights up" and real coaxial cable leading to, so it would appear, a hidden monitor. For $90, Javelin claims, it is an inexpensive way to scare off "the unsophisticated small-time thief."

If you are willing to go up to $3000, on the other hand, you can get a good buy from Magnavox. It's a one-tube color CATV camera and it actually works. Mass-production will start this fall and, later on, the company will introduce a complete, low-priced studio package.

More statistics of interest from TvB indicate network billings for the first third of 1970 are up almost six percent from 1969's initial four months. The total went over $608 million and the largest increase was for weekend daytime, 16.3%. A good hike in weekday daytime ad spending might occur over the summer, however, as TvB figures show viewing during that period increases two percent (25.2% of households during the winter, 27.3% in the summer).

"Discovery Audit" is a service designed to help station managers find out what they think is being done that isn't. Cecil Webb, formerly of Kaiser Broadcasting and KRON-TV (San Francisco), plans with this new offering to fill "a definite need for a 'short-term' station manager, un-numbed by familiar routine, who can pull administrative and regulatory detail together and then leave."

Peter Scheiber's compatible quad stereo system which debuted in March (see *BM/E*, May, page 38) has been taken up by Advent Corp., Cambridge. Under an agreement announced recently by Scheiber and Advent president Henry Kloss, the company will complete the commercial development and begin production and marketing of the system. A big selling point of Scheiber's device is that it produces on disc, tape or for broadcast, an encoded four-channel signal which can be played on all normal stereo equipment with normal stereo reproduction, while quad equipment will reproduce the four-channel sound.

Broadcast pay-TV may have its first regular station constructed soon. Vue-Metrics, Inc., has filed with the FCC for a construction permit to build in Philadelphia. The company proposes to use Channel 23, with an effective power above 1.8 MW, to serve the city area plus most of southern New Jersey, northern Delaware, north-east Maryland and southeast Pennsylvania. Vue-Metrics president Sanford C. Curcie claims that in a recent company survey, six out of ten Philadelphia residents said they would be happy to get and pay for programs (home sports contests, first-run movies, Broadway plays and concerts) not shown on free-TV.

Reform of programming and employment practices has been agreed to by three Shreveport, La., stations—KSLA-TV, KTBS-TV and KCIJ Radio—as a result of successful negotiations with a Shreveport community group, the Ark-La-Tex Communications Committee. In return for the Committee's promise not to oppose their license renewals, the broadcasters filed letters with the FCC outlining the reform agreement. According to committee spokesman, Dr. L. C. Pendleton, the terms were: to include black citizens in the full range of locally produced programs; to hire qualified and qualifiable blacks in specific job classifications (managerial, on-camera news correspondents, technicians); to offer regular news and public service coverage of the black community; to use courtesy titles when referring to black persons and exclusion of racial identification except where necessary for criminal apprehension; to recruit and train black students; to present diverse views on all controversial issues of public importance, including editorials; to adhere to FCC regulations concerning fairness as to personal attack. Assisting the citizens' group was the United Church of Christ's Office of Communications, directed by Rev. Dr. Everett C. Parker. The Office has also helped a similar community effort in Texarkana, Tex., to reach a reform agreement with KTAL-TV, and was involved in court revocation of a license for WLBT-TV (Jackson, Miss.) for failure to broadcast in the interests of the black community.

For $2950 a day you can get complete facilities and crews for production of videotaped commercials. The flat daily rate is offered by Jefferson Productions (Charlotte, North Carolina) for "a complete, turn-key job from pre-production to completed commercials. It includes three color cameras, studio or remote, a staff director, lighting director, full production staff, full technical crew, three videotape machines, complete editing and mixing facilities, stock set and props and even a half-hour of new, evaluated videotape." A

half-day of shooting costs $1750 and a half-day of editing and mixing costs $1200. Included is use of the new, $100,000 CDL-101 computerized electronic editing system

(shown above) along with three Ampex VR-2000 videotape recorders, all under control of a Jefferson Productions engineer.

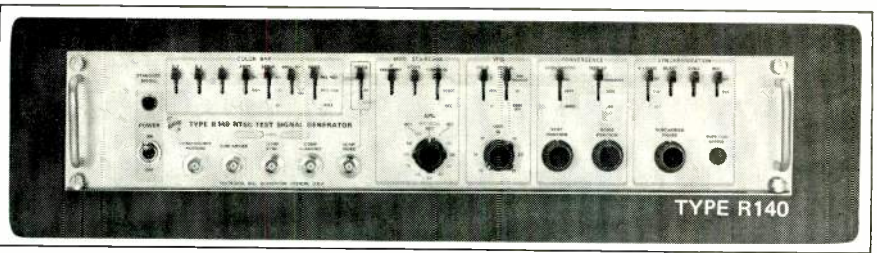
Fernseh's general rep in the East is now Sennheiser Electronic (N.Y.), which will handle the West German company's entire line of TV equipment.

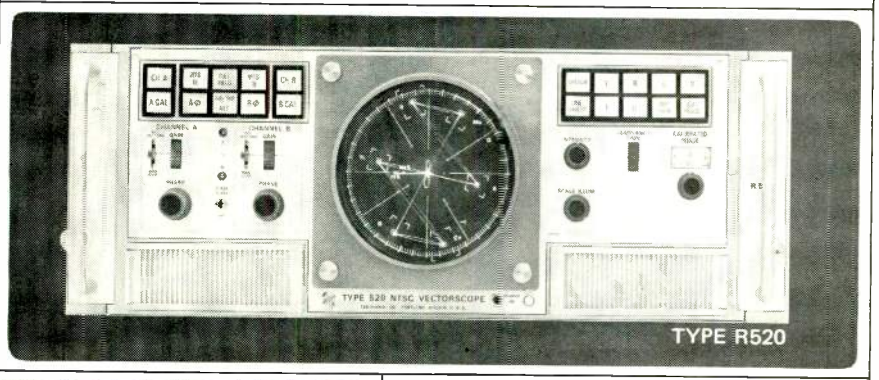
Business Notes: Signs of the squeeze turn up everywhere, as **ABC, NBC** and **CBS** have cut expenses (travel, entertainment) and might turn out fewer new programs this fall. The **Radio Advertising Bureau** has postponed its fall management conference until early spring '71, so everyone can go out and sell. And **Hewlett-Packard** is going on the four-day week every other week to keep inventory down. . . . **HEW** has come up with a few good boosts for broadcasters: $40,345 to activate an educational radio station in Bethel, Alaska, serving 60 Eskimo villages in the state's southwestern lowland area; $339,625 to Boise State College to activate Channel 4, which will be part of a state network serving educational fare to about 85% of Idaho's population; $341,250 to help get educational Channel 47 in Peoria going; and $230,365 to bring noncommercial WYES-TV (New Orleans) color programming facilities. . . . **Amvideo Corp.** has signed sales contracts worth over $200,000 for **Craftsman Electronic Products'** 26-channel remote-control push-button converters. . . . **International Video Corporation** has established a subsidiary in Canada to market its line of color TV cameras and videotape recorders . . . **Kaiser** is building a CATV cable plant taking up about 60,000 sq ft in Phoenix. . . . The Roswell, N.M. facilities of **LTV Electrosystems** didn't do the business expected and are being closed . . . **RCA's** news: It has formed a cable systems department and plans to broaden its line of cable products; it offers "an un-

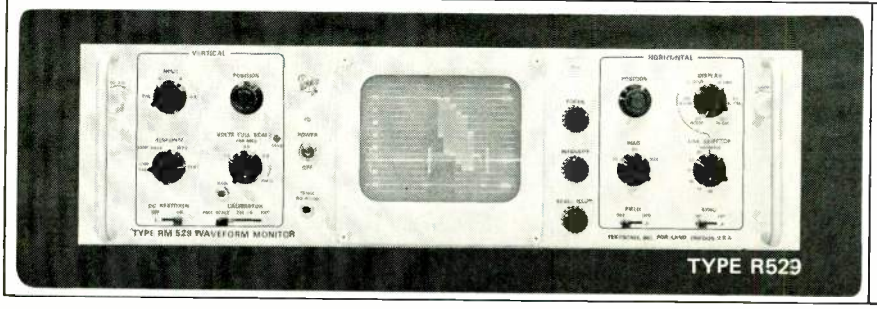
Continued on page 48

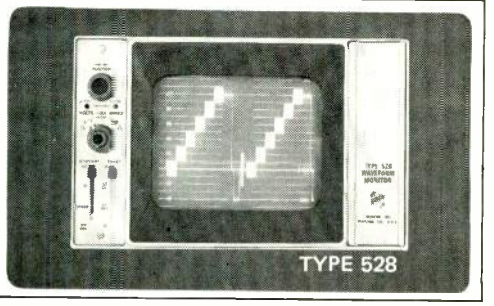
A COMPLETE FAMILY OF TELEVISION TEST INSTRUMENTS FROM TEKTRONIX

From signal source to waveform display Tektronix has an instrument designed to satisfy your video measurement requirement.









THE TYPE 140 NTSC TEST SIGNAL GENERATOR is a solid-state source of high-quality television test signals. 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. **Convergence Crosshatch** provided for picture monitor linearity evaluation and 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. The Type 140 is the source of the waveforms displayed above.

140 NTSC Test Signal Generator $1800
R140 NTSC Test Signal Generator $1800

THE ALL SOLID-STATE TEKTRONIX TYPE 520 VECTORSCOPE is designed to measure luminance, hue and saturation of the NTSC composite color television signal. **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) 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

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. Requires only 5 1/4 inches x 8 1/2 inches mounting space. **Flat, IRE, Chroma, and Diff Gain** vertical amplifier response positions. 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

THE TYPE 529 WAVEFORM MONITOR is a general-purpose video monitor with VITS measurement capability. Vertical response characteristics are **High-Pass, Low-Pass, IEEE** and **Flat** (8 MHz). **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.** Horizontal selection provides **2-field** or **2-line** displays, plus calibrated sweep rates of **0.125 H/cm** or **0.25 H/cm. 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
Rackmount Type RM529 ..... $1250

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

Tektronix, Inc.
committed to technical excellence

Circle 107 on Reader Service Card

INTERPRETING THE FCC RULES & REGULATIONS

The Fairness Doctrine—New Developments

Closely allied to the political "equal opportunity" provisions of Section 315, the Communications Act (see *BM/E*, July, 1970, page 14), the Fairness Doctrine concerns the broadcast licensee's *broad* obligation to air *all sides of a controversy of public importance*. Recently the Federal Communications Commission has refined its requirements under the Fairness Doctrine and has proposed stringent new standards.

In general, this doctrine requires that the broadcast licensee: (1) encourage, implement and foster the carriage of programming designed to expose public issues; and (2) afford a reasonable opportunity for all sides of important, controversial issues to be aired by the licensee's station.

Evolution of the Fairness Doctrine

The Fairness Doctrine has grown out of a series of cases. Its definitive policy statement appeared in the Federal Communications Commission's 1949 *Editorializing Report,*[1] and was the subject of the 1969 landmark case, *Red Lion Broadcasting Company, Inc. v. FCC.*

As noted in its *Editorializing Report,* the Commission has always believed that the full implementation of the Fairness Doctrine places an *affirmative* obligation on broadcast licensees:

> If . . . the public interest is best served in a democracy through the ability of the people to hear expositions of the various positions taken by responsible groups and individuals on particular topics and to chose between them, it is evident that broadcast licensees have an affirmative duty generally to encourage and implement the broadcast of all sides of controversial public issues over their facilities, over and beyond their obligation to make available on demand opportunities for the expression of opposing views.

In a letter to *Mid-Florida Television Corporation,* the Commission further explained the "affirmative obligations" of broadcast licensees:

> The mechanics of achieving fairness will necessarily vary with the circumstances and it is within the discretion of each licensee, acting in good faith, to choose an appropriate method of implementing the policy to aid and encourage expression of contrasting viewpoints. Our experience indicates that licensees have chosen a variety of methods, and often a combination of various methods. Thus, some licensees, where they know or have reason to believe that a responsible individual or group within the community holds a contrasting viewpoint with respect to a controversial issue presented or to be presented, communicate to the individual or group a specific offer of the use of their facilities for the expression of contrasting opinion, and send a copy or summary of material broadcast on the issue. . . . As stated, it is within the discretion of the licensee, acting reasonably and in good faith to choose the precise means of achieving fairness.

Thus the Commission believes *licensees must act affirmatively* to achieve compliance with the Fairness Doctrine. However, the licensee has considerable discretion in choosing the particular form of affirmative action to be used. It is not a matter of choosing one method and rigidly adhering to it; the licensee's analysis of a particular situation and selection of the means to achieve "fairness" is what counts.

In *Red Lion* the Supreme Court noted the broadcast licensee's duty, as pronounced by the Commission, to give adequate coverage to public issues and, in so doing, to meet the requirements of the Fairness Doctrine. The Court also pointed out that "this must be done at the broadcaster's own expense, if sponorship is unavailable," and "the duty must be met by programming obtained at the licensee's own initiative if available from no other source."

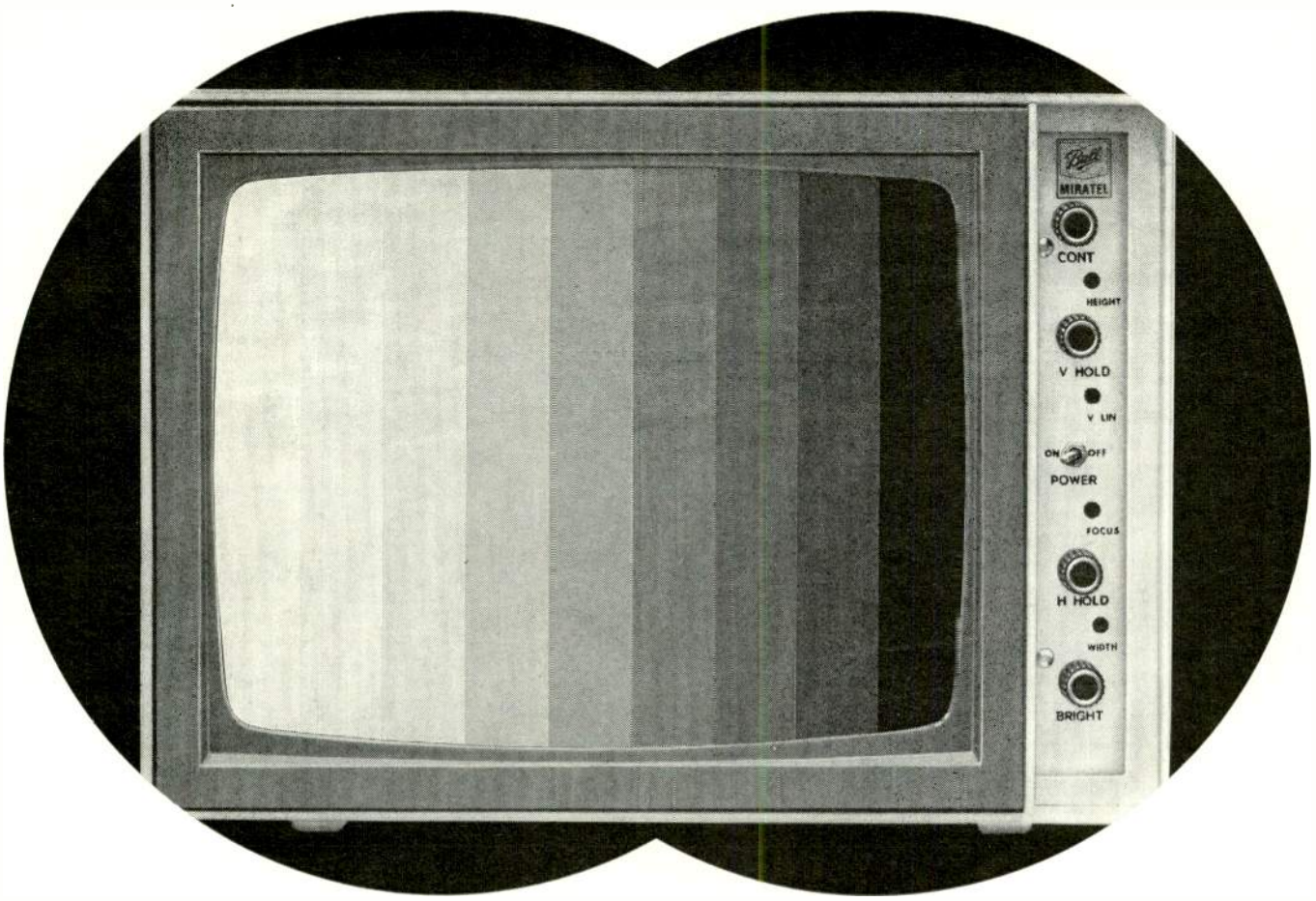
Fairness Doctrine refinements

In its letter of June 3, 1970, to Nicholas Zapple, Communications Counsel, Committee on Commerce, United States Senate, the Commission presented hypothetical cases to explain its more restrictive applications of the Fairness Doctrine.

Consider the following situation: Your station

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.

1. 3 FCC 1246 (1949)

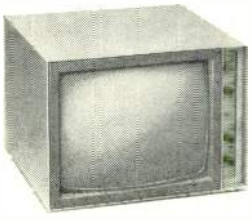


You don't need binoculars, any more

The Ball Brothers Research Corporation TE-12 general purpose black and white monitor is designed for easy viewing, even at a distance.

Its large 12-inch screen gives you almost as much viewing area as ordinary 14-inch-screen models, and it fits in a rack space only 10½ inches high. You can get the TE-12 in a cabinet-mounted or chassis-mounted configuration, too.

The TE-12 features all-solid-state design for high reliability. Images are displayed with high clarity, thanks to the TE-12's 600-line resolution. And the high output voltage (12 kV) produces a brightness of 40 ft-lamberts—enough to permit easy viewing from across the control room under normal ambient light conditions.



Price of the TE-12 is only $350; $310 for the chassis-mounted version. So put down those binoculars, and write us for full specifications on the TE-12. You have nothing to lose but your eyestrain.

BBO/13

BALL BROTHERS RESEARCH CORPORATION, BOULDER, COLORADO 80302
SUBSIDIARY OF BALL CORPORATION

Circle 108 on Reader Service Card

sells time to candidate A, his authorized spokesman, an individual, a group, or an organization supporting candidate A to urge his election. Candidate A does not appear personally on any of these broadcasts; however, issues in the campaign and/or the candidate are discussed. Then an authorized spokesman, an individual, a group, or an organization supporting candidate B requests "fairness" time under the FCC's existing policies. Does the Fairness Doctrine apply?

Yes. The Commission has clearly held that the Fairness Doctrine is applicable[2] and, in answering this question, the Commission reiterated what the Fairness Doctrine requires: When a licensee presents one side of a controversial issue of public importance, he must afford a reasonable opportunity for the presentation of contrasting views.

> Where a spokesman for, or a supporter of Candidate A, buys time and broadcasts a discussion of the candidates or the campaign issues, there has clearly been the presentation of one side of a controversial issue of public importance. It is equally clear that spokesmen for or supporters of opposing Candidate B are not only appropriate, but the logical spokesmen for presenting contrasting views. Therefore, barring unusual circumstances, it would not be resonable for a licensee to refuse to sell time to spokesmen for or supporters of Candidate B comparable to that previously bought on behalf of Candidate A.

Would *free time* have to be provided to candidate B's spokesmen or supporters? The Commission has held that the public's "right to know" cannot be defeated by the licensee's inability to obtain paid sponsorship for presentation of a contrasting viewpoint *even where the initial presentation was made under paid sponsorship.*[3] However, when spokesmen or supporters of Candidate A have purchased time, the Commission feels *it would be inappropriate to require licensees to, in effect, subsidize the campaign of an opposing candidate by providing Candidate B's spokesmen with free time.*

Suppose your station sells time to an individual, a group, or an organization supporting Candidate A and the time is used to criticize Candidate B or his position on the issues of the campaign. Authorized spokesmen, an individual, a group, or an organization supporting Candidate B request fairness time under the FCC's policies. Must you furnish time on your station?

The Commission says the Fairness Doctrine is applicable here; however, you would not be obligated to provide *free time* to authorized spokesmen for Candidate B, or to those associated with him in the campaign, *if authorized spokesmen for Candidate A, or those associated with him in the campaign, had used paid time* on your station to criticize Candidate B or his position on the campaign issues.

In other words this latest statement of Commission policy means if your station *sells time* to Candidate A, or to an individual, a group, or organization supporting Candidate A, and (1) Candidate A does not appear personally on the program, but issues in the campaign and/or the candidate are discussed, or (2) the broadcast time is used to criticize Candidate B or his position on the issues of the campaign, *then the Fairness Doctrine*

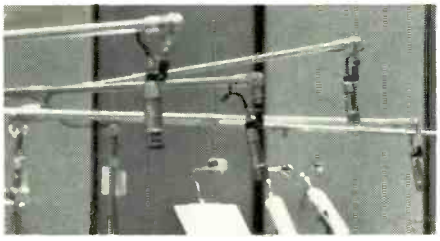
2. Letter to Nicholas Zapple 19 RR 2d 421, (1970)
3. Cullman Broadcasting Company, 40 FCC 576, 25 RR 895 (1963)

How good is the new Electro-Voice RE20 studio dynamic microphone?

Here's proof from the new scoring stage at Glen Glenn.

The fine reputation of Glen Glenn Sound Company rests on their knowledge of sound... their ability to turn a full symphony orchestra into a perfect sound track for TV, the movies, or a new album. And their desire to be first with the finest.

So for their new scoring Studio M, Glen Glenn engineers asked to see the latest products in every category . . . tape, film, electronics, and — of course — microphones. Especially a new E-V dynamic cardioid microphone which they had seen in prototype form earlier.



Glen Glenn put the RE20 to the test. Including days of studio experiments and actual sessions that pitted the RE20 against every type of musical instrument. Plus a searching critique by the musicians themselves. The RE20 passed every test with flying colors.

As a result, when Studio M was completed, RE20's were on the booms... almost four dozen of them from our first production run.

Since then, Glen Glenn has scheduled a number of major recordings with RE20's. And the RE20 has often been used where previously an expensive condenser was the automatic choice. Why? Because the RE20 has proved itself a significant advance in microphone design. With wide-range, peak-free response on axis (even the off-axis response is better than many other studio microphones on axis). Transient response rivals any other studio microphone, regardless of design. Directional control is uniform and predictable from every angle. Yet proximity effect is virtually eliminated (a problem that plagues almost every cardioid — except E-V Continuously Variable-D® microphones).

MODEL RE20
dynamic cardioid studio microphone $425.00 list, less normal trade discounts.

In short, the RE20 does everything a good condenser does, and some things better. Without the complication of power supplies. Or special cables. Or shock mounts or windscreens (they're both built in). Or the need for equalization just to overcome design faults.

It's simple. It's flat. It's rugged. It's clean. With a 2-year performance warranty unmatched in the industry (it's spelled out completely on the spec sheet). The RE20. For the studio looking for better sound. Your E-V microphone specialist will gladly loan your studio an RE20 to make any tests you like. Call him today.

P. S. For full technical data on the RE20, write us today. To find out more about Studio M, write Joe Kelly, VP, Engineering, Glen Glenn Sound Company, 6624 Romaine St., Hollywood. Calif. 90038

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Circle 110 on Reader Service Card

does apply and time must be made available; however, *you would not be obligated to provide free time.*

Proposed new rules

The Commission is now considering whether it should place licensees under an *even more compelling obligation to actually seek out appropriate spokesmen* to represent one side of a controversial issue of public importance.

Last year the Commission considered a case where a licensee, after presenting only one side of a controversial issue in an editorial, had rejected a spokesman for the other side as inappropriate. The Commission held that while such rejection may come within the wide latitude given the licensee under the general provisions of the Fairness Doctrine, the licensee was under a *compelling obligation* to take steps to obtain an appropriate spokesman. Thus, the licensee could *not* rely on general announcements over the air but, instead, had to invite specific persons believed to be appropriate spokesmen to appear.[4]

The Commission now proposes that where a licensee presents only one side of a controversial issue in a *series of broadcasts* (more than one broadcast) within a "reasonable" time period (probably six to nine months or less), with no plans of its own to present other viewpoints, the licensee may rely upon the general announcement technique *only for the first presentation.* If no appropriate spokesmen come forward as a result of the on-the-air announcement and the same controversial subject is again discussed, the licensee must directly contact specific persons believed to be appropriate spokesmen to present the contrasting viewpoint.

These persons must be given the essence of what has been broadcast and offered a "clear and unambiguous opportunity" to respond.

Under the proposed rules, therefore, if a licensee broadcasts more than one "program" on a controversial subject, and no group or individual comes forward in response to the licensee's on-the-air invitation to present opposing viewpoints, then the licensee must actively go out and find "appropriate spokesmen" to present the opposing view—even if these "appropriate spokesmen" have neither seen nor heard the licensee's initial broadcast.

Conclusion

The Commission continues to expand broadcaster's responsibilities under the Fairness Doctrine. The *Red Lion* case of 1969 has sharpened Commission sensibilities and, as a result, has placed a greater burden on the broadcaster.

You and your staff should carefully consider all of the foregoing in planning your programming. If you have questionable areas of Fairness Doctrine applicability, get in touch with your counsel.

The Fairness Doctrine continues to generate voluminous mail each month to the Commission. Thoughtful planning and a genuine effort to broadcast all sides of controversial issues will, hopefully, free your station from Commission inquiry. **BM/E**

4. Richard C. Ruff, 19 FCC 2nd 838 (1969)

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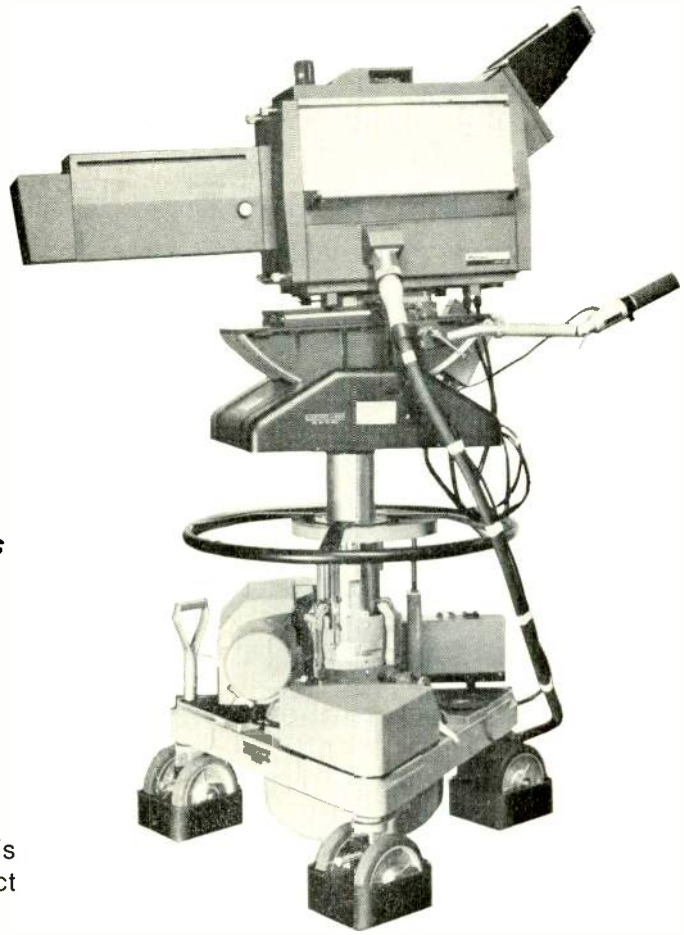

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We invite inquiries on this equipment and urge you to request our material describing it, together with a list of stations now using it.

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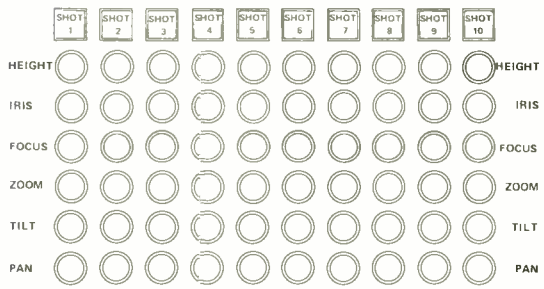
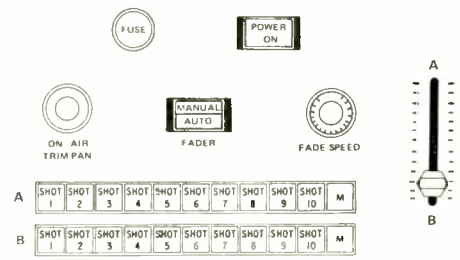


CONTROL PANEL



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Circle 112 on Reader Service Card

Blue-Sky Exhibits at '70 NCTA

Two-way Systems Capability dominates NCTA exhibits. Local origination gear, programming ideas prominent.

Fire and burglary alarm signals are traced to location by central CRT grid system in the Advanced Research two-way system. Circle 300.

Prototype subscriber responder for two-way from G.E. Circle 301.

Music lessons via two-way cable and meter reading possibilities shown by Anaconda. Circle 302.

Anyone outside the cable industry visiting the 19th NCTA Convention exhibits would have concluded that cable in the USA was delivering its full promise. The American home was depicted as an electronically-served educational/cultural/entertainment center, and something of a fortress at the same time. At the Anaconda exhibit, for example, two-way cable brought a music teacher and piano student together without either leaving his own home. And, at the same time, the Anaconda system was monitoring the house for fire or theft as well as reporting to the local utility how much electricity that music learning console was burning.

Veteran NCTA convention goers, although impressed with all the showmanship, were inclined to agree with the sentiments expressed by the C-Cor people: "Two-way is kind of an emotional bit that has overtaken an industry prone to fads."

But if it wasn't just a fad, C-Cor was not about to be left out and the dominant theme of its booth was two-way.

The majority of amplifier manufacturers were touting two-way capability. Cascade, a pioneer in two-way last year, stressed practical applications such as monitoring amplifier performance and return of originated programs to the headend. CAS Mfg. Co. on the other hand, a recent convert, said such mundane info could be handled by separate cables and the return channels should be used for far-out data information such as remote use of computers in the home.

The theme of the CAS exhibit was TOCOM—TOtal COMmunication. Downstream transmission was seen as capable of 25 to 36 channels. Upstream was in the 10 to 30 MHz band. The TOCOM concept envisioned the TV receiver as part of the system and therefore CAS would redesign the TV set to cable operator needs—meaning it included a 36-channel tuner-converter and a transmitter to talk back. The transmitter portion, digital in operation and crystal-controlled, would send back to the central office the subscriber's identifying base frequency and peripheral information as generated by the subscriber. The central office would have a computer do all of the things proposed for CATV. So far the TOCOM system is only a mass of words, but CAS said it was planning to build a model system in Irvington, Texas.

Here's a quick rundown of some of the two-way capability shown by other amplifier manufacturers:

Ameco—stressed selective two-way service for existing systems and showed a filter and separate amplifier (both enclosed) to shunt sub-band signals (5 to 40 MHz) back upstream.

American Pamcor—as the distributor for Lindsay products, showed a similar self-enclosed sub-channel amplifier (5 to 30 MHz).

Anaconda—stressed the Century 21 thin-film hybrid amplifier as the best amplifier for any purpose, single or two-way, but also devoted a lot of space to two-way capability.

C-Cor—emphasized sub-channel amplifiers (5 to 40 MHz) with or without crossover filters.

Cascade—demonstrated 5- to 25-MHz sub-band amplifiers for incorporation into standard Unicom trunk amplifiers.

Electronic Industrial Engineering—as a new company, EIE was busy showing its total capability, which meant that two-way amplifiers were proudly displayed.

HTV—showed full range capability such as combination trunk and bridging amplifiers with sub-channel capability on all four feed ports and bypass filters for line extenders.

Jerrold—stressed using two-way taps and line extenders now if two-way operation is anticipated and said modification of trunk amplifiers could come later.

Kaiser—devoted a small panel to two-way but did not stress subject as did others.

Sylvania—showed working equipment and oscilloscope response of bidirectional amplifer (module in the trunk amplifer).

Vikoa—showed new 28-channel mainline and bridging amplifier (which also featured a no-bolts, cam-locking enclosure) capable of accepting a sub-channel amplifier module.

Entron and SKL didn't highlight two-way although Entron was discussing a microwave alarm system which it would franchise to cable operators.

Although the major amplifier

manufacturers were aboard the two-way bandwagon, it was a non-amplifier company that showed a total system capability of taking information out of the home and back to the central office. That company was Advanced Research Corp. and it recommended two cables rather than bidirectional amplifiers. Advanced's argument was that active amplifiers aren't needed for much return data therefore an amplifierless system is more reliable—an important feature for fire and burglar alarm services. The company's Versacom system is built around a CRT central station monitor which presents a panoramic view of the entire alarm system in a grid form. Subscriber addresses emitting signals are further identified on Nixie digital readout tubes and recorded permanently by a printer. In operation, a scanner at the central station generates interrogation signals, and receives and interprets return signal from the remote transponders. Transponders take signals from transducers located in subscribers' homes. Advanced claimed to have practical transducers for burglary and fire alarms, and an encoder for utility reading. (A proposal for a meter reading scheme was also shown by the McGraw-Edison Company at the Anaconda booth.)

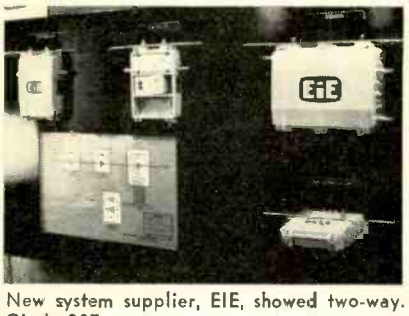
When the market is ready for TV shopping and audience measurement, Advanced said Versacom would be ready. On this score, though, General Electric took the lead by showing a prototype of a possible subscriber responder terminal for this purpose.

Two-way was a popular theme at engineering and management sessions. Engineering papers on such transmission systems were delivered by engineers from Anaconda, Jerrold, Sylvania, Ross Telecommunications, HTV and a reprint paper given by Michael Rodriguez at the National Canadian CATV Convention was distributed by Vikoa. During the management session, an electronic mail system was discussed by William Gross of GE (See *BM/E*, May, p. 40) and a total two-way system by Edward Harmon of Subscription Television Inc. (See *BM/E*, June, p. 28). Herman Moeller, a consultant, told the CATV industry if they didn't move into the meter reading field soon, that particular business would go by default to the telephone companies.

Continued on page 20

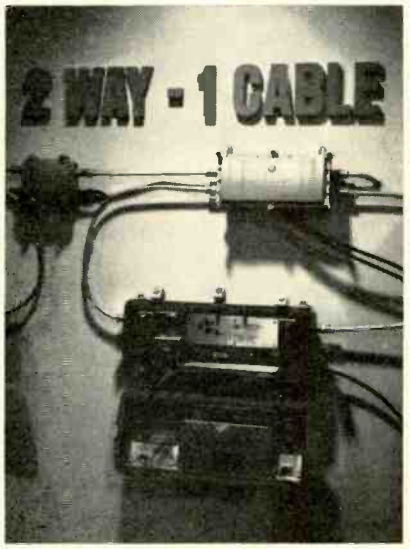
New Sylvania trunk amplifier has a sub-channel return amplifier for two-way. Circle 303.

New case and return channel from Vikoa. Circle 304.



New system supplier, EIE, showed two-way. Circle 307.

Full line of two-way items from HTV. Circle 305.



Jerrold also stressed two-way. Circle 308.


C-Cor's sub-channel amplifier. Circle 306.


Ameco showed separate amplifier for return signals. Circle 309.

For more information on these products, circle on the Reader Service Card numbers following the captions.

Program distribution links

Now fully authorized by the FCC for local distribution service (LDS), Theta-Com activity promoted its AML (amplitude-modulated link) concept which operates in the 12-GHz microwave band. System can carry all vhf and FM stations plus mid- and superband TV and telemetery signal. Theta-Com, joint venture of Hughes Aircraft Co. (which provides the satellite expertise) and TelePrompTer (which provides the CATV experience and need), said satellite distribution is next.

Taking a swipe at disadvantages of amplitude-modulated links, Laser-Link Corp. promoted a filtered pulse-width modulation (FPWM) technique as a less noisy approach. The system is in the microwave band (18.5 GHz) and uses a traveling wave tube rather than a laser as might be expected—hence the FPWM system is dubbed the Quasi-Laser Link System. (A true laser system was demonstrated at NCTA by Dr. Thaler of Georgetown University. A practical scheme for modulating lasers has yet to be developed.)

There was standard microwave gear on hand also. Collins Radio demonstrated its LMX-106 converter, which can add 60 voice or data channels to any Collins microwave system. Scientific-Atlanta showed its new Series 7000 Busi-Link microwave system designed especially to connect the studio or a remote origination pickup site to the headend. It was all solid state.

Microwave Associates showed its B-Line portable microwave system.

As an alternative to short-haul microwave links, Ameco discussed using dedicated coax cable with frequency converters and sub-channel amplifiers.

Headend gear

Headends got comparatively little attention. Dynair showed a tunable TV demodulator ($1310) which accepts an optional crystal control tuner. This unit was first shown at the 1969 Convention. It's in production now and will handle adjacent-channel color. Scientific-Atlanta and Telemet exhibited new modulators as well as demodulators. Blonder-Tongue demonstrated its custom-designed front ends with an emergency changeover feature: Automatic switching can change tuners, amplifiers, and even antennas in case of equipment failure or loss of signal. Another feature was for disaster warnings—an override function interrupts all TV channels on the cable, substituting a special channel which may be a prerecorded tornado warning or a live camera.

Rediffusion—and its U.S. associate Leghorn Corp.—demonstrated the unique dial-a-program CATV technique used in Great Britain. (See "Dial-a-Channel CATV System," *BM/E,* February 1970.) The firms made a joint announcement that the first U.S. installation using direct video on multiple pairs of cables is being installed in Dennisport on Cape Cod, Mass. The system will have capability of 36 channels, with 12 off-air programs. One exchange will be used, and it can serve up to 336 subscribers. Number of system miles is 1.4.

The Cape Cod installation will demonstrate operational and economical feasibility. To be proved operationally is the reliability of the central switch board. The economic factors involve trading off benefits (two-way communications with subscriber terminal—dial or touchtone phone—included) against the additional cost of the multi-conductor cable.

An unusual but useful product on display was the heat-shrinkable signal shield made by Chomerics. It's actually heat-shrinkable plastic tubing with a conductive coating on the inside which provides tight coupling and good rfi shielding between coax sections. It also makes a good bond between cable and an amplifier housing.

Collins added 60 voice channels to microwave (upper left, Circle 310) and Dynair showed a demodulator (center left, Circle 311).
In converters, Craftsman showed a push-button unit (lower left, Circle 312), AEL a two-way switch block converter (center below, Circle 313), and SKL a dial switch (below, Circle 314).

Latest approaches in subscriber converters

Several new approaches to the troublesome subscriber converter problem were displayed at the 1970 Convention. Craftsman, which showed a prototype unit last year, was back with a 25-channel version which it says is ready for production. It uses solid-state varactor tuning (pushbutton) to avoid rf switching. Subscriber tunes his TV set to one channel and can then use pushbuttons to select any of the channels offered (12 standard, 13 midband). The cable operator can easily blank out certain channels for a guarded service.

Spencer-Kennedy Labs showed a prototype 18-channel converter (50 to 220 MHz) also varactor tuned. To avoid direct pickup problems, the SKL system converts all incoming signals to nonstandard channels with guard bands.

AEL showed a tunerless superband (220 to 270 MHz) converter which is now being sold in production quantities. The unit block-converts seven superband channels to Channels 7 through 13. A two-position switch is all the set owner operates.

A special midband converter was shown by Electronic Industrial Engineering Company.

Originate now

Local origination equipment exhibits focused on the larger CATV systems, which must begin cablecasting in 1971 (now April—as per the latest FCC date extension). Probably the biggest buy was made by TelePrompTer, which announced at the convention an order for $1M worth of RCA equipment including the one-tube color camera, for its Manhattan system. Most of the small-system operators we talked with were interested in local origination, but couldn't justify it economically yet. Packaged systems capable of color were priced around $30,000, B & W systems about half that.

The numerous displays of live color and B & W cameras caused one observer to compare the exhibits to the earlier NAB. Most exhibitors showing cameras had the works—pretty girl models and lots of lights.

RCA showed, in addition to the color PK-730, its PK-430, a black-and-white camera which is convertible to color. (Indicating its committment to CATV, RCA also announced formation of a new Cable Systems Department with W. Thomas Collins as manager.) Phillips Broadcast Equipment Corp. stressed the Norelco LDH-1, a three-Plumbicon color camera, priced at $21,425, but also showed new monochrome models. GE demonstrated its compact and smartly-styled TE-201 color camera first introduced at NAB. It's closer to $30,000. TeleMation showed off its recently acquired Bell & Howell color cameras (IVC) and film chain (the same package offered at NAB by Visual Electronics). The prices were right —$6,950 for the IVC-100 video camera with 6:1 lens. Also at TeleMation was the two-tube Sony DXC-5000 modified to work with the multi-caster—cost $9000.

Color and B&W cameras were also shown by IVC, Sony and Ampex. Commercial Electronics showed its low-light color camera, model CEI 270. B&W cameras were shown by GBC, Jerrold, Shibaden and Vikoa. AV Systems displayed an easily-transported two-camera remote package, complete with video and audio control, monitors, lighting, and carrying cases. Jerrold, as new CATV distributor for the Visual Electronic CCTV line (formerly Raytheon), set up an elaborate origination display.

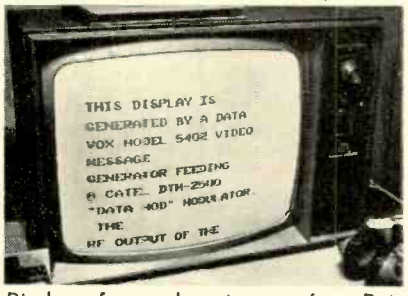
Most of the above companies also showed some projection equipment, including optical multiplexers and film chains, but "firsts" were scored by two companies: Riker Information Systems and AV Systems.

Riker showed a super 8-mm film projector camera chain (imported from Germany) that is expected to sell for about half that of 16-mm systems. AV Systems, which has been selling heavily to schools, included an opaque projector in its film chain. Printed graphics could be easily interspersed with slides, films and live inputs.

To get more out of time and weather scanners, TeleMation introduced an automatic video switcher which switches to a separate message scanner (3 × 5 in. cards) once every cycle.

New low-cost character generators were shown by TeleMation

Inexpensive film chain from AV Systems could also handle opaques. Circle 315.



Display of new character gen from Data Technology. Circle 316.


Cameras were plentiful. This one's from Shibaden. Circle 319.


TeleMation's non-duplication switcher. Circle 317.

Switchers, like this one from Telemet, were shown widely. Circle 320.

First super 8 film chain from Riker Video. Circle 318.

For more information, circle on Reader Service Card numbers following captions.

and Data Technology. GPL Singer showed, as part of the Monitel program services, a film strip projector coordinated with time, weather and message projectors.

CBS Labs was on hand to score points with operators who have had some color experience. The company showed how much better locally-produced color pictures looked after processing by the Mark II Image Enhancer ($3640) or the new CBS Labs Color Corrector ($3600) which permits color correction after NTSC encoding. Although the CBS Labs demonstration had the color corrector hooked up into a camera chain, it could be located at the headend to improve color balance of off-air signals.

Helical videotape machines were all over the place, chiefly at the live camera displays. Thus Sony had its new AV series (½-inch format to new Japan standard) working, IVC its top-of-the-line 900 series, and Ampex was featuring the 7500 series. AV Systems showed the new NEC 350 model VTR, which is color convertible and has electronic editing. Jerrold and Shibaden also had helical machines in operation.

Production switching

The growing importance of local origination brought to the convention, for the first time, Central Dynamics and Computer Image. Central Dynamics demonstrated a single but flexible switcher—its VSE-741 production model for cablecasting. Four rows of buttons offered Preview, Program, Mix/Key A and Mix/Key B. A three-bus vertical interval production switcher, the VS-152A ($1795) was shown by Dynair. Computer Image Corp. showed simple switching equipment ideal for CATV. International Nuclear displayed video and pulse distribution amplifiers.

TeleMation showed its TMP-2400 automated switcher introduced last year for nonduplication, which permits presetting 400 events for a 24-hour period.

Studio lighting

Another new concept for cablecasters to ponder was the need for lighting that local studio. On hand to help with spots, barn doors, gobos, and lighting control boards were Berkey-ColorTran, Century-Strand, and Sylvania.

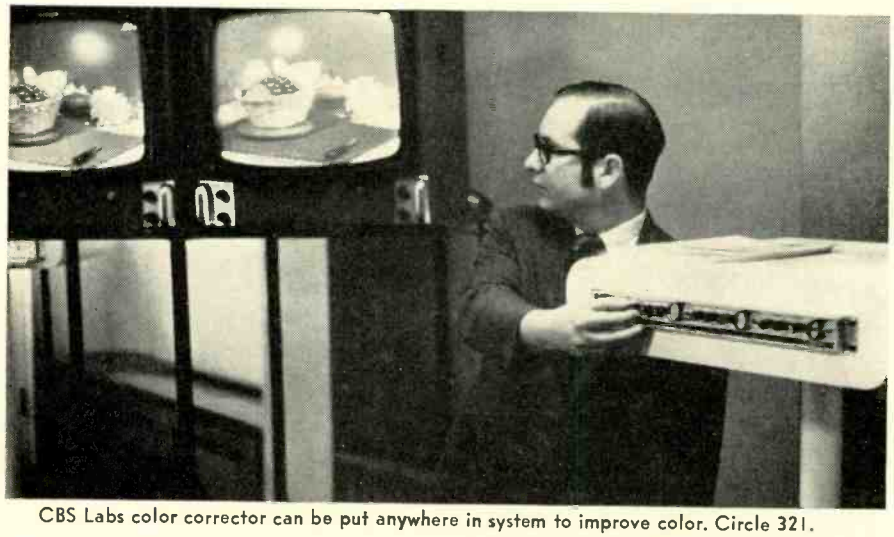
Most camera-oriented booths relegated audio to something minimal like the Shure M67 miniature mixer. But CCA Electronics, a broadcast equipment supplier exhibiting for the first time at NCTA, had a full-size broadcast console and turntables on display.

Tape-Athon and Thomas J. Valentino had automated background music equipment and services on hand.

Catel exhibited an FM stereo package, consisting of the SM-2100M stereo generator and FMX-2000 FM modulator, for local stereo origination, and an FM tuner for off-air pickup.

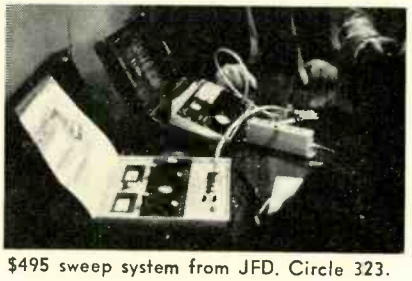
New test equipment

TeleMation demonstrated an automatic programmable system that periodically inserts VITS test signals to any channel for checking performance down the line—ideal for testing multi-channel microwave systems. Spencer-Kennedy Labs exhibited a 12-channel oscillator ($5,225) which generates a signal anywhere in the system to measure such things as cross modulation and cumulative distortion. Craftsman had a new cable-fault finder, Model 107. It operates on the principle of time-domain reflectometry. Texscan showed a new sweep generator/scope pair for checking trunk or feeder lines as well as a full line of test equipment. St. Petersburg also brought in a full line of test gear "priced for the CATV market." JFD showed a truly inexpensive sweep system ($495) for analyzing CATV/MATV installations. Secret to low cost was use of a white-noise generator (simulating sweep) which was calibrated against a crystal-controlled reference signal. It could be used with JFD's accurate field strength meter ($265), which is precise enough to do headend alignment. **BM/E**



CBS Labs color corrector can be put anywhere in system to improve color. Circle 321.

Dial-controlled switcher in Rediffusion coaxless direct video system. Circle 322.



$495 sweep system from JFD. Circle 323.

Get "in" gear

Titling Generators, like the TCG-225, handle news flash and titling needs with one or two lines of twenty-five characters each—one line horizontal crawl.

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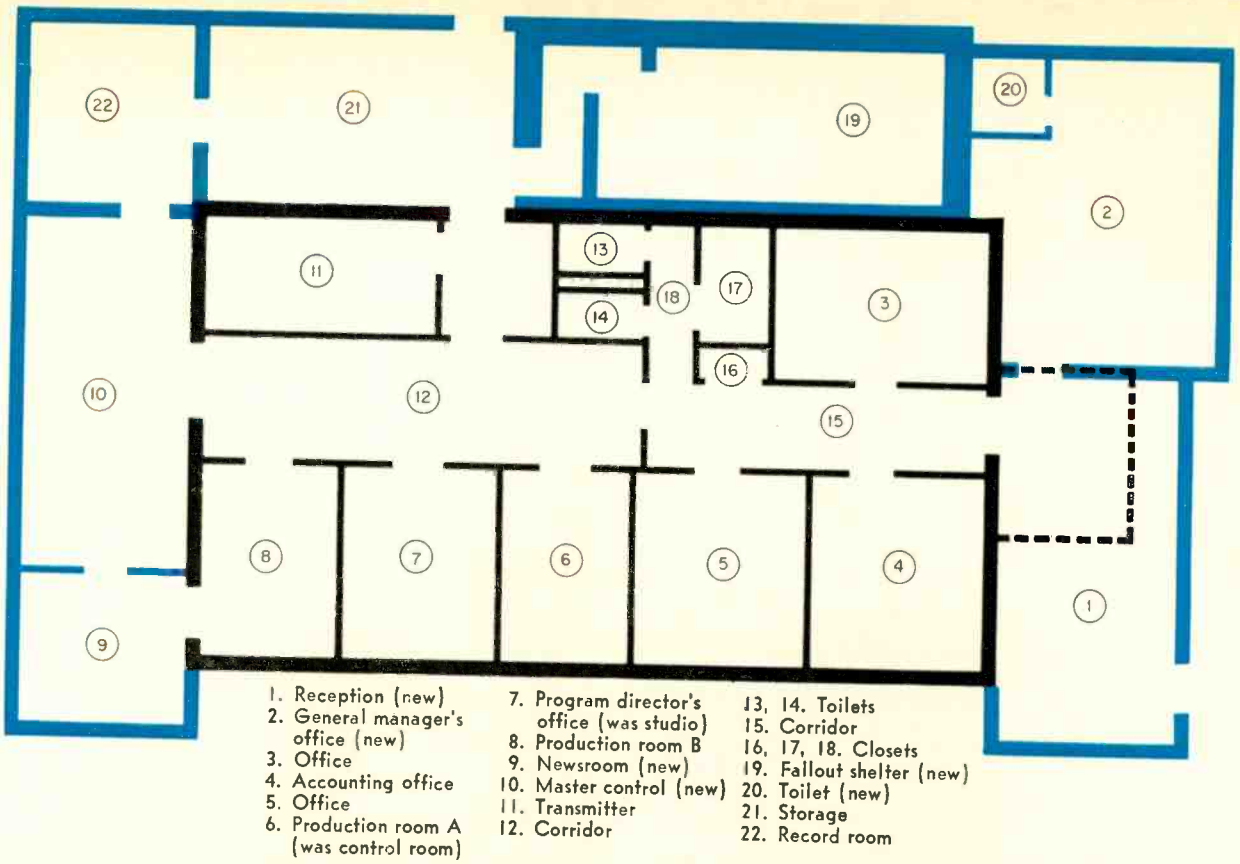


WAAX Updates by Blending Old with New

A total new look was achieved by ceilings, paneling, and coordinated colors. Costs were kept down by not touching the transmitter.

by Michael H. McDougald

DELIBERATING AND PLANNING for change has been, seemingly, a permanent job for Etowah Broadcasting from the moment it first purchased a station in Gadsden, Alabama. At the outset a new location was needed and it took two years to find a "right" location that would take a three-tower array. Mountains, rivers and flood plains had to be considered along with FCC/FAA complications. The final location, a 55-acre site, looked good; it was only three miles from the downtown area, fronted a major highway, and was alongside a golf course.

Nevertheless it was conceded at that time that this was to be the transmitter site only and that studios would be here temporarily until a downtown location could be arranged.

Times change—and areas change. In a few years it became apparent that the WAAX location was unique in a number of ways. A new dam site made a lake out of our bordering Coosa River. And though we didn't plan it, or imagine it, our location turned into a popular sports area with lovely new homes and fancy restaurants going up all about us. We realized WAAX was in a most desirable spot. We had plenty of parking, which the downtown stations were hardpressed to find. And the advantage of having studios and a transmitter together were obvious on the balance sheet.

But it was apparent that we needed more space. Already the U.S. Army Corps of Engineers had asked us to build a fallout shelter under the National Defense Emergency Authorization program. We decided it was time to add on and hopefully we could make the fallout shelter functional rather than merely a storage space which it was at most other stations we surveyed.

We also knew that if we didn't have to move the transmitter room, we'd save lots of money, but unfortunately every "add on" plan we came up with looked bad esthetically or would not give us the proper traffic flow and convenience that we needed.

It was not until the fifth plan was developed that we got away from that tacked-on look, kept the transmitter where it was, and preserved a decent traffic flow. It turned out that the addition should be a wrap-around.

When the project got underway we began to realize the mixture of the old and new would result in a contrast we did not want. We quickly revised our budget and asked the contractor for new ceilings throughout. This, more than anything else, gave us a totally new look. New ceilings with the addition of paneling and blended colors throughout were the three most important things contributing to the new effect.

Michael H. McDougald is general manager of WAAX, Gadsden, Ala.

Adding carpeting throughout also gave a class feel to the building. In the broadcasting area, carpeting gave us soundproofing that we did not otherwise design for.

We used a great deal of plate glass in the master control room area and the carpeting alone gave us the nearly perfect degree of soundproofing needed. Our news room, with two machines running constantly, is adjacent to, and opens directly into, our master control room. The carpeting provides a "hush" that is adequate. Thanks to carpeting we don't need expensive double-doors. People can move in and out of the quiet areas without bothering the man performing on the air. And the extensive use of plate glass gives us the airy, bright, roomy, and colorful look we sought.

Goals: new control room, old transmitter

We determined early in our planning that we wanted the announcer to be "King of the Mountain," although we didn't want to waste space. Everybody else's control room that we looked at had the announcer buried down in a canyon of equipment. Cart machines were the worst offenders. Today carts are more compact but when we started planning they were all large. We strove to place them so they would not stack up in tall columns and obstruct the announcer's view, yet so they would be accessible. By not losing sight of this goal we achieved a final console that is convenient, easy to maintain and, we think, beautiful.

Another goal was to prevent remodeling from interfering with daily operations. Thus a job that should have taken three months actually took over a year—but we were never unduly inconvenienced.

The plan called for building a completely new master control room. The old control room was to be remodeled into a production room and the existing production room updated. To save money, we decided not to budge the transmitter an inch, as mentioned earlier. For economy's sake we also decided not to move bathrooms. New tiles and a new ceiling modernized them.

Because we were building a new control room, we were able to remain in the old master control room until the new one was finished. We moved over only the three ATC cart machines, one by one, the last one going the night of the switchover date.

A customized console

Though we saw numerous boards we would have liked for the master console, all factors seemed to point to a Gates Diplomat. We didn't think we could beat it cost-wise, and we had excellent success with other Gates equipment. (The station has used the BC5P Gates 5-kW transmitter for over ten years. Our original console was a Gates SA-40 and it is still in use in secondary production. The console we were giving up was the Gatesway.)

We are pleased with the board after some original problems with defective volume controls finally got straightened out.

We didn't freeze the plan on the master console until the new board arrived. We set it on a table and began to experiment with various setups. Somehow or other we kept getting a unit that was too high off the floor. The cart machines were the trouble. Finally it dawned on us that we could drop the rear portion of the console down into the supporting table without affecting the front panel. (This was because of the semi-circular type of construction of the Diplomat.) We could then place the carts on top and still keep the height unusually low.

Once the configuration was set, two excellent cabinet makers did an outstanding job in giving us a French Provincial appearance. Liberal use of piano hinges and knockout panels permits fast access to equipment. See photos on page 27.

We have always felt that if the announcer has the best sound available, he would be stirred to do the best job possible. We use stereo cartridges for our record pickup since all records will sooner or later be stereo. Our hookup, of course, is monaural. We do not use the master amplifier in the Diplomat but wire directly into a McIntosh 30-

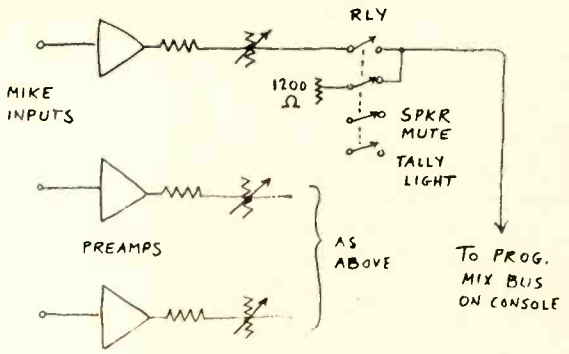
Old WAAX building went up in 1959 when the three-tower antenna array was put in. Studios were temporary.


New WAAX studio-transmitter complex grew around the old, blending the two into a modern, attractive building.

Gates 5-kW transmitter (right) remained in place as new master control (background) was developed.

Outboard Mike Preamps

Once an announcer sets the level for his mike, it seldom needs changing throughout his shift. Why tie up a console fader with the announce mike, when the fader won't be used? Using that reasoning, WAAX Chief Engineer Mel Rogers built an outboard unit consisting of three mike preamps, three pots, and relays. The unit handles the announce mike and the two news/interview mikes at the desk in front of the console. Output goes straight to the program mix bus in the Gates Diplomat console. The outboard assembly is mounted in the lower right portion of the horseshoe console desk, where it can be reached by the announcer when he needs to set level. Most important, it frees three console faders for use with sources which require gain riding.



Details about the outboard preamp package:

- Preamps are by Russco Electronics.
- Pushbuttons are by Ampex.
- Pushbutton switchguards are from Allied Radio.
- Relays are Potter and Brumfield, Type AP17D, 4PDT, 24 Vdc, with four sets of contacts.
- One set of relay contacts connects the preamp output to the mix bus.
- One set of relay contacts bridges a 1200-ohm resistor across the mix bus when the preamp output is disconnected.
- One set of relay contacts mutes the control-room speaker when the mike is on.
- One set of relay contacts turns on a light on the control panel when the mike is on.
- A diode rectifier was used across the relay coil to prevent popping.

watt power amplifier—to give us what we consider the highest fidelity possible. We pipe this within the station through a Bozak speaker system which includes a 12-inch woofer, a midrange and a set of tweeters. The sound is astounding. Incidentally, we are not a good music station in the usual sense—we program a modern Nashville country sound.

Since we are monitoring through our high fidelity system rather than off the air, we need communication between the transmitter engineer and the announcer. A silent sensing relay and a buzzer are used to alert the announcer if he needs to tighten his production or if something has gone wrong.

A pot for everything

In planning our console, we hoped to be able to delegate a volume control pot for each input. Some stations will put a tape recorder and turntable on the same input, necessitating a switch. Or, the telephone input may be on the network input—some days you need both of these together. There are consoles on the market with lots of pots but they cost nearly $10,000. We decided on the ten-input Diplomat but we decided to use the normal microphone input channels for other purposes.

If you stop to think about it, main announce mikes and news/interview mikes are usually set only once a day—and maybe not even that often if you don't change newsmen. So we had our chief engineer make up a special microphone preamplifier package that would handle three mikes, each with its own volume control and each wired into the Diplomat board past the normal microphone input channels. See box above.

The preamp is placed on the lower right hand side of the operator, below a patch panel, where it can be easily reached for adjustments.

We turn on our microphones with pushbuttons. There are 12 pushbuttons with guards along the console desk just at the bottom of the volume controls. These switches activate ratchet step relays which turn off and on other control items as follows:

1. Tape #1
2. Tape #2
3. Turntable #1
4. Turntable #2
5. Master microphone
6. Announcer mic #1
7. Announcer mic #2
8. Cart #1
9. Cart #2
10. Cart #3
11. Time tone
12. News beeps

Announcers agree that pushbutton switches make life easier—a great deal of reaching is cut out. Each switch has its own on-and-off light so the operator knows what is running. A wall display also indicates which mikes are on.

Our volume controls are hooked up in the following manner:

1. Tape recorder #1
2. Tape recorder #2
3. Emerg. Mike
4. Turntable #1
5. Turntable #2
6. Cart #1
7. Cart #2
8. Cart #3—also telephone and remote
9. Net
10. Two-way

Note that every volume control has its own thing and need not be switched off its assigned duty except for the third cart machine. Although we allowed for an emergency microphone, we are thinking of moving the telephone to that position. Remotes are patched in through Cart #3—most of which come in by FM or two-way radio.

No booths

Our News/Announcer table is only a couple of feet from the master console rather than in a separate room, which is customary. The carpets keep noise down and the newsman can get cues more efficiently when he is in the same room with the main announcer—especially during election night and other specials. The news table is equipped with two pushbutton switches.

We long ago decided that we could not simulate good sound from within our own studio for any musical endeavor, so we sold our piano and turned the main studio into the program director's office. If we want a musical program we do it live (via Marti two-way radio) or on tape from a church auditorium where the quality is far better than we could devise from our own studio.

We have no regrets about having only one on-the-air operating room—it hasn't prevented us from becoming number one in our market. Extensive use of patch panels permits us to patch almost everything to anything.

No "make do"

There were many temptations in the building program to "make do." For instance, in building the master control room and the console cabinet it would have saved us time and money to just hang our mikes somewhere, simply prop our flip cards and tack on our temperature gauge. Instead we went for design integrity. Our mike Dazor arm was placed on a matching pedestal, our flip cards on a handsome walnut stand and so on. The decorator chose colorful blends of wallpaper and draperies to match. It would have been cheaper to go to a variety store.

We were tempted to use our existing mikes and maybe add only a couple of new ones. Instead, for overall continuity in our operations we chose new Electro-Voice 666 mikes. They seemed extremely popular in the industry (we had seen a lot of them in our trade magazines), and they were light and compact, and offered excellent quality. We decided we had no need for multi-directional types, so we bought six 666s and have been pleased with the choice. We don't think you can beat Gray transcription arms and we have used numerous cartridges in them, but have settled on Stanton 500s for a test period.

We thought our beautiful design ideas might fall apart when we got to the subject of where to store cartridges. We studied metal cabinets, wire racks and peg boards, and finally settled on drawers. They are convenient and no eyesore.

Speaking of beautiful design, we outdid our plans when it came to the general manager's office. Simply by accident the GM's office was the last to be worked on and we realized it would look pretty much like all other offices. So we asked the builder to substitute wainscoting and wallpaper for paneling, which he did for little or no extra. Then we proceeded to make it a showplace by choosing rich carpeting, building in book cases, and adding some smart furnishings.

The office carries a prestige which has definitely impressed our public. There is no question but that people like to deal with success and our office speaks softly of the success of our operation.

The cost

What did it all cost? In round figures about $75,000, which is not inconsiderable. However, we gained a complete fallout shelter, which we use daily as office space (with kitchenette), and an emergency generating plant (located in a separate Butler steel building). The NDEA program paid for both of these items so our actual cost was

Continued on page 45

Console has French Provincial look courtesy of a talented local cabinet maker. Note roominess achieved by plate glass.

Diplomat console does not sit flat but is recessed on a slant into the cabinet.

Entire wiring is accessible by hinging cart machines up and console panel down.

Designing and Lighting the Cyclorama

By James L. Moody

For big, crisp, lively pictures of network quality you need a cyclorama. Here's how to get one.

THE CHANCE that a cyclorama was planned for in a facility only three years old is unlikely at best, and whether you are convinced of your need now is probably doubtful. Much of this doubt can be dispelled with a clearer understanding of what a cyclorama can do for you in production. How you should plan for it, and what is involved, are no secondary considerations either. Helping you decide on the material, color, size and length for the cyclorama and, most important, how to light it, are the aims of this article.

Needed: one cyclorama

What if the local baseball team wins the state championship and the program director decides it would be a great idea to have the whole team on the news. Where do you put 20 teenagers? The best place is in front of a cyclorama. If you land the local auto dealer to sponsor your late night movie, you may be called on to do on-the-air or taped commercials of his cars in your studio. You need a stretched cyclorama for this and it should be lighted evenly. You wish to accent the car and not clutter the picture. This will make the car stand out, and if the car is properly lighted, it will shimmer and shine.

A cyclorama for every budget

There are as many different materials used for cycloramas as there are studios with small production budgets. The choice of material can be based on economics, taste or, more realistically, availability. The type of cloth used is extremely important. The effect desired depends as much on the material as on how you light it.

The best colors for your drapery are white, cream, or buff. This allows you to light the drapery in different colors and create two, three or more draperies from one. By playing different colors or combinations of colors on your neutral-colored cyclorama, you are able to create several backdrops from the same cloth.

Cycloramas fall into two basic categories: stretched and draped. Stretched materials are usually of a cotton base. Muslin heads the list of most-often used fabric. It is inexpensive (60 cents per square yard at the local drygoods store), and it is usually unbleached—it will shrink unless a sizing is added. Generally, you will not find widths of over 45 inches available in local shops. Widths up to 120 inches are available but harder to acquire, because a special loom is needed. The most likely place to buy this is a theatrical supply house. The cost can go to $1.60 or more per yard in 120 inch widths.

Always seam the material in a horizontal direction on stretched cycloramas. The trick is to seam the material as straight as possible, because when it is stretched, poor seaming will pucker.

Muslin is a light-weight material (3.8 oz. per square yard). Because of this, it is best to weight the bottom of the cloth with pipe or chain so that normal air movement, or someone walking behind the cyclorama, won't cause the drape to ripple.

There are advantages to leaving the muslin colored off-white or buff, but it can be dyed cheaply if desired. Muslin can also serve as a poor man's scrim* or semi-transparent (41 percent) cloth that, when lighted from behind will appear to be a haze. This effect is useful in creating a mysterious or dreamlike quality for the setting.

If a stretched cyclorama is used, it can be tilted toward the lighting fixture to permit more even illumination (see Fig. 3). A stretched cyclorama is used for large area coverage. Used correctly, it can give a feeling of infinite distance. Lighting it evenly in one color will liven the picture and provide an inexpensive backdrop for a dance group or choir. Just change colors, and you will have a new backdrop. Several colors can be played on the cloth to create a collage effect. Choosing the correct color can turn the cyclorama into a chroma-key background.

The heavy velour so common in theatre should be draped only. It will absorb about 60% of the light shown on it. This is handy to keep unwanted shadows out of sight, as it absorbs 80% of ambient light. It approaches a true non-reflecting surface. The cost, again, is high ($4.00 and up), and unless you can get a good buy on secondhand goods, it may not be practical. It is an extremely

James L. Moody is a studio lighting expert and technical sales administrator for Berkey-ColorTran.

*A true scrim material, when lit from behind only, will almost disappear. A problem is that stray light from the front will tend to cancel the backlight, so be careful when doing your area lighting.

For those who have the money, shark-tooth scrim sells for about $14.50 a yard. It is the best scrim available. Bobinette, cotton net and nylon net are also used for scrims. Prices range from $10.50 per yard (216 inches wide) to $3.25 per yard (72 inches wide). There are some nylon-base fabrics which can be used. They offer the adantage of being extremely consistent in weave and color. Nylon is also more expensive, averaging about $1.25 per square yard. The use of a scrim is limited in television, but it nevertheless has value when used with discretion. Stringing miniature Christmas tree lights behind it can create a night sky effect. The real question is whether the cost or frequency of use justifies the scrim.

durable cloth and offers a long life and the look of quality and elegance. It is questionable whether elegance is a quality that can be seen on camera, and it is therefore probably not justified. Elegance can be created by proper lighting and correct selection of color. Using the material hung in folds can create a rich interior or a backgroup that represents a rich interior for a dramatic show or an early-morning talk show.

Practically speaking, the family of materials made of cotton is best for draperies. These materials are readily available and priced within most budgets. Some cotton materials are:

Material	Price per Sq Yard	Opacity
Duvetyne	$ .70	66%
Repp	.85	81%
Monks Cloth	2.00	73%
Velveteen	.85	89.6%

Silks and satins can also be used to create "wispy" effects but are shiny and reflect light, which can cause lighting problems. A combination of stretched and drapery materials is usually kept on hand. Several small pieces of drapery come in handy to meet the requirement of a quick backdrop for a speech or an in-studio interview.

You might want to consider several other materials: indoor-outdoor carpeting and plaster. The carpeting idea, which offers sound-proofing and durability, has yet to be applied to any great extent, but there is a studio under construction which will use carpeting for both the walls and the floor. By curving the bottom of the wall, the station hopes to create a true unseen horizon. The color chosen is a buff. A primary color would not allow for any major color change through lighting change. The buff or cream colors are best but are becoming hard to get. One major carpet supplier, Ozite Corp., reports it is discontinuing these neutral colors because of lack of demand. However, there are other carpet suppliers, so do try for the neutral colors.

One of the big advantages of carpeting is that it can be cleaned, and if a portion is ruined or worn, it can be cut out and replaced without leaving any sign. Another excellent characteristic is sound-proofing.

Building a plaster cyclorama is very tricky and an expert is needed. Seams or uneven application will result in a picture with lines on the background. Marks made by bumping into it will show and are difficult to remove. If the plaster is formed into a four-foot radius curve at the bottom, it will appear as an infinite background, which gives the illusion of a larger studio than you really have. If you use a curve, reinforce the structure so people can walk on it.

How big?

No matter what material is used, the questions of length and height are important. The size of the room is a determining factor, but not as important as what lens is used on the camera. If, on the farthest pullback, you can show ten feet of back wall, then a cyclorama should be 12 feet, or two feet higher. Generally, a cyclorama should not be shorter than the grid height. This rule is not appliable to movable-pipe systems. If the coverage of the lens is 18 feet across, then obviously the drape should be that long. The drape should be longer to accommodate two or more settings of a pan shot. As a rule of thumb, half of the studio walls should be draped. This allows for the placement of sets when a shot will pan 180 degrees from one set to another. This is a technique used on many shows.

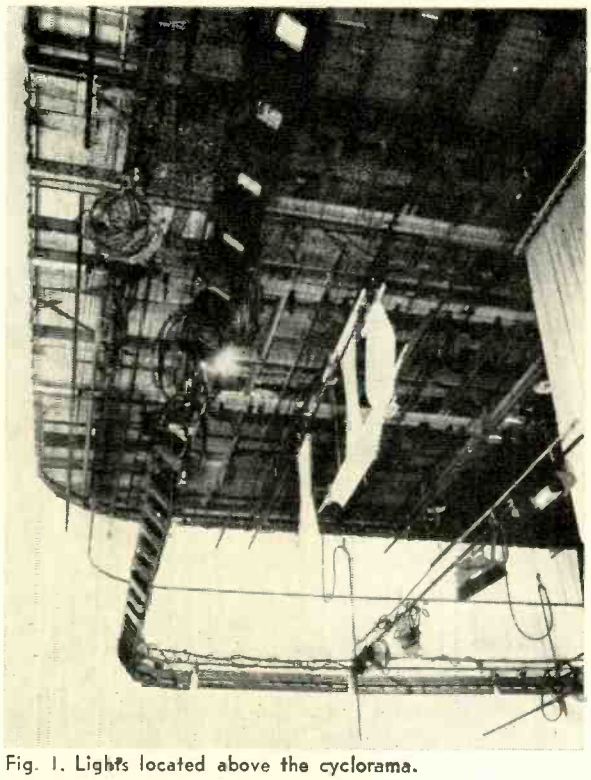


Fig. 1. Lights located above the cyclorama.

Fig. 2. Lights located below the cyclorama.

To light this big piece of cloth, you need lighting fixtures designed specifically for this important job. The basic need to light the background separately from the subject is universally accepted. It gives depth and a feeling of space between the subject and the background.

Before you plan the lighting you must first de-

cide whether you are going to use a plaster, stretched cyclorama, velour, or cotton. These materials dictate the mounting position of the lighting to be used on the cyclorama.

The high-intensity type of fixtures are best suited for today's production requirements. They normally use 1000-W lamps and have reflectors designed to give an even light distribution to the drape when mounted above or below. Properly positioned, they can achieve a light distribution of less than ¼ of an *f*-stop variation from top to bottom of the cyclorama. All such fixtures are not the same, however, and a great deal of difference can be observed from manufacturer to manufacturer.

High-intensity cyclorama lighting strips come in combinations of one to four circuits. With multiple circuits several different colors can be mounted in the fixture. One color can be used in one scene, and the next act gets a new background simply by changing circuits—or two or more circuits combined.

Generally, two circuits are used in television, but three can be useful. Three- or four-circuit strips tend to bring in other problems, though. With only every third or fourth light on, vertical evenness of light can become a problem. Secondly, it is extremely difficult to light around a corner, especially a tight corner. Great care must be taken in positioning and tilting the fixture to get even lighting distribution. Usually, mounting distances are increased for three and four-circuit units.

Use color fixtures

Be sure that the high-intensity fixture you purchase will accept all color media. There are four media presently available: Glass and three flexible materials. Glass has the obvious disadvantage of being breakable.

The other media are: gelatine, plastic, and the new Mylar(R) base products. Gelatine is the next oldest to glass as a color media. It is extremely vulnerable to heat and moisture. Color consistency is poor, and short color life is the rule. Plastics offer fewer moisture problems but are still poor in their resistance to heat. Their life is longer, and color consistency is better than gelatine, but not to an acceptable level for broadcast usage.

Berkey-ColorTran, Inc. introduced a Mylar(R) base material about a year ago which has met with great success. The Mylar(R) provides a better base than plastic or gelatine. It is more durable, it is practically tear-proof, and its heat resistance is superior to gelatine and plastic. Color life and consistency are also greatly enhanced.

The choice of colors used should be limited to the primaries, blue being predominant, but red, amber and green are useful. Combining the three primary colors will give, theoretically, any color you want. Practically speaking, the color of the background should not be the same as the dominant color used in the set or dress of the actors. White is quite useful at times, as is a black background. But color television demands color, and what better way to use it than to frame your talent against a pleasing, shocking, restful, wild or fun background.

Before the development of the new, high intensity fixtures, scoops were used quite universally. There are many studios which still use scoops. They are impractical from the standpoints of efficiency, even distribution of light, and the physical space they take up. If you are working with a low grid, you can't afford to have these fixtures hanging down.

Strip or x-ray lighting fixtures do not all produce an even wash of light. Those using PAR and R type lamps are extremely inefficient and are not recommended. This type of fixture does not produce enough light intensity for televised or film work.

A cyclorama that is 12 to 14 feet high can be lit by a single row of high intensity cyclorama strip fixtures. If the drapery is to be higher, 14 feet to 25 feet, two rows are required, one at the top and one on the bottom. The distances given below reflect generally sound standards, but the user must be ready to do some adjusting after the drapery and fixtures are positioned. The reflectance of the cloth and height of the cyclorama are the important factors here.

Generally, four feet from a 12-foot cyclorama for most draped or stretched materials of a buff or cream color will be suitable. A 16-foot cyclorama of the same materials will usually require a spacing of 4½ to five feet. A curved plastic cyclorama of 12 feet can be lit 4½ feet away, to allow for the curve. At 16 feet, the same cyclorama requires that the fixtures be placed six feet away. If the cyclorama is only high enough to require one row of strips, it is best placed above the cloth, Fig. 1. Placement on the floor offers ease of re-gelling, but it is a permanent obstruction and will be bumped and moved until the relation of the cyclorama to the lighting fixture no longer resembles the original placement.

When your cyclorama is high enough to require two rows of lights, the bottom row can be placed on the floor and hidden by a ground row, Fig. 2. This can be nothing more than two-or three-foot high stage flat painted the same color as the floor and running the length of the cyclorama.

A four-foot radius curved unit built of basswood can be constructed to simulate the infinite horizon concept, but usually it is only partly effective. Another method is the cyclorama pit, Fig. 3. This method, generally, must be planned for in the studio construction. It requires that a pit two feet deep and three feet wide be dug the required distance from the cyclorama. This method eliminates the need for a ground row and gives a cleaner line to the background picture. Just watch out for people stepping into it!

A double track cyclorama is not uncommon in larger studios. It is simply two cyclorama tracks

set six inches to a foot apart. The same lighting fixtures serve for both. Usually the front track will be a scrim or stretched cyclorama and the back one a draped material. These arrangements offer obvious flexibility.

A method of using a scrim and stretched cyclorama with a light pit is shown in Fig. 3. Lighting the back cyclorama from the pit and the scrim with a top strip fixture creates a sense of depth.

Consider power requirements

The consideration of power distribution is also extremely important. It is best to provide power for cyclorama strips all the way around the studio. This power should be on a special set of battens running parallel to the cyclorama. If the cyclorama is built with a corner, it should be at least a five-foot radius and be lit by three two-light or three three-light strips. Any lesser quantity will not give an even light to the corner.

Balance is the key to lighting between the cyclorama and the light on the talent. The ratio of Key, Fill and Back lights is usually well understood, but the ratio of these to the backdrops is often not considered. A 400 fc key light can appear as no light at all if too much light is on the backdrop. Keep in mind that the color filter used will cut the cyclorama light output by 60% to 80%. This is the reason for the 1000-W lamps. Most of the intensity is lost when the light is used with a color filter. If one circuit remains clear of filters, it may prove to your best advantage to use 500-W lamps in that circuit. Often, color broadcasters lose sight of the black-and-white audience who find backgrounds blending into dress and furnishings because the ratios of intensity and color transmission are not carefully considered.

Dimmers needed

This leads us to the item usually lacking in studios: dimming. Although various people have expounded on the need for lighting control equipment, their reasoning seems to have fallen on deaf ears, or it just hasn't reached all the station engineers. If you think you can't dim in color broadcasting, ask any network lighting designer if he'd rather give up his right arm. While the key light is a touchy thing (although it can be dimmed slightly), the biggest need for dimming is in the cyclorama. To eliminate the problem of overbalancing the talent or subject, the ratio of intensity must be maintained if the best possible picture is to be presented. That ratio can be generalized as 50% of the back light, but because of changing sets, talent, or products, this balance must be flexible. The changing of colors or mixing must be done with dimming for economic as well as artistic reasons.

The power required to light a functional-sized cyclorama will be the largest single power draw you will have in the studio. Most studios use more

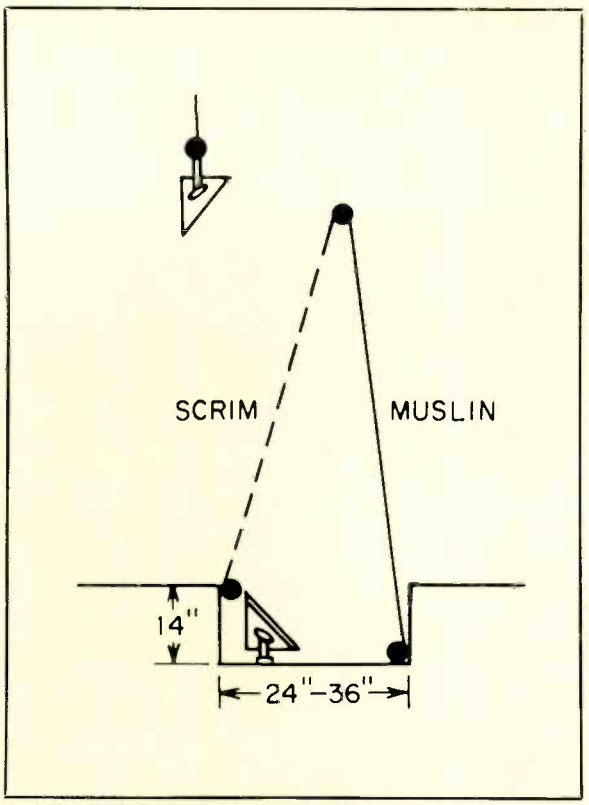


Fig. 3. A stretched cyclorama can be tilted for even lighting, or adjusted for back lighting.

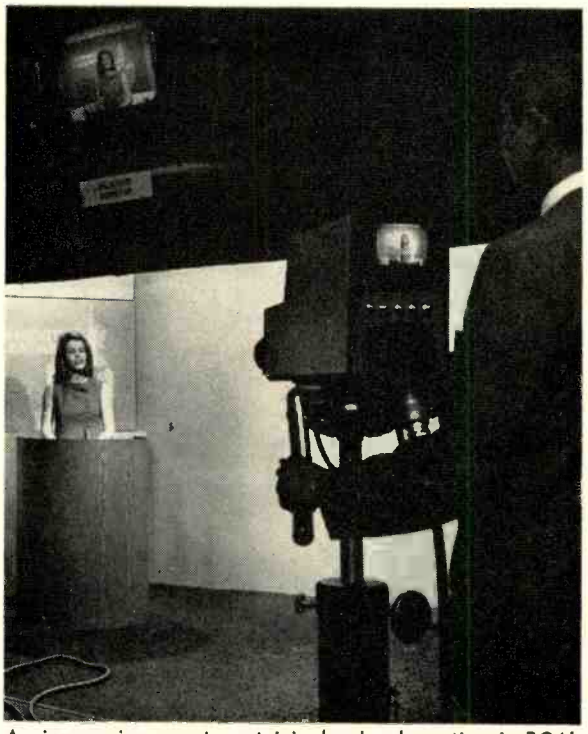
power on the cyclorama than over the entire production area. For example, a 64-foot long cyclorama, lit from only the top or bottom, uses 72,000 watts of power. This is why early planning of main power feeds is extremely important. Dimmers used for this purpose should be the 12-kW size. When the cyclorama has two circuit strips, you should plan on enough 12-kW dimmers to handle the entire length of the cyclorama in both circuits. The control should be planned so that by adjusting two controllers, you regulate a section of the cyclorama in both colors. You may end up with a couple of 6-kW or 3-kW dimmers required to round out the control power needed to light the cyclorama.

In the case of a three-circuit strip configuration, the best situation would be to have full dimming capacity for all three circuits, although in all but the largest studios, this is usually impossible. The alternative is to repatch the needed circuits at the patch panel, or have a delegation function designed into the control console and patch panel. While the show is in progress, it is possible to repatch the needed circuits without interfering with the program. Usually, just two circuits are used at once or alternated.

All considerations taken into account, either for financial or practical reasons, the real question is how professional a picture you want. Will a flat, uninteresting picture do, or do you want a picture that is lively and crisp? A well-lit cyclorama is a big step toward achieving that picture. **BM/E**

CCTV that can grow

By David L. Bower



An inexpensive way to get into local colorcasting is RCA's PK-730 one-tube color studio camera, shown here in the demonstration booth at the June NCTA Convention in Chicago. Cost is under $10,000, much less than broadcast gear.

CATV local programming will begin for many systems on or before April 1, 1971. You may start with a single camera and a VTR, but why not plan ahead to the day when you'll do live high-school football remotes? Here's how to invest your video dollars wisely.

NOT TOO MANY YEARS AGO, just about the only way to set up a television system was to buy expensive broadcast equipment. Today, comparatively low-cost CCTV gear—both black-and-white and color—is available from a variety of manufacturers. For $6000 you can buy a B&W camera and VTR. Color starts a bit higher

Small systems usually grow into large ones. Instead of simply replacing the initial setup with more costly and versatile equipment, it's much more economical to plan ahead. The idea is to include the original gear in the later system. That way, nothing is discarded. There are two general plans of action:

- Buy equipment which can be expanded with plug-in printed-circuit boards and/or manufacturers' update kits.
- Buy equipment which includes all anticipated technical capabilities.

The first method is cheaper, but the second is more practical from an engineering standpoint.

The simplest CCTV system consists of a camera, a monitor, and a videotape recorder. Expansion means adding more of the same, plus switching and audio equipment. But there are different requirements for single and multi-camera operations. The same is true for the other equipment.

David Bower is chief engineer of Television Services at the University of Tennessee in Knoxville.

Cameras

Black-and-white or color? That depends on what you're going to telecast. B&W is less expensive and useful in relatively noncritical applications in business, industry and education. A B&W camera requires only simple studio lighting and staging. Color is more expensive but necessary where the subject matter requires it, as in medicine and art. And since many CATV subscribers are used to getting most broadcast programs in color, cablecasters should plan ahead to local origination in color.

Broadcast color cameras use three or four pickup tubes and are quite expensive ($50,000 and up). Much more realistic for CCTV use is a one-tube color model costing around $10,000. A few types are available as B&W with an expansion kit for color conversion.

What type of camera tube—vidicon or Plumbicon? The vidicon produces a sharper picture, costs less, has a longer life, but requires more lighting. The lead-oxide Plumbicon gives a softer picture, costs more, has a shorter life, but produces good pictures at lower light levels. Some cameras will accept either kind of tube.

Should a camera have a viewfinder? A fixed camera, as for surveillance, doesn't need one. But if a cameraman has to frame shots on a program, he'll need a viewfinder. With some brands, you can buy the camera now and the viewfinder later.

Composite or noncomposite video output? The single camera driving a monitor and/or VTR usually produces composite video (picture and sync). In a multi-camera system, sync is added at the switcher, and the camera must produce noncomposite video (video without sync). Some cameras produce both.

Internal or external sync? The single camera must generate its own sync, but in a multicamera

installation a separate sync generator usually supplies drive pulses to all cameras. Some cameras are capable of either mode of operation. By the way, the camera should have a phasing control, to compensate for pulse delay when two or more cameras are used.

Zoom or fixed lens? Today only low-cost B&W cameras use fixed lenses. A fixed lens costs less but restricts the usefulness of the camera. A zoom lens is more expensive but makes possible a smooth one-camera program which is very difficult to do with a fixed lens.

Monitors

A monitor accepts either composite or noncomposite video, but not rf. A receiver accepts on-channel rf, and a jeeped receiver also accepts composite video. A monitor used with a single camera, or in a multicamera installation after the switcher, must accept composite video. But in a multi-camera installation, the monitor at each camera control unit must accept noncomposite video and external sync. It seems more useful to buy monitors which can be switched between composite and noncomposite video.

Videotape recorders

Broadcast standard quadruplex VTRs cost from $20,000 to $100,000. While they produce excellent color pictures, they are just too expensive for CCTV. Fortunately, there are many helical-scan recorders on the market, ranging in price from $650 to $30,000. The less expensive machines use ¼-and ½-in. tape and are useful in relatively noncritical applications in business and industry and instruction. While some will handle color, generally the VTRs using 1- and 2-in. tape are more readily available in color versions.

The worst bottleneck in helical VTRs today is the lack of compatibility between brands. With very few exceptions, a tape recorded on a Brand X machine can't be played on a Brand Y model. If your facility plans to exchange tapes with anyone else, find out what kind of VTRs they use or plan to get, and plan accordingly. Many CATV systems are using 1-in. VTRs.

Some desirable features in video recorders are electronic editing, a servo system that will lock up to external sync, remote control, vertical rack mounting, and sync-processing equipment. The last is most important in cablecasting, as the composite video output of a helical VTR should be cleaned up by a processor before it's put on the cable. This will present a cleaner, more stable signal to viewers.

TeleMation's TMC-2100 B&W camera can be had with viewfinder and zoom lens (top) or sans viewfinder, with fixed-focal length lens (bottom), depending on use.

For a thorough discussion of helical features and a list of formats by brand, see "Helical Video Tape Recorders," *BM/E*, April 1970.

Switchers

When you buy a second camera, you'll have to buy a switcher also. In a simple two-camera system, a mechanical video switcher without a lap dissolve is usually adequate. It switches composite video.

But a two- or three-input switcher has very limited usefulness. It's usually better to select a model with six or more inputs, to allow room for future expansion. Even though such a model might not have lap dissolve, try to get one with audio-follows-video. It will simplify the initial installation. Later, when the system has expanded and a new output switcher has been purchased, the old model can be used as a routing, preview, or VTR input switcher or some other auxiliary task.

Beyond the simple installation, the switcher

becomes a sophisticated thing. Desirable features include vertical interval switching (to prevent picture rolls), lap dissolve, fade to black, and special effects (wipes, keyed inserts, etc.) Non-composite switching is done from cameras, with sync added at the switcher.

Audio gear

In the simple one-camera setup, a microphone is used directly with the VTR (and an external amplifier and speaker for playback or monitoring). In a multicamera installation, the system may include several mikes, one or more audio tape recorders and disc playback equipment. The simplest audio mixer has three or four mike inputs, one or two of which can be switched to accept a signal from a tape deck or turntable. A VU meter is a must for riding gain.

Beyond such a simple mixer, a multi-camera studio should have a small audio console with six input mixers, accepting both low- and high-level signals from mike, turntable, and tape. There should be both monitor and cue facilities.

Planning system expansion

First, compare your current operation to the proposed system. The object is to obtain equipment that's compatible with what you've got.

Figure 1 is the starting point; it shows a simple camera-VTR-monitor operation. It's normally not necessary at this point to invest in video switching and audio hardware to provide satisfactory operation. Also, this type of system is frequently portable, not a permanent installation.

If the system of Fig. 1 is as far as your facility will go, you can select equipment from almost any source. However, if you plan expansion, the problems of future equipment compatibility, technical performance, operational capabilities, and other factors become important in limiting the types of equipment that will produce satisfactory results. Every effort should be made to visualize the possible future applications of the hardware before making a definite equipment selection.

Figure 2 shows the next step: adding to original equipment and expanding the system. The second camera is chosen to be compatible with the first. In fact, it's best to select the same brand and model.

The videotape recorder is the same item shown in the first stage. Occasionally, such features as electronic editing are added in this second phase.

A simple, mechanical video switcher is normally satisfactory for many applications. However, if Fig. 2 is as far as your facility is going, it may be desirable to invest in a simple fader-type switcher. Since it is often difficult to update a simple lap-dissolve switcher, it is best to select the former switcher if a more advanced system is planned.

A simple audio mixer allows the use of two or more microphones.

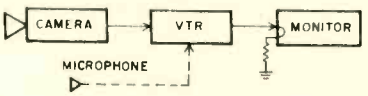


Fig. 1. In this simple CCTV system, the camera drives the VTR and the monitor direct.

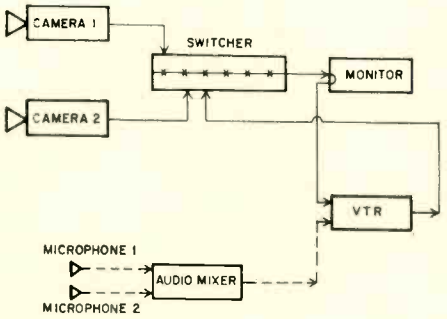


Fig. 2. An intermediate system, using a simple audio-video switcher and a microphone mixer.

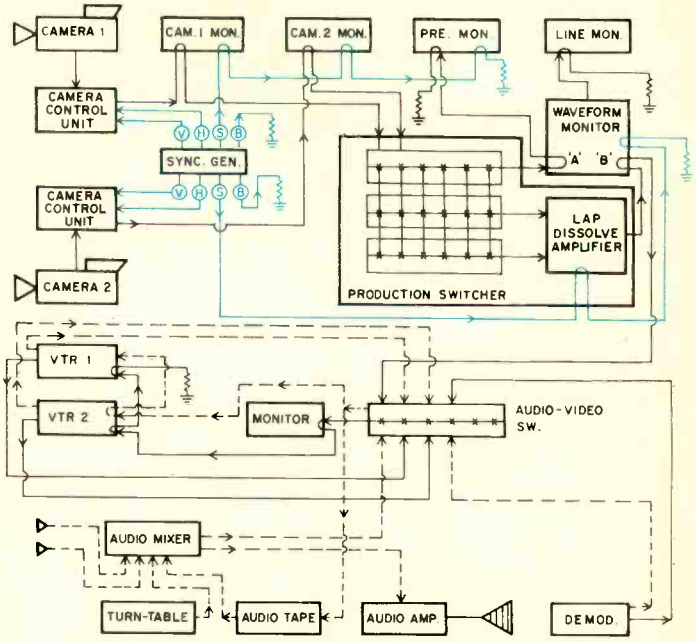


Fig. 3. An advanced video system, with a lap-dissolve switcher. Sync distribution is shown in color.

Figure 3 shows a further expansion. The system provides two cameras, two VTRs, an off-air demodulator, and a flexible audio system capable of handling discs, audio tape, and live mikes.

The production switcher of Fig. 2 has been relegated, in Fig. 3, to a VTR input switcher. A new lap-dissolve switcher with a preview bus has been added in Fig. 3. It has spare inputs for future expansion.

Viewfinders have been added to the cameras, as well as tally lights and an interphone system.

Continued on page 45

Turn on the Ampex AG-440B and listen:

Perfect silence.

Switch to record: no pop.

Hit the stop: no pop.

Go from rewind to stop: no tape shrieking.

The Ampex AG-440B is so mechanically quiet some engineers use it in the same room with live microphones. It's so electronically quiet you can forget about switching pops.

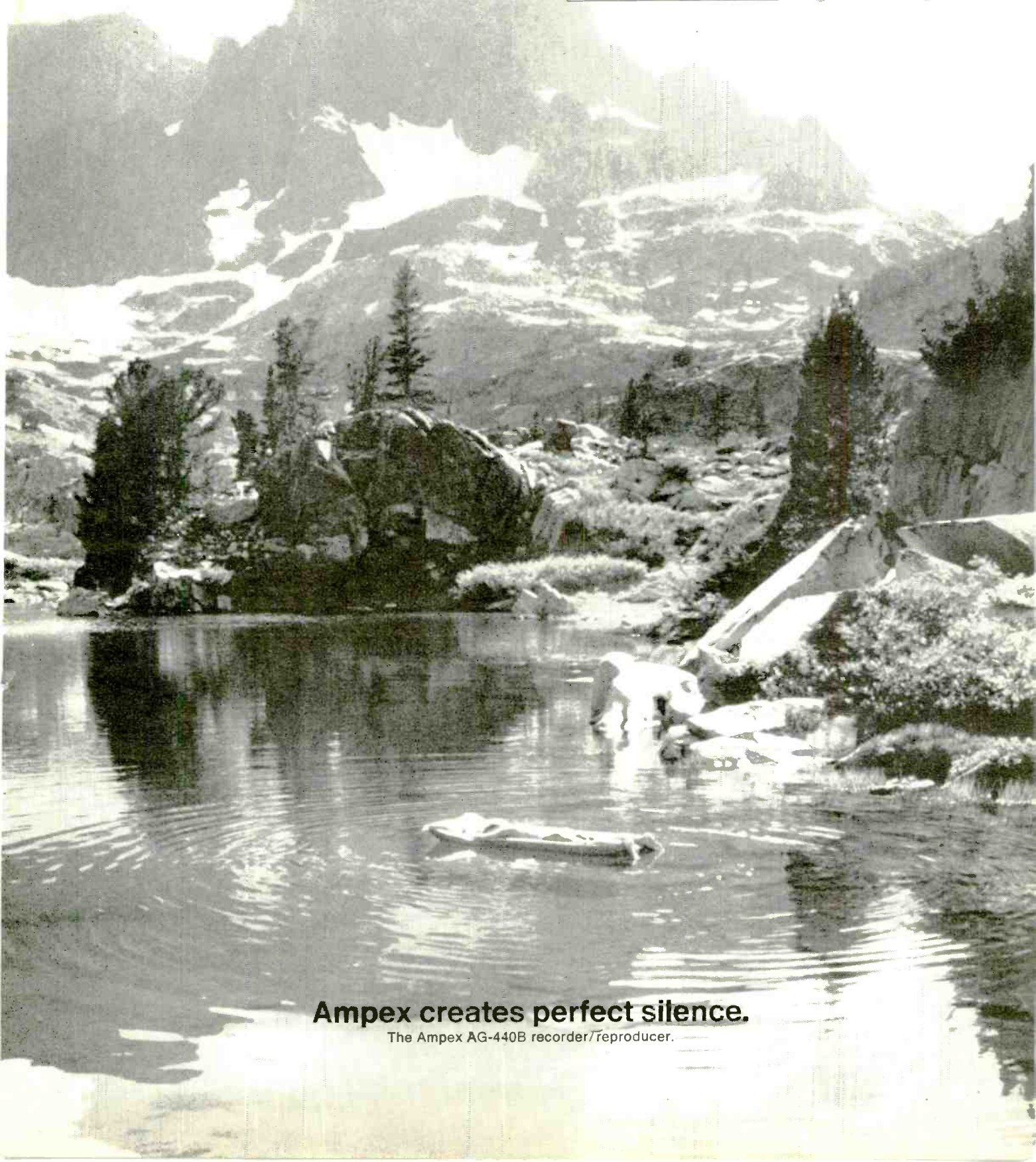
That's why, in its own quiet way, the AG-440B has become the standard of excellence.

Ampex quality is featured throughout: Rigid die-cast frame. Modular design with front-mounted circuit boards. Individual torque motors control tape tension. Easy changeover from quarter-inch to half-inch tape.

The AG-440B is also one of the most versatile recorders you can buy. Console. Portable. Or rack installation. Start with one channel. Build up to four or more. It's the perfect reproducer for the future four channel stereo.

To hear other quiet reasons why the AG-440B can be your best recorder/reproducer buy, and how you can put it to work for you for as little as $50 a month, give us a call. (415) 367-4400. Or write Ampex Corporation, Professional Audio Division, M.S. 7-13, Redwood City, Calif. 94063.

AMPEX



Ampex creates perfect silence.

The Ampex AG-440B recorder/reproducer.

Urban Strife: WJJL Radio's Answer

By Robert Dyment

With a program called "Niagara Challenge," WJJL Radio crossed over the communications gap that split a city.

"Black Challenge" panelists discuss community problems on the air and answer phoned-in questions.

Robert Dyment is a freelance journalist in Dunkirk, New York.

ALMOST EVERY RADIO AND TV station in the country has faced the problem—but how many have been able to take quick, effective action when a city explodes in the heat of summer?

Last year Niagara Falls saw racial tensions build into riot, vandalism and frustration. On August 18th a state of emergency was declared and a curfew imposed on two areas of this "honeymoon" community. The emergency lasted three full days and when it was over, civic leaders saw there was a lot to be done if the city was to regain anything more than temporary peace.

"I knew we had to get this uptight community

Continued on page 46

The Niagara Challenge Program

Community involvement was the most important consideration in planning a series of broadcasts aimed at local problems. Something was needed which would overcome the communications and understanding gap between different areas of the city. A planning and advisory committee was set up to make sure all relevant subject areas and ideas were presented. "Listeners can tell if the panel is stacked in favor of one viewpoint or another," Talbot explained.

WJJL's committee consisted of representatives from the Human Relations Commission, City Youth Board, Chamber of Commerce, SPUR (Society for Promotion, Unification and Redevelopment of Niagara), LOGIC (Local Government Improvement Commission), National Conference of Christians and Jews—Talbot is co-chairman of the Conference; also on the committee were the City Manager, Superintendent of Schools and the Deputy Director of Urban Renewal.

Air time of 5:05 and 6:15 was chosen because it preceded news time and would catch listeners driving home after work. The last 15 minutes were reserved for phone-in questions from listeners. City Hall, as the place where the decisions must be made, was a natural location for the broadcast.

Monday: The Black Challenge—A panel staffed entirely by representatives of a cross-section of the black community, including the executive director of the city's Human Relations Commission as moderator, plus two black businessmen, the chairman of the New Black Society, a member of Human Resources Development and the director of NiaCap Multipurpose Center. Talbot preferred an all-black panel because "only they could portray the real black problems in such a manner that both the black and white residents of Niagara Falls could understand."

Tuesday: The Youth Challenge—An open discussion among young people from the different community areas. Subjects covered included drugs, draft, dress, school, hang-ups and a list of other problems adults often view from only one side.

Wednesday: The School Challenge—Parents, educators and community leaders discussing education problems, with a former school board member heading the panel.

Thursday: The Social Challenge—A panel discussion under the direction of a member of the Niagara County Social Service Department, covering discrimination, housing, welfare and job opportunities.

Friday: The Urban Challenge—The vice president of the Niagara Falls Area Chamber of Commerce, analysing, with the help of professionals and experts, questions and issues raised in the previous broadcasts.

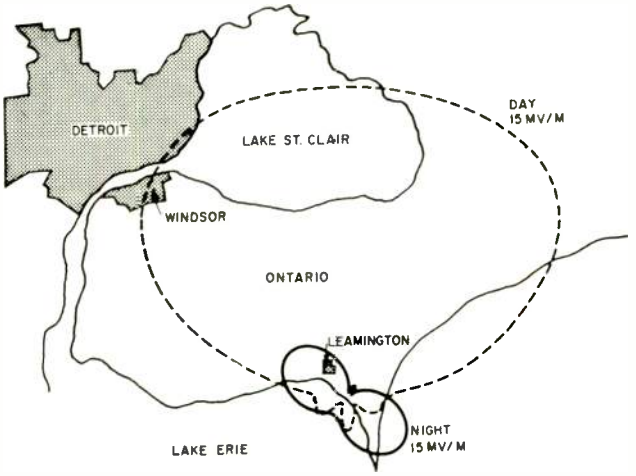
Program Objectives

- Bring into focus the problems of the city.
- Provide answers or guidelines to the problems.
- Overcome apathy and improve community attitudes.
- Offer two-way, in-depth, mass communication to all members of the community.

Two-Frequency AM Station

By Arthur S. Gadd

An unusual solution to a common problem for small-market daytime AM stations—how to go full time. This may be the only station in North America which uses different frequencies day and night.



SEVERAL YEARS AGO our company operated daytime station CJSP in Leamington, Ontario. Like many daytimers, we wanted to go fulltime, but we couldn't operate nights on our frequency of 710 kHz because of international radio treaties. Furthermore, there was no fulltime frequency available which would fit in Leamington.

Then we discovered a loophole—730 kHz. That's a Mexican clear channel, and by treaty, all U.S. stations must sign off the frequency at night. Canadian stations may operate on 730 at night however, provided they protect the Class I-A assignment at Mexico City.

It meant we'd be operating on one frequency daytime, and another nighttime—and with different powers and directional patterns. Our program director, Lou Tomasi, felt it would be difficult to promote two stations with different call letters and frequencies. Listeners would be confused, and simply tune us out.

So he proposed we drop the CJSP call and use two sets of call letters which could be pronounced similarly. We settled for CHYR (day) and CHIR (night), both of which become "Cheer" on the air.

We use the exact call letters only in our hourly ID's, for legal purposes. The rest of the time we're "Cheer Radio Seven." Notice we say "seven." Hardly any radio indicates exact frequencies, and most of our listeners just tune in the vicinity of 700 until they get us. Since we don't give our exact frequency, we avoid confusing listeners.

At sunrise and sunset when we change stations, we tell listeners it's "Fine Tuning Time." A distinctive electronic sound is put on the air, and we tell listeners to re-tune until they find that sound again. Then we take the one station off the air and put the other on. The terms "sign-off" and "sign-on" are carefully avoided.

Actually, the frequency change is less important than the power change. Daytime power is 10 kW, while nighttime power is only 250 watts. Thus the only people who re-tune are those within the nighttime contour.

The diagram shows the day and night patterns. Both stations operate from the same site, which has six towers. During the daylight hours, CHYR uses five towers and 10 kW with a cardioid pattern, protecting various U.S. stations.

At night, CHIR uses two towers (one common with the day pattern) and 250 watts in a modified figure eight with nulls toward co-channel stations at Mexico City, Montreal, and Blind River, Ont.

Since it's impractical to run a 10-kW transmitter at 250 watts, we use two transmitters. Both are remote controlled, and we accomplish the changeover twice each day in about ten seconds.

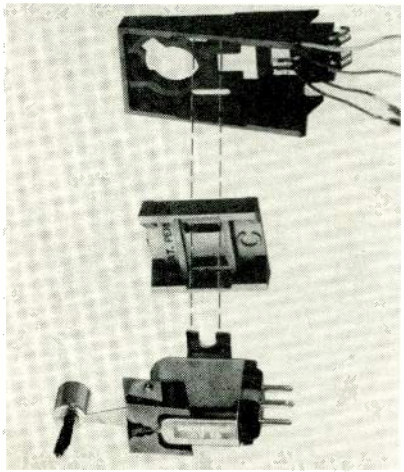
Both stations are operated as a single broadcast service. While there are some differences between day and night programming, they are caused by the difference in service area which gives us slightly different audiences.

Had the two available frequencies been widely spaced on the dial, we might not have attempted two-channel operation. But our close-spaced frequencies have made it possible for us to offer a fulltime broadcast service to Leamington and the surrounding area. **BM/E**

Arthur S. Gadd is business manager of Cheer Radio Seven in Leamington, Ontario.

BROADCAST EQUIPMENT

Snap-in phono cartridge mount



Plastic adapter attaches to phono cartridge and snaps into tone-arm shell; allows mounting quickly, without use of tools, and with proper alignment; lugs molded into adapter fit where mounting screws normally go; kit includes adapters for Pickering cartridges to fit AR, Benjamin Miracord, Dual, Garrard, BSR, Perpetum-Ebner and Pioneer turntables. PICKERING.

Circle 276 on Reader Service Card

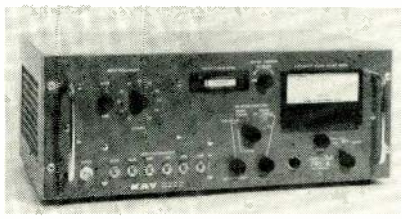
CATV systems analyst

Model 7500 testing unit can be used to sweep cables for return loss and freq resp; troubleshoot trunklines; check amplifiers for gain; check splitters, directionals and taps for loss and VSWR; measure bandpass of filters and single-channel amplifiers; and calibrate field-strength meters. Provides data in dB, emitting a continuous flat signal from 50 to 220 MHz, acc of ± 1 dB; ref signal at 73.5 MHz, amplitude of which is monitored on panel meter, calibrated to within ± 0.5 dB. Also contains built-in 75 ohm comparison bridge for measuring return loss of any passive or active 75 ohm device. Weight is six lb including rechargeable battery; $495. JFD.

Circle 275 on Reader Service Card

CATV noise meter set

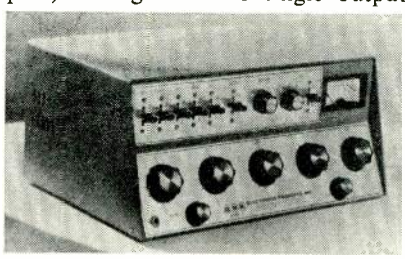
Model 792A1, low-cost automatic noise measuring set featuring a 75 ohm, 10 to 250 MHz tuned amplifier input and a 75 ohm, 10 to 1000 MHz full-range noise head; higher-priced facilities also available for higher freq measurements; input bandwidth nom. 5 MHz centered from 10 to 170 MHz, nom. 10 MHz from 170 to 250 MHz; noise figure accuracy ±0.5 dB; weight 22 lb; power 117 V ±10%, 50/60 Hz; $840. KAY ELEMETRICS.



Circle 280 on Reader Service Card

Five-channel mono audio console

Model QRK-5 handles 14 audio inputs, mixing five into single output stage; contains 10-W monitor amplifier and has cue positions in all faders: 30 lb; $995. QRK.



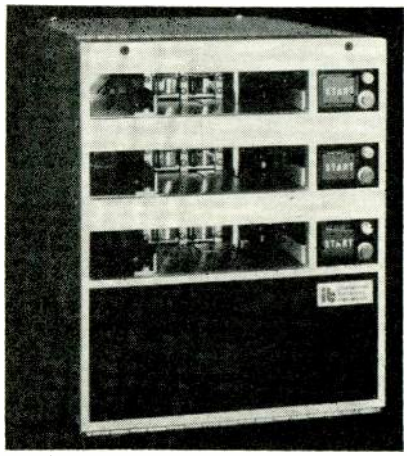
Circle 278 on Reader Service Card

Digital clock & time code generator

Model 0180 provides digital time signals to broadcast systems for record keeping and program control uses, on nine-digit Nixie tube day-hour-minute-second display; uses 115 Vac power; will accept external time base or use own self-contained crystal-controlled oscillator; equipped with built-in power monitor and nickel-cadmium battery supply to ensure continuous time-keeping if external power fails. CLIMET INSTRUMENTS.

Circle 279 on Reader Service Card

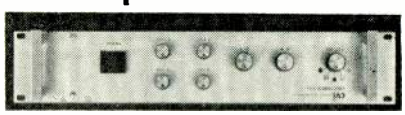
Multi-deck cartridge player



Model 3D-0001, compact tape cartridge machine, with recorder option which converts bottom deck to record/reproduce; uses common capstan drive. INTERNATIONAL TAPETRONICS.

Circle 277 on Reader Service Card

Video pointer



Model 610C can produce a series of oblong or crosshair patterns in a TV picture; manually or computer controlled; operates as a cursor or an indication of X-Y coordinates; especially useful for ITV, CCTV; $1,950; delivery 60 to 90 days. CVI.

Circle 282 on Reader Service Card

Wideband video distribution amp

Type AVF video distribution amplifier can be used for all three standard TV systems—NTSC, PAL and SECAM—and features flat freq resp, small residual differential phase and gain and group delay; has two independent amps, each with one bridging-type input and six resistor decoupled outputs (five in rear and one

THE CARTRIDGE KILLER.

Scott Muni
WNEW-FM, New York

This man doesn't have time to baby the tools of his trade. Not with a commercial, a traffic report and time check breathing down his neck. He's got to keep those records spinning fast and furious. And, if he kills a cartridge or two along the way, well—that's how it goes.

Until now.

Meet the Stanton 500AL—the cartridge that's tougher than disc jockeys. Here is the workhorse of the broadcast industry. We designed the entire stylus assembly to withstand the rugged demands of back cueing and the kind of handling that would quickly ruin ordinary pick-ups. Yet its high restoring force and tracking reliability is accomplished without sacrifice of professional standards for frequency response, output, channel separation, etc.

Also inquire about Stanton Models 500AA and 500E—the standards for critical auditioning and broadcast applications. They're designed especially for uninterrupted broadcasting of long-playing records or for disc auditioning and evaluation.

SPECIFICATIONS	500AL
Frequency Response	20Hz to 17kHz ± 2½dB
Output	1.0 mv/cm/sec.
Channel Separation	30dB
Load Resistance	47,000 ohms
Cable Capacitance	275 pF
DC Resistance	800 ohms approx.
Inductance	550 mH approx.
Channel Balance	within 2 dB
Stylus Tip	0.7 mil Spherical
Tracking Force	3-7 grams
Cartridge Weight	5 grams
Mounting Dimensions	7/16" to ½" centers

For complete information and specifications write Stanton Magnetics, Inc., Terminal Drive, Plainview, L.I., New York 11803

STANTON

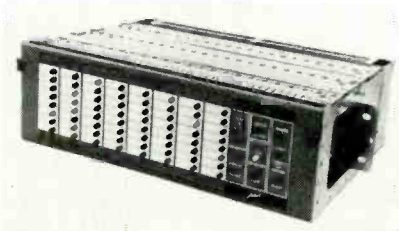
Circle 115 on Reader Service Card

in front for monitoring); freq range 1 Hz to 20 MHz, resp better than ±.05 dB from 10 Hz to 5 MHz, better than ±0.2 dB from 1 Hz to 10 MHz and better than ±0.5 dB from 10 MHz to 20 MHz; $750. ROHDE AND SCHWARZ.

Circle 281 on Reader Service Card

Alarm for unattended remote stations

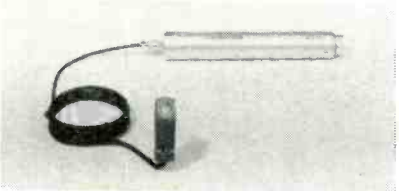
The 51F alarm system reports to central location from unattended field communications stations with monitoring information on status of microwave radio repeaters, cable carrier terminals, and radio and TV broadcast transmitters; continuous interrogation brings back report of normal or off-normal conditions in seven to eight seconds; 64 alarm capacity on a single tone freq, which can be distributed among one to 64



stations; up to 8 master terminals (with 64 reporting functions each) can fit on 8-kHz microwave circuit along with voice; all functions can be displayed by lamps on master control panel. LENKURT ELECTRIC.

Circle 284 on Reader Service Card

Condenser lavalier microphones



Two microphone systems; each supplied with plotted response curve. MKH 125 system is for normal mike-cable use; MKH 124 has unbalanced output for connection to wireless microphone transmitter. Both have frequency response 20 to 20,000 Hz, with lows attenuated and highs boosted slightly to compensate for position of microphone on talker's chest. For MKH 124, sensitivity is 0.32 mV/μbar, EIA rating, –131.5 dB; for MKH 125, sensitivity is 2 mV/μbar, EIA rating, –121.5 dB. S/N ratio for both is 59 dB. Impedance is 150 ohms for MKH 124, 10 ohms for MKH 125. MKH 124 requires 5 mA at 8 V, MKH 125 requires 6 mA at 10 V. SENNHEISER.

Circle 285 on Reader Service Card

NEW LIT

For copies of these literature offerings, circle numbers for appropriate items on Reader Service Card.

Pneumatic-coupled speaker system, PC-12, modestly-sized cabinet which provides low freq output equivalent to three 12-inch woofers, described in four-page technical bulletin with specs, diagrams; Air-Coustic. **200**

Freq deviation monitors for AM, with digital (on Model 520) or meter (on Model 510) display; from Metron Instruments. **201**

RC-2600 digital readout remote control, ALD-1RA Autolog broadcast transmitter logging printout system and CPX-10 FSK status/alarm system, all described in four-pager from Rust Corporation. **202**

Tape duplicating system, model 260, covered in brochure and spec sheets from GRT Corp. **203**

Microphones, the complete Turner Co. line, described in 24-page catalog containing specs and prices, list of accessories, and a section on how to choose a mike. **204**

Rear-projection screen, the Chromascreen CS-140, described in two-page illustrated data sheet, with definitions of terms related to rear-screen projection; applications and specs; from Panelgraphic Corp. **205**

Pre-amps, the Cybertran series from AMF, covered in six-page short-form catalog with specs; also includes information on typical amps, preamps and line drivers which can be built to order. **206**

TV transmission products and related gear in Ampex brochures and data sheets: Transmitters, translators, antennas and coaxial products in 16-pager (circle **207**); information sheet on DR-10 series portable video disc recorders for closed-circuit (circle **208**); TA-8000 vhf transmitters (circle **209**); ABR-10/15 series recorder reproducers for automated systems (circle **210**); VP-4900C color and b&w videotape player with built-in color corrector (circle **211**).

Simplified Radiotelephone License Course: Volume 1, by Leonard C. Lane. One of the toughest jobs in this world is writing a study guide for FCC license exams, because FCC rules continually change. This book attempts to school the reader in basic law, basic operating practice, and basic broadcast operation, in preparation for the exam for the radiotelephone third-class operator permit with broadcast endorsement. While the author has done a basically good job, the book is marred with 22 major errors and a few minor ones. For example, the author repeatedly stresses the need for service endorsement of the license as a requisite to renewal, even though this requirement has been waived by the FCC for 19 years. The author seems confused about how to keep logs at broadcast stations, and he doesn't know the rules about maximum modulation levels. There is no mention whatsoever of license fees. Finally, this flaw: The book purports to prepare the reader to obtain a radiotelephone third-class operator permit with broadcast endorsement; it consistently omits mention of the specific job duties and privileges of the holder of that permit. All the errors in this book concern FCC rules; since the topics covered (Elements 1, 2, and 9 of the FCC operator license exam) are about 90% FCC rules, the deficiency is serious. This is the first of a projected three-volume series which will (hopefully) carry the reader up to the radiotelephone first-class license exam. Perhaps the other two volumes will be more carefully edited. Soft cover; 127 pages including index; 1970. Price $3.95. Hayden Book Co., Inc., New York, N.Y. 10011.

SALE OF THE MONTH

Who can say NO . . . to his own sales pitch?

Si Willing
President
KMAR, and KCRF-FM
Winnsboro, La.

The Challenge: Ours is a large agricultural area. It was a challenge to me when I was told by the leading tractor dealer: "I don't have to advertise. I've been doing business here for the past forty years and everybody knows me." I welcomed that objection because to me it's easier to make a sale when you have an objection to dissolve. The effort did become more difficult when the tractor dealer poo-pooed the suggestion I made about the natural law of attrition taking its toll of customers to the tune of from seven to ten percent every year. So I knew my next visit would have to be carefully planned.

The Solution: Next time I arrived with a cassette recorder and some hard-hitting tractor commercial copy. The dealer was a bit skeptical when I asked him to give me an ad-lib talk about his tractor dealership. He started in low gear, but the more he talked about himself, the better he sounded. He loved the playback. Then I asked him to read the copy I had written. After reviewing it he said he liked it. The next step was to invite him to give the messages on the cassette. He did. He loved the way they sounded. He agreed that they should be used on my station. And he has been a regular advertiser ever since. *He now writes his own copy and records it on his own cassette.*

Salesmen, wherever you are, be prepared to take NO for an answer —but be certain that you can convert that NO into a YES.

Salesmen—Let's hear you!
Send us your best sale in local market radio and TV. Follow the style you see above and, if we print your story, you'll get $10 plus a handsome SALE OF THE MONTH certificate.
Who can say NO?

When KFDA-TV rolled out color film, commercial business rolled in.

"The field is wide open here for commercial color film processing," says Tex Weaver, Director of Film Processing and Film Production for the Amarillo station. "And the results we're getting from the Kodak ME-4 Process are really bringing it in.

"We got our ME-4 Process for news—we're in a competitive three color-station market. But when our processor isn't doing news, it works for us with commercial processing.

"A local ordnance plant chose us to do their nonclassified processing work. We've found the animation advantages of film, and we're working with a local advertising agency on all of their animation jobs. We're even processing the new super 8 KODAK EKTACHROME EF Films for football teams in the area.

"A word-of-mouth and direct mail advertising program tells interested people that we have color film processing and production facilities. We may make a full-fledged ad campaign to get even more business.

"We shoot and process commercials for our advertisers. We're getting money from the Kodak Silver Recovery System that would normally have gone down the drain. We aren't having any trouble with the process or the chemicals. We're getting beautiful results."

Is your color film processor doing all it could for your station? Check into the commercial processing possibilities in your local area. And if you don't even have the Kodak ME-4 Process yet, contact one of our Regional Chief Engineers. Call Ray Wulf in New York, Dick Potter in Chicago, or John Waner in Hollywood. Hurry, you're late.

EASTMAN KODAK COMPANY

ATLANTA: 404/351-6510
CHICAGO: 312/654-0200
DALLAS: 214/351-3221
HOLLYWOOD: 213/464-6131
NEW YORK: 212/262-7100
SAN FRANCISCO: 415/776-6055

Kodak

CROSS-TALK

Delay line discussion

Dear BM/E:

In February, 1970 *BM/E*, Mr. Richard McLean describes an electrically variable delay line in "The Artificial Delay Line: A Must for TV Processing." Also, Mr. McLean references the article, "Phase Correction Holds Colors Steady," *BM/E*, September, 1969.

Since the earlier article described applications of our Model 120, Automatic Video Delay Line, some technical points should be clarified. Mr. McLean states: "An electrically variable delay line is very much like a simple LC network; . . ." The application of *simple* electrically varied LC networks for delaying composite video signals is disastrous. If the reactance of either or both elements is electrically changed by modification of the potential across or the current through the element(s), the video signal will also produce a delay variation. The result, by definition, is differential phase.

In some applications, *complicated* LC networks are used for electrically delaying video signals. To achieve acceptable transmission characteristics, the ratio of the control to video signals must be very large and differential delay line configurations must be used. Even then, it is difficult to obtain satisfactory operation without sacrificing signal-to-noise ratio and/or tolerating large minimum delays.

Electrically varied delay is achieved in our equipment with a unique approach (patent pending) and does not require any LC networks, simple or complicated.

Incidently, Mr. McLean's figure 3 appears to be a reproduction of the block diagram of Mr. Robert J. Butler's color translator, originally . . .

Buck C. Brown
Vice President
Control Concepts Corporation

Dear BM/E:

With regard to Mr. Brown's comments on my discussion of electrically variable delay lines, I can do nothing except agree with him. *Some* delay lines, used by themselves, are totally unacceptable for processing video.

A quartz, or a glass delay line requires compensating circuitry to restore insertion loss and equalize the signal bandwidth. An EVDL, in its simplest form, cannot be used to process a color signal.

Obviously, a current or voltage variable delay line must be designed for video and as such is not a simple device.

Figure 3 is a reproduction of the block diagram in Mr. Butler's work. We have worked closely with NBC and Mr. Butler in the design of the very complex problem of synchronizing remotes. The resultant block diagram would not lend itself to use in a short article, so Mr. Butler's simpler diagram was used.

Richard H. McLean
Manager, Video Products
Andersen Laboratories

Phone-in comments

Dear BM/E

We are very interested in your article "Automatic Phone-in Simplifies Listener Participation" (March 1970).

KVOR has used a three minute Code-a-phone for about 2½ years similarly to WXVW: as seasons change, our Code-a-phone is a Fishing Phone, a Hunting Phone, and a Ski Phone. Each report contains latest available information on roads, weather forecasts, and "where it's best" data.

We have had great success, both in drawing callers and advertisers. Messages (and commercials) are changed on the Code-a-phone daily, and the service is heavily promoted on the air.

Eliot Kohen
Program Director
KVOR Radio
Colorado Springs

Dear BM/E

For our Wall Street Report, we utilize a Code-a-Phone Model 200, and Mountain Bell supplies the equipment for the livestock report. All the apparatus is located in our newsroom. I have found the Code-a-Phone equipment vastly superior to any other answering devices, including the telephone company machine.

There is an interesting sidelight to our operation. I have found that the livestock report receives the most response in the evening hours, when the caller can get closing report and prices. This is the same information which is contained in many early-morning livestock broadcasts, but the audience seems to prefer getting the information in the evening.

David P. Felice
News and Public Affairs Director
KUAD Radio
Windsor, Colorado

WAAX

Continued from page 27

about $63,000. But this included a huge new sign, complete landscaping and paving. It included a totally new and complete master control room, a news makeup room, a new record room, a new storage room, a new engineering workshop, a new reception office, a new manager's office and private bathroom.

It included the services of a decorator and site-planner (which we highly recommend). It included new paneling, lighting, ceilings, carpeting, painting and draperies throughout.

One side of the building was completely transformed through the use of decorative marblecrete. It also gave us night lighting—six huge quartz lights and a huge parking area, which means a great deal.

We got a new console, new microphones, and new turntables. It transformed the old master control into a modern production center. It gave us marvelous high fidelity.

Yes, it cost us more than we intended to spend but we got more than we hoped for.

Our management is happy because they believe in being armed with the best tools and in doing more than just getting by. Ours is a management that says a radio station should look as if it means business. Our appearance is not deceiving. **BM/E**

CCTV

Continued from page 34

Each camera has a control unit and a monitor at the control position to permit the director to call shots. A single sync generator is used to lock the entire system together.

At the production switcher, separate monitors are used for preview and line, and a switchable oscilloscope is used to monitor waveforms.

The audio system has been augmented with a tape recorder and disc playback equipment. A second VTR has been added.

Film equipment

At some point in expanding a CCTV system, a film island is added. This is simply a TV camera, an optical multiplexer and one or more projectors—usually 16 mm film and 35 mm slide. The multiplexer allows the selection of which projector feeds the camera. The 16-mm projector must be designed for the 30 frames per second of the TV system, not the 24 frames per second of conventional 16-mm film.

The TV camera used in a film island can be the same type used for studio work, if it has sweep reversal (it picks up a mirror image from the film). Using the same type of camera throughout the system simplifies maintenance and spare-parts inventory. **BM/E**

Urban Strife

Continued from page 36

developing and working together," was the response of radio station WJJL president, Thomas W. Talbot: "It had to be done."

So he began a personal investigation to see what his station could do to help. "I concluded that a lack of in-depth understanding existed within the community of Niagara Falls. I saw an opportunity for our station to make a constructive contribution. I was convinced that the first vital step toward solving our community problem was 'two-way' communication."

And two-way communication is just what he set up.

Inviting representative black and white leaders to a station luncheon, Talbot organized them into a planning committee. The committee endorsed a series of programs called "The Niagara Challenge"—broadcast live and direct from City Hall each weekday evening from 5:05 to 6:15 during the week of October 6th.

The committee then helped get participants for the show, including leaders from many different parts of the community.

Programming for the community

The five-day program was simple and direct (see box). Each day gave more than an hour to discussion of the "Challenge" presented by youth, schools, social and urban problems; lead-off broadcast was the "Black Challenge."

Publicity came from newspaper stories, signs printed by school dropouts and pamphlets distributed by students at supermarkets. The Human Relations Commission and Youth Board also stepped in to spread the word. Promotion encouraged listeners to telephone questions to the panel during the live broadcast. Phones were manned by members of the city's Youth Board.

"Niagara Challenge" caught on quickly. The first evening's program was deluged with calls. Questions on the 'Black Challenge' were so numerous and tension so high, that Talbot decided to remain on the air in violation of FCC rules

Community participation in the "Niagara Challenge" program was solicited by high school students—here distributing at a supermarket pamphlets they prepared.

requiring sign-off by 7:30," Talbot's reasoning: "If we were to go off the air with interest running high, we would be lending support to the black charge that the community doesn't listen, and, as a result, conceivably contribute to future problems."

No commercials interrupted the action—they were waived by the sponsor, Niagara Permanent Savings and Loan Association (itself a victim of the summer's disturbances).

Quick results

But did WJJL's innovative broadcasting help? Talbot's answer to that is filled with confidence. "We think 'The Niagara Challenge' brought Community problems into focus—committees are now functioning and communicating." Listener response he calls "overwhelming."

"We just couldn't handle all the calls that were coming in. 'Niagara Challenge' not only was creating an audience, but, more important, was bringing into the open what was troubling the community, black and white, young and old—all citizens. People were listening, talking, communicating, rather than rioting and name calling."

Social science classes in local colleges have used the Niagara Challenge problems in classroom discussions. Scripts were transcribed from tapes of all the programs (which Talbot moderated) and the scripts have been sent to all area legislators—including one to Governor Rockefeller—to educators, City Council members and colleges.

And, Talbot adds proudly, "We have letters and statements from community leaders saying that the series has done more than anything else in recent years to help make a real 'honeymoon' between races. We have helped bridge the roar of dissension through our broadcasts. And, we have kept this dialog going—in our 'Viewpoint' program, heard every morning."

One other, most important result Talbot sees coming from the broadcasts: "People of all races have had an opportunity to learn first-hand what is on the people's minds . . . This is a continuing effort." **BM/E**

Unemployed young men at the Human Relations Commission office prepared signs for City Hall, promoting WJJL's community programming.

News

Continued from page 10

precedented full year's service labor coverage on its new Trans Vista solid state color television models," and this covers parts as well; it set up WJCL-TV (soon to begin operations in Savannah) color studio and transmitting equipment; and it won a $3.3 million contract for four TV station transmitting systems from the New Jersey Public Broadcasting Authority. . . . Miami's WKAT-FM has been bought by the **San Juan Racing Association** through its wholly-owned subsidiary, **SJR Communications, Inc.** . . . A new division, Superscope Special Application Products, has been started by **Sony/Superscope** to market and distribute Sony and Marantz goods aimed at specialized needs in the audio industry . . . **TeleMation** has made two purchases—the video systems division of **Ward/Davis** and the color camera and VTR inventory of **Bell & Howell**—and it has contracted to provide character generators for a CATV programming service in Salt Lake City. The service is called CABLEGUIDE, by Gower Enterprises, and it "prints out" current and future CATV program lists with time and channel.

NAMES
IN THE NEWS

Four public broadcasters have been selected by the Corporation for Public Broadcasting to spend a year studying and working with the national broadcast organizations of Holland (**Frank A. Millspaugh,** formerly of WBAI-FM New York, will go there); Denmark (**Peter L. Anderson** of WEDH-TV Hartford, Connecticut); Australia (**William S. Giorda,** KUT-FM, Austin); and Britain (**Michael J. Ambrosino,** WGBH-TV, Boston).

Charles E. Anderson has moved up to the position of product planner at Ampex, where he will work in the selection and development of new products and technologies.

New chairman of the All-Channel Television Society is **David M. Baltimore,** vice-president of WBRE-TV, Wilkes-Barre, Pa.

Director of marketing for Telestrator Industries (manufacturer of a device which writes over any video source) is **Lynd J. Carter,** who moved from a similar position at Philips Broadcast Equipment Corp.

Lynd J. Carter

Gordon Sherman

The new Radio WAVS (Fort Lauderdale) will have **Gordon Sherman** as president and general manager, and **Robert Brown** as operations manager.

Frank Rankel, formerly of WEDU-TV, Tampa, is the new chief engineer of WTVT, Tampa-St. Petersburg. Mr. Rankel joined the station as remote supervisor in 1965.

The NAEB has opened a new department called Information Services and its director is **Edward J. Pfister,** assistant to the executive director at the National Instructional Television Center, Bloomington, Indiana. Mr. Pfister's department will be responsible for all NAEB information activities, news dissemination and liaison between members and other national agencies.

New director of engineering at Noram Communications (Ontario) is **W. E. Evans,** formerly with Metro Videon.

Donald F. Johnston has been named marketing vice-president for Avco's Cartridge Television. Mr. Johnston had been with Philco-Ford.

BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

DISPLAY CLASSIFIED ADVERTISING: $22.50 per inch 1x; $22.00 per inch 3x; $21.00 per inch 6x; $20.00 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 25¢ per word; minimum $3.00. BLIND BOX NUMBER: No extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceding issue date.

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

HELP WANTED

NEW YORK CITY

EXPORT SALES BROADCAST EQUIPMENT

Career opportunities for area sales managers in Export Department of radio and TV broadcast equipment manufacturer. Positions are in New York City International Department, and would require some OVERSEAS TRAVEL. Must have strong technical knowledge of radio and TV transmitting equipment with a manufacturing concern. Salaries fully commensurate with responsibilities and generous company paid benefits. For further information send resume including salary history in complete confidence to Robert T. Fluent, Assistant Personnel Manager OR

CALL COLLECT: (217) 222-8200

GATES RADIO COMPANY

A Division of Harris-Intertype Corporation

HARRIS-INTERTYPE CORPORATION

123 Hampshire Street Quincy, Illinois 62301

An Equal Opportunity Employer (m/f)

CIRCUIT/PRODUCT DESIGN ENGINEERS

The engineers we seek will include their talents in Video, Audio and Computer related circuitry designing products for the Television Broadcasting Equipment market. Send resume to the personnel manager. Vital Industries, Inc., 3614 S.W. Archer Road, Gainesville, Florida 32601.

CCTV DEALERS WANTED

. . . to sell and service a complete line of CCTV equipment mfg. by Hitachi, Ltd.—a name noted for quality electronic equipment the world over. Dealerships are now offered for most of the country. Address inquiries to: MAI Dept., Marubeni-Iida (America) Inc., 200 Park Ave., N.Y.C., N.Y. 10017 Phone 212/973-5603.

LIGHTING DIRECTOR—Mississippi ETV Authority seeks experienced lighting director for all color production center. Challenging ground-floor opportunity for national quality production. Eight station networks. Send resume to Director of Engineering, MAET, P.O. Drawer 1101 - Jackson, Miss. 39205.

STUDIO MAINTENANCE SUPERVISOR for New York City UHF Station. Must be thoroughly familiar with Ampex 1200VTRs and Color Terminal equipment. Union scale with salary commensurate with experience. Send resume to: Fred M. Samuel, Chief Engineer, WXTV Channel 41, 641 Main St., Paterson, New Jersey 07503, or call (201-345-0041). An equal opportunity employer.

ELECTRONICS—CCTV TECHNICIAN—To operate, maintain B/W studio serving public school district. CCTV experience necessary. Production and maintenance experience desirable. Salary commensurate with abilities. Call Mr. Dietz, 609/877-7900.

HELP WANTED (cont'd)

WFTL, Ft. Lauderdale, Fla. needs a great Chief Engineer NOW. Thorough knowledge of AM and automated FM Stereo essential. Good pay in growing, good living area. Contact Manager directly. Staff aware of this ad. Box 1400, Fort Lauderdale, Fla. 33302.

POSITIONS WANTED

EXPERIENCED ENGINEER. Looking for an experienced, fully qualified engineer? Solid Background in broadcasting and electronics. All maintenance, studio, transmitter, recording. Seek secure position as chief engineer in medium market or rural area. Presently at NYC 50k station. Availability date and resume on request. BM/E Box 870-1, Blue Ridge Summit, Pa. 17214.

Starting announcer wants job. Leaving Vietnam and Army, available July 1st. Some experience 31st market. 3rd phone endorsed. Married, 25. M.R. or religious preferred. Tape and resume available. Edward Wright, 232 Bassett Ave., Lexington, Ky. 40502.

Announcer, news-sales/deejay. Willing to do behind the scenes productions. Some "on-the-air" experience. Third class ticket. Bill Yuhnke, 351 Crowley, Buffalo, New York 14207.

Experienced Black combo. Available, will relocate anywhere for $190.00 minimum. Roy Lambert, 50 Page St., St. Louis, Mo.

1st phone. Experienced-6 months. Age 23. Willing to relocate. Energetic. John Vunarecci, 415-474-7344, 1530 Hyde St., San Francisco.

1st PHONE—broadcast school graduate, newspaper background, want first broadcast job. Lyle LaFaver. 484 Jamul Court, Chula Vista, Calif. 92011, 714-422-1802.

Mr. Manager: Fed up with squirts who scoff at your adult presentations? News, copy, mature music, talk. Old Pro. 200 W. Romie, Salinas, Calif. 408-758-3097.

WANTED TO BUY

Music wanted. The music library of the "International Broadcasters Society" wishes to collect a comprehensive selection of American instrumental recordings ranging from jazz, country and western, MOR contemporary, and evergreens to classical and semi-classical. The budget of the society is too limited to allow the purchase of new recordings, therefore the appeal is being made to American radio stations for second hand LPs and 45s in reasonably good condition. The IBS is not seeking charity, but regrets it can only offer nominal payment for these records. Preference will be given to large collections, such as complete or near complete music libraries from radio stations. Please submit your offer, with asking price, to the New York office of the International Broadcasters Society, 22 East 42nd Street, New York 10017—c/o Mr. Eugene Bernald, The Secretary General of the IBS will be flying to New York from Europe in mid-May to make final selections and arrange transfer to the Secretariat in Holland.

EQUIPMENT FOR SALE

SURPLUS 2 INCH VIDEO TAPE. Over 200 full hour reels in good usable condition. Mostly 3M type 379, master tapes, few splices, low dropout count. Priced "as is" F.O.B., N.J., 1-5 hours $50/hour, 6-10 hours $35/hour, 11 or more hours $25/hour. Half hours and shorter also available. COMQUIP P.O. Box 12, Ridgewood, N.J. 07451 (201) 444-0196.

Browning model BT-3A-67 Background Music SCA receivers—67 Kc. Also some McMartin 67Kc Background Music receivers. These receivers require some repair. As is, $35 each. Also have some Seeburg 1000 Background Music players. Compact units without amplification. $125 each. All in good working order. Also have some 3M Contata 700 Background Music players with tapes. $250 each machine and 1 tape. In good working order. Background Music, Inc. 714 2nd Avenue, South Minneapolis, Minn. 55402, 612-333-4517.

SCULLY TAPE RECORDERS: Mono., 2, 4, 8, 12, & 16 track models plus 270 automatic players. Some models in stock now. W.A.L. custom audio control consoles & console modules. Solid state 120 Watt power Amps. We buy and rebuild Scully lathes. WIEGAND AUDIO LABORATORIES, INC. 3402 Windsor Road, Wall, N.J. 07719. Phone 201/681-6443.

SOLID-STATE AUDIO PLUG-IN OCTAL (1" Dia x 2" H) modules. Mic preamps, disc & tape preamp-equalizers, tape bias osc. & record ampl., power amps & power supplies. Send for free catalog and audio applications. Opamp Labs., 172 So. Alta Vista Blvd., Los Angeles, Cal. 90036.

Jack Panels and patch cords. Audio and Video, new and used. Precision video coax cable and connectors (Belden 8281). Write for catalog. Gulf Electro-Sales, Inc., 6325 Beverly Hill, Houston, Texas 77027. Phone 713-781-3066.

AMERICA'S LARGEST STOCK AND CONSIGNMENT LISTING of new and used broadcast and recording equipment. We trade-sell and buy. THE MAZE CORPORATION, P.O. Box 6636, Birmingham, Ala. 35210.

3-RCA COLOR CAMERAS TK-41C. Updated to NBC Specs., includes "paint pots," 50' camera cables, lenses, dollies, tilt heads, and Orthicons. All 3 for $43,500. COMQUIP, Box 12, Ridgewood, N.J. 07451 (201) 444-0196.

The complete and reliable source for new and used broadcast equipment. Request our free listings. Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee 37620.

12 kw UHF television transmitter. General Electric, type TT-25-A. Just removed from service. Al Ruch, Chief Engineer, KBAK-TV, Bakersfield, Calif. 805-327-7955.

Towers for sale, erection and maintenance, 18 years experience in tower erection. Robinson Tower Company, P.O. Box 143, Greenville, N.C. 27834. Phone 919-758-1453.

Gates RDC-10 Remote Control. Includes studio and transmitter units. Excellent condition. WELB Radio, Elba, Alabama.

Any type tower erection finance. Bill Angle—Tel. 919-752-3040. Box 55, Greenville, N.C. 27834.

RCA TK-30 and TK-31 image orthicon cameras; RCA TR-2 and TR-5 videotape recorders, plus many incidentals. Television Facilities, Inc., Box 396, Montgomeryville, Pa. 18936. Tel. 215-855-0970.

RADIO STATION FOR SALE

Radio Station 5,000 watts . . . Eastern Arizona coverage . . . expanding community . . . $175,000. KHIL, Willcox . . .

BUSINESS OPPORTUNITIES

FIELD SALES REPRESENTATIVES—If you are making regular calls on customers in all areas of television broadcasting, and are interested in selling a complete, well established, line of video patchfields and accessorics, please write or call: MR. JESS F. LANCASTER, Marketing Manager, Broadcast Products, COOKE ENGINEERING CO., 900 Slaters Ln., Alexandria, Va. 22314 703-548-3889.

MISCELLANEOUS FOR SALE

DECALS, TRADEMARKS & LETTERING made for sales aids. All kinds since 1944. Write for idea catalog. Mathews Co., 827 S. Harvey, Oak Park, Ill. 60304.

PROGRAM SERVICES

TECHNICAL SERVICES

INSTRUCTIONS

BM/E ADVERTISERS' INDEX

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41 Stevens Lane
Cohasset, Massachusetts 02025
617-383-0029
Donald B. Kennedy

MID-ATLANTIC
820 Second Avenue
New York, New York 10017
212-661-0450
H. R. Shanton Granger

SOUTHEAST
Ken Fairleigh Associates
P.O. Box 3956
Charlotte, North Carolina 28203
704-366-1434
Kenneth F. Fairleigh

ADVERTISING SALES OFFICES

MACTIER PUBLISHING CORP.
820 Second Avenue
New York 10017 212-661-0450

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612 North Michigan Avenue
Chicago, Illinois 60611
312-642-3774
Thomas F. X. Carter

WEST COAST
1245 East Walnut Street
Pasadena, California 91106
213-795-1528
213-684-0590 (Los Angeles)
Lawrence C. Papp

Thompson & Healey Inc.
1111 Hearst Building
San Francisco, California 94103
415-362-8547
William J. Healey

JAPAN
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan
Yoshi Yamamoto

FROM THE EDITOR

Fine the Engineer? Why Not Fire Him?

Leaking the answer is a way of rigging quiz shows and passing FCC radio telephone license exams. One quick way of earning a third class ticket is to buy a pencil at test time with the answers imprinted on its edges. Five weeks at a cram school is apparently sufficient to learn enough to pass a first-phone exam.

The FCC is aware of the absurdity of this situation and is now, we are told, trying to come up with exams that have some relevancy to today's needs—such as broadcasting in color, changing power on directional antennas, etc.

In the meantime, stations are getting cited for violations because operating personnel really don't know what they are doing. As one remedy, some old pros favor the suggestion of fining the ticket holder (rather than the station licensee) for violations. The reasoning behind this move is that a fine of a couple hundred dollars for FCC citations will weed out the incompetents.

We are not so sure. We can readily imagine situations where station management will quietly reimburse the engineer for his loss. After all, management can't help but be aware that some of the assignments given to combo men make simple duties such as log keeping on time physically impossible.

On this score, we see greater merit in citations for violations being entered directly on the operator's license much in the same way that driving violations now get entered onto driver's licenses. So many violations and you lose it—until you can demonstrate new competency.

This practice would at least have the knowledgeable engineer protesting to his management against questionable station procedures and practices. There would be no mute acquiescence to unlawful procedure just to keep one's job because the end outcome would be disbarment from any engineering position.

Another suggestion of merit that has been proposed is to require some on-the-job experience—an internship—before full credentials are given. There would be no instant first class tickets awarded—one would now have to spend time in ranks as is now the practice in the merchant marine and armed services.

To stop some of the silly games played with poorly certified and poorly trained help, the NAB has requested a relaxation of operator requirements and asks that a station be permitted to let any third-phone operator perform routine operations for virtually all radio stations regardless of power. This makes sense but certainly does nothing to guarantee better results. Why not try for a real solution?

We propose that the FCC rules be revised to require the most stringent on-air performance standards—but at the same time drop all sections spelling out qualifications for personnel. That's right: don't even require a staff engineer. To prevent all hell from breaking loose, the FCC should take the simple expedient of concomitantly setting fines for technical violations significantly higher than they are now. This will force a solution.

Owners will likely junk wornout gear and dismiss obsolete technicians. New equipment will be paid for out of payroll savings and will be maintained by real experts on contract. The evolving contract service organizations will be manned by the industry's professional dedicated engineers. These organizations would prove their value to station owners simply by *guaranteeing* no trouble with the FCC.

It's extreme, but simple. With Mr. Burch, the doer, at the helm of the FCC, now is the time to give it a try.

James A. Lippke, Editor

PRODUCT INDEX

A quick reference to products mentioned editorially or in advertisements. Page number is listed first (light face type) followed by reader service number (bold face.)

AUDIO

50/**127** Audio components/Fairchild
3/**101** Automation system/Schafer
30/**276** Cartridge mount/Pickering
39/**115** Cartridges/Stanton
50/**129** Cartridges/TelePro
41/**117** Cartridge tape eraser/Sparta
38/**278** Console, five-channel mono/QRK
23/**113** Control unit/TeleMation
40/**285** Microphones, condenser lavaller/Sennheiser
9/**105** Microphones, condenser lavalier/Sennheiser
15/**110** Microphones, dynamic cardioid/Electro-Voice
8/**104** Monitors, AM/Wilkinson
45/**122** Recorders, reproducers & loggers/Metrotech
48/**125** Tape cartridge head alignment gauge/Sparta
38/**277** Tape cartridge player/Int'l Tapetronics
35/**114** Tape recorder-reproducer/Ampex
C4/**132** Tape recorder-reproducer/TapeAthon

TELEVISION CONTROL & STUDIO EQUIPMENT

21/**319** Cameras/Shibaden
17/**112** Camera system, remote control/Power Optics
5/**102** Color corrector/CBS Labs
22/**321** Color corrector/CBS Labs
7/**103** Control equipment/Grass Valley Group
21/**315** Film chain/AV Systems
13/**108** Monitors/Ball Bros. Research
10/**106** Monitors/Belar
44/**121** Studio installation/Soll Inc.
21/**318** Super 8 film chain/Riker Video
21/**320** Switcher/Telemet
23/**113** Titling generator/TeleMation
38/**281** Video distribution amplifier/Rohde & Schwarz
32/**282** Video pointer/CVI

CATV (See also: COMPONENTS, WIRE & CABLE)

19/**304** Case and return channel/Vikoa
19/**309** CATV return signal amplifiers/Amelco
21/**316** Character generator/Data Technology
20/**312** Converter (pushbutton)/Craftsman
19/**300** CRT grid system/Advanced Research
20/**311** Demodulator/Dynair
22/**322** Dial-controlled switcher/Rediffusion
20/**314** Dial switch converter/SKL
50/**128** Equipment, engineering, installation/Kaiser
38/**280** Noise measuring set/Kay Elemetrics
21/**317** Non-duplication switcher/TeleMation
19/**306** Sub-channel amplifier/C-Cor
18/**301** Subscriber responder/GE
51/**130** Towers/Fort Worth Tower
47/**124** Trenching equipment/Charles Machine
19/**305** Two-way CATV equipment/HTV
18/**302** Two-way CATV system/Anaconda
19/**307** Two-way CATV systems/EIE
11/**308** Two-way CATV systems/Jerrold
20/**313** Two-way switch block converter/AEL
19/**303** Trunk amplifier/Sylvania
C3/**131** Various products/Dynair

ANTENNAS, TOWERS & TRANSMISSION LINES

42/**120** Antennas, FM/Jampro
44/**121** Construction/Soll Inc.
20/**310** Microwave equipment/Collins

CCTV

41/**118** Lenses/Cosmicar

TEST EQUIPMENT

38/**275** CATV system test unit/JFD
14/**109** Monitors, antenna/Delta
22/**323** Sweep system/JFD
48/**126** TV color analyzer/Minolta
11/**107** TV test instruments/Tektronix

COMPONENTS, WIRE & CABLE

C2/**100** Cable, coaxial/Comm·Scope
16/**111** Connectors/Cooke Engineering
42/**119** Silicon rectifiers/Wilkinson

MISCELLANEOUS

40/**284** Alarm system for unattended stations/Lenkurt
46/**123** Books/TAB Books
38/**279** Digital clock & time code generator/Climet Instruments
40/**116** Surge protectors/Wilkinson

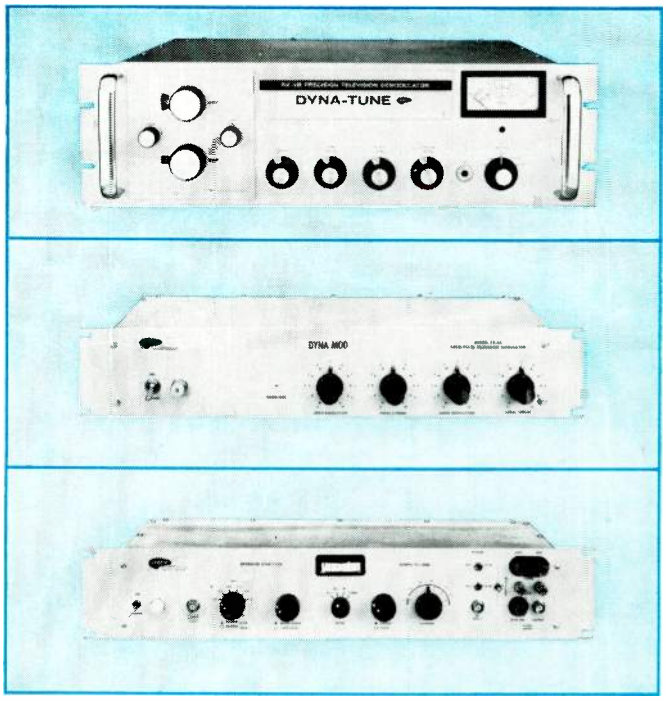
from professional-quality local origination
. . . all the way to testing, switching and distribution

DYNAIR OFFERS MORE THAN 200 DIFFERENT PRODUCTS FOR THE TELEVISION INDUSTRY

DYNAIR concentrates its major effort in one technical area: Equipment for the television industry. More than a decade of pioneering design experience has produced a comprehensive line of equipment that—year after year—sets the pace in video signal distribution, switching, modulation and RF demodulation.

FOR THE HEAD END

DYNAIR's field-proven, solid-state equipment solves CATV head-end problems and assures broadcast-quality pictures. Here are three tried-and-proven units which belong at the head end of every CATV system. . . .



RX-4B DYNA-TUNE for high-fidelity off-air color. Uses completely new filtering and signal-restoration concepts to provide superior adjacent-channel color performance in either microwave-fed or demod-mod systems. Actually improves the color signal in many critical areas over that produced by the broadcast RF transmission system.

TX-4A DYNA-MOD for broadcast quality transmission. Supplies signals approximating FCC specifications. Provides interference-free pictures in a full 12-channel system . . . with crisp, clean color. Available for operation on any standard VHF channel.

TS-100B SIDEBAND ANALYZER for broadcast-precision testing. Quickly checks overall alignment of video amplifiers, modulated stage and RF amplifiers of modulators—in normal operation. Provides the same test techniques used by broadcasters and eliminates tedious point-to-point checking. Tunes to all channels for system flexibility.

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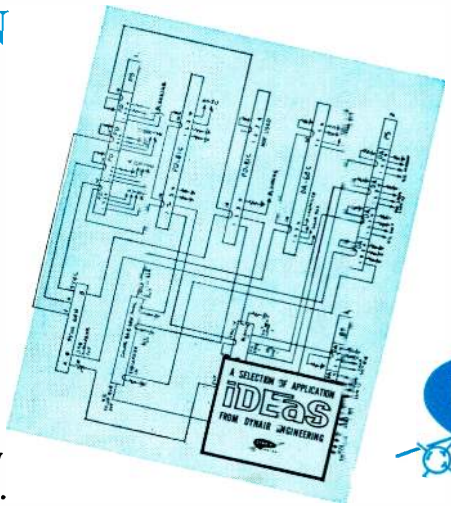
DYNAIR's complete line of low-cost programming accessories are designed specifically to provide professional results without fancy cabinetry or expensive "frills." You can assemble a system for your particular needs between camera and monitor from dozens of available DYNAIR units, including . . .

- Video Switcher-Faders
- Special-Effects Generators and Switchers
- Sync Generators
- Video Distribution Equipment
- Pulse Distribution Equipment

DYNAIR's new "IDEAS" booklet will prove very helpful in designing your local-origination system. Make sure you add it to your library.



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Circle 131 on Reader Service Card

the first 14″ RECORDER/REPRODUCER without hang-ups

Other big names in tape machines have tried to design a 14" unit to handle extended playback and recording — but if high price isn't their hang-up, tape breakage, stretching, wow and flutter and drifting become the big problems.

Now let's look at the 1400, Tape-Athon's new tape unit — sensibly priced — unexcelled performer — ideal for any AM and FM broadcasting or recording facility.

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AND NO SIDE "OVERHANG-UP" The reels on the 1400 are located in the center of the chassis, eliminating side overhang and the inherent problems of reels being bumped or knocked off. (Why do it any other way?)

NO TAPE REVERSING HANG-UP — Tape direction reversing is fully automatic and operates electromechanically **or** by foil sensing. (Why not have your choice?)

Plus — illuminated touch-button control, automatic tape lifts, a fast drum-band type brake system, local or remote cueing, and high speed rewinding.

Detailed specifications are available in data sheet 265-5. Send for a copy today.

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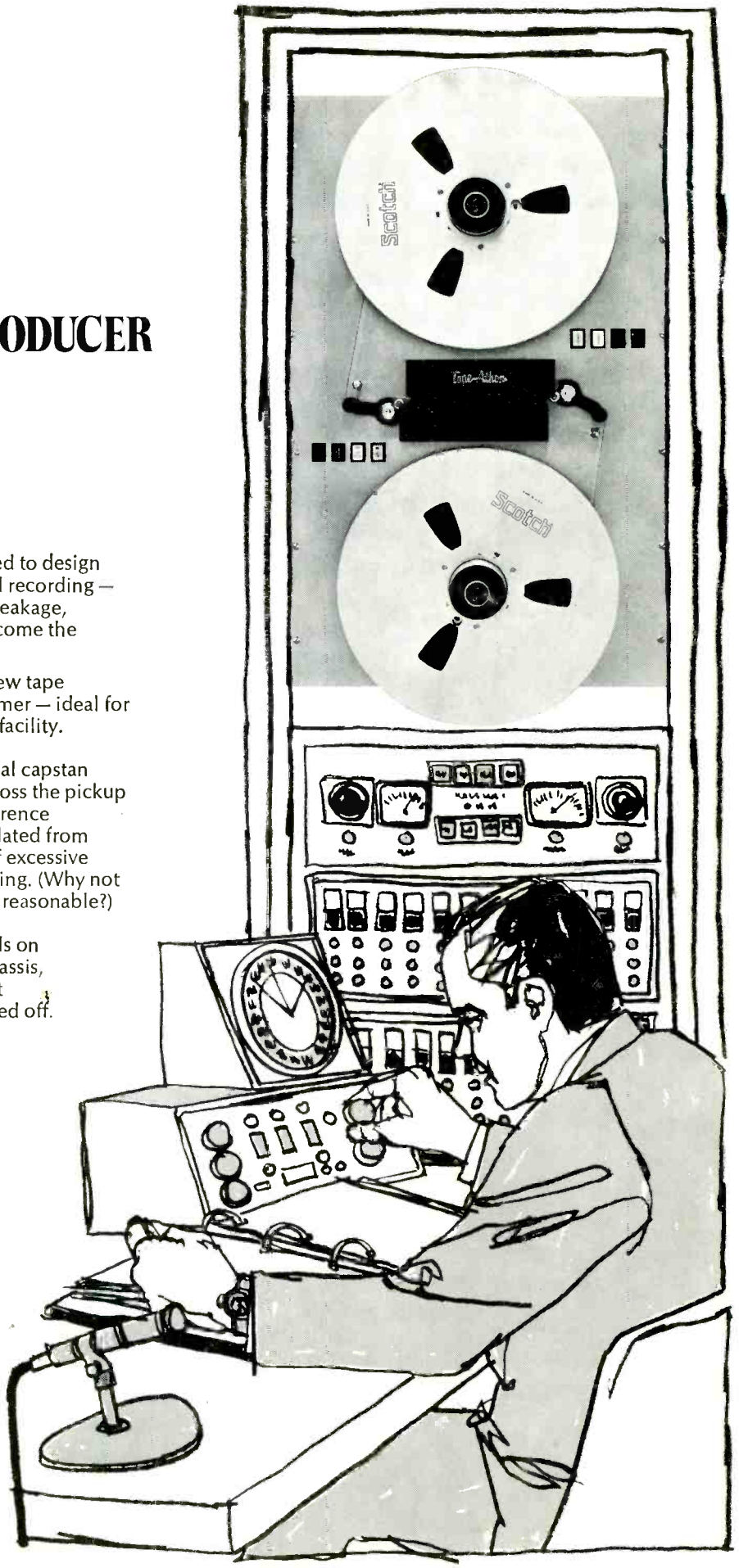

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