

OCTOBER 1971

# BME

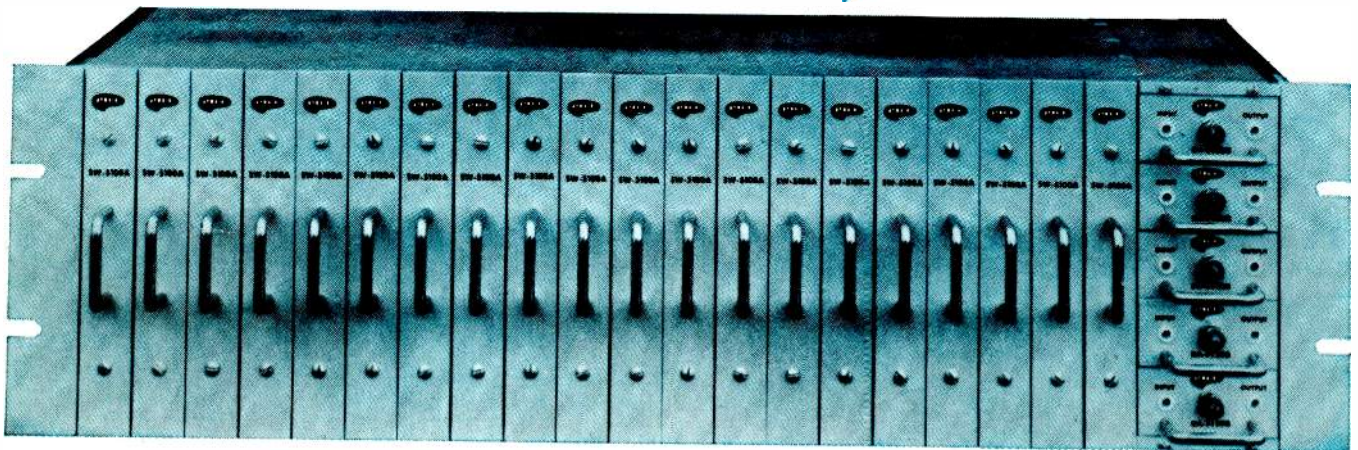
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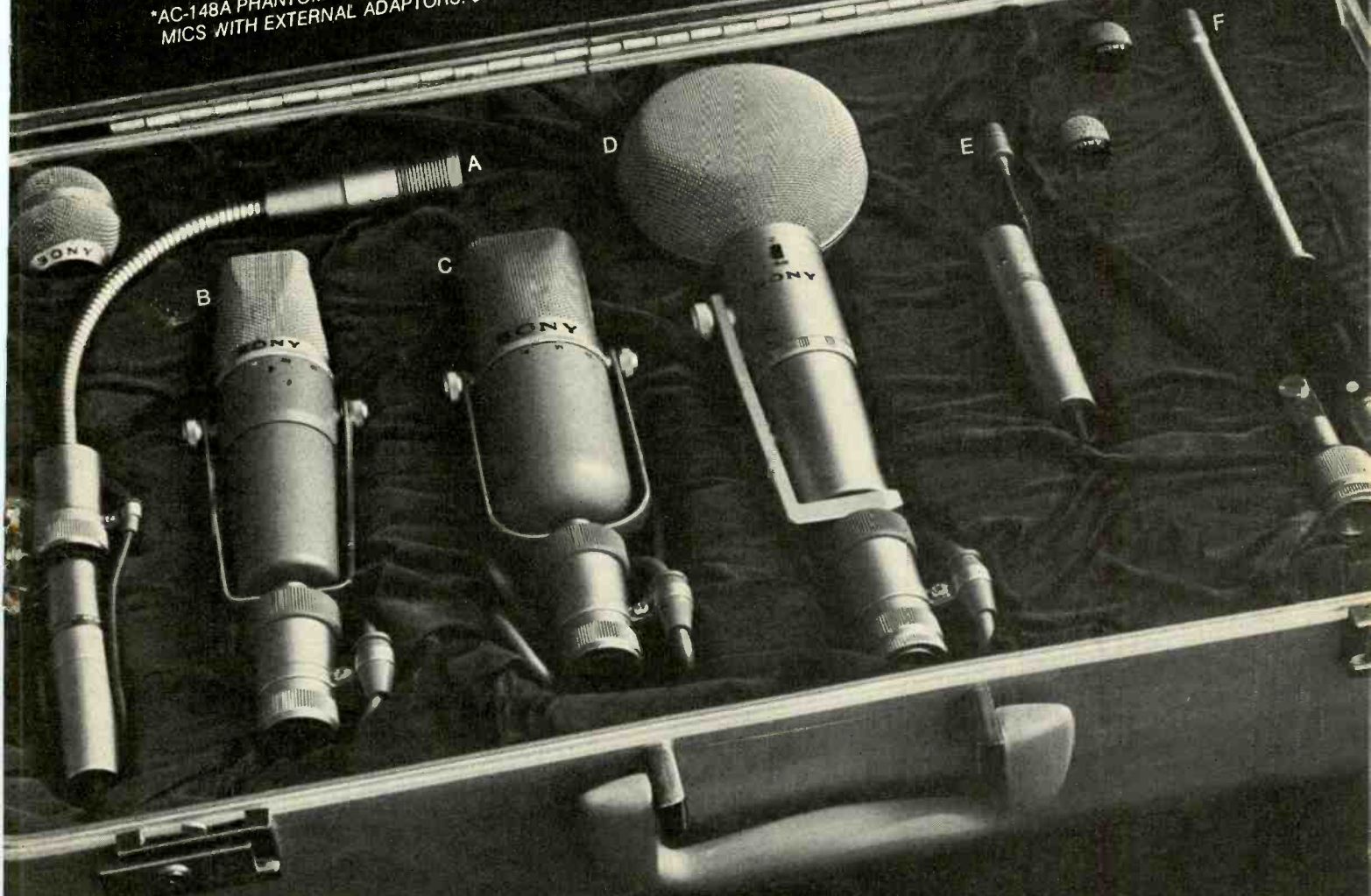
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# BM/E

BROADCAST MANAGEMENT/ENGINEERING



We dedicate this cover to the BBC which is concerned about students acquiring knowledge in a passive uninvolved fashion. For a rundown on producing participative, responsive ITV, check the article on page 31.

## **BROADBAND INFORMATION SERVICES, INC.**

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### **Editor:**

**James A. Lippke**

### **Technical Editor:**

**Thomas R. Haskett**

### **Assistant Editor:**

**A. E. Gehlhaar**

### **Art Director:**

**Gus Sauter**

### **Production Manager:**

**Arline G. Jacobs**

### **FCC Counsel:**

**Pittman Lovett Ford  
Hennessey and White**

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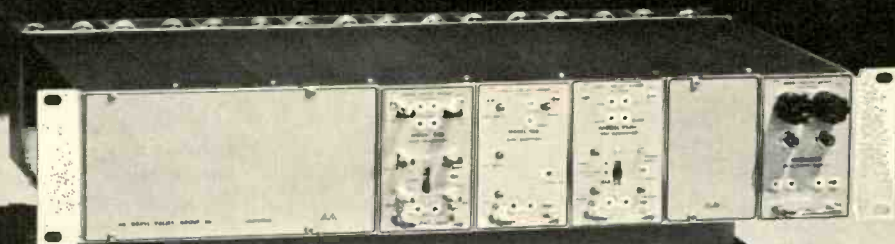
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# BROADCAST INDUSTRY NEWS

## 1971 NAEB Meeting Set for Miami Beach

Case reports on successful public programming, new ideas in station management and in audio and radio engineering, plans for better education for jobs in educational broadcasting, the latest program production techniques, the political and public relations problems of the educational broadcaster are among the talk-session topics scheduled for the annual meeting of the National Association of Educational Broadcasters, in the Fontainebleau, Miami Beach, October 18, 19, and 20th.

On the exhibit floor, the doldrums in the broadcast industry will be evident, as they were at last year's NAEB meet, in the absence of most of the major manufacturers of broadcast transmitting equipment. Something over 60 exhibits will be devoted largely to closed-circuit television equipment. Among the new items on display will be the Magnavox Series 200 and Series 300 color cameras, designed specifically for closed-circuit TV and CATV.

Dr. Sidney Marland, U.S. Commissioner of Education, will address a General Session on Tuesday morning, October 19. A forum on the relations between educational stations and politicians will be led by Gerald G. Yokom, of NAEB's educational radio division.

Magnavox Video Systems introduces at NAEB two new color television cameras—the Series 200 (Right) and the Series 300.



There will be a paper on how four ETV stations use computers to collect and analyze instructional data, by George L. Hall, Research and Development Officer, NAEB; and a paper on the successful use of broadcasting to improve vocabulary skills in inner city St. Louis, by Dr. Gerald H. Moeller, Director of Evaluation and Research, St. Louis Public Schools.

Among the score of other general topics are: innovations in educational programming; evaluation of instructional programs; and use of an ETV staff to improve community involvement. Engineering sessions cover virtually the whole range of topics that interest the ETV engineer, from video tape techniques to remote transmitter control, from 16-track audio to the role of satellites in ETV.

For a *BM/E* report on "Making ITV Accountable," see page 31.

## Also In Miami— NITA-ITS Meeting

On the same days (October 18, 19, 20) that the educational broadcasters exchange ideas and encouragement (above), and also in Miami Beach's Fontainebleau Hotel, there will be a joint convention of the National Industrial Television Association and the Industrial Television Society, two groups of persons actively concerned with television in a wide range of non-

broadcast applications. The program will consist mainly of panel discussions and presentations dealing with better use of television in business, industry, medicine, and other non-broadcasting areas.

## SMPTE Conference to Emphasize Television

At the Queen Elizabeth Hotel in Montreal, from the 3rd to the 8th of October, the Society of Motion Picture and Television Engineers will hold its 110th Technical Conference, with about 35 papers devoted to television engineering topics, and a two-day symposium on video cartridge, cassette, and disc player systems.

The television papers cover a very wide range of broadcast and cable engineering topics, including among many others: new magnetic tapes; advanced switching systems; studio design; audio monitoring equipment; studio lighting; new cameras; the use of satellites in broadcasting networks; an analytical study of the image transformation process; a panel discussion on the need for on-air color correction of film.

## Precise Time Broadcast by NBS

An experimental television time code system developed by the National Bureau of Standards will be tested nationally in October. Line one of the vertical interval has been chosen for transmitting both a hour-minute-second code and a precise microsecond code.

The viewer will not be aware of the test but broadcasters could use a simple decoder to superimpose an alpha-numeric readout on the TV screen. The system can transmit, at the same time, a precise 1MHz carrier. Thus precise time and a stable frequency signal can be delivered on a wide scale basis inexpensively.

## Dolby FM Noise Reduction is Getting Continued Trial

Following a demonstration by Dolby and WFMT in Chicago, at

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## NEWS continued

the time of the Consumer Electronics Show, Dolby encoders have been installed on an experimental basis by several FM stations. WFMt is continuing to use the system, and others that have joined in are KANU, Lawrence, Kansas; KARK, Little Rock, Ark.; and WLRS, Louisville. Dolby claims a reduction in background noise, for FM receivers having the decoder circuitry, of 10 dB. As *BM/E* pointed out in the May issue, reporting on a March demonstration of the system, that amounts to improving receiver sensitivity by about a factor of three, and multiplying the station's coverage area by three. Now, if FM receiver makers can be persuaded to put decoders in (for about \$10), FM'ers would seem to have a quick route to greatly increased coverage. (The encoder costs about \$1000.)

### New Low-Frequency Radio Warning System On the Way

Under contract from the U.S. Office of Civil Defense, the Westinghouse Corporation will build by July 1972 a 50,000-watt low-frequency radio transmitter at Edgewood Arsenal, Md., and will also install 500 receivers to bring in the signals from the transmitter to law enforcement offices, fire houses, and selected state and local government agencies in eight eastern states. The system will supply much faster and more reliable warning of both nuclear attack and major peacetime disasters. Warnings received by the local government agency are relayed from there to the local community. The system is the first in a series projected by the OCD and called "Decision Information Distribution Systems." A second group of 1600 receivers will be installed after the first batch is in working order. The OCD wants eleven other similar transmitter and receiver system to cover the whole country.

### Communications Engineers—They Want You in Australia!

The Australian Post Office, which controls Australia's postal and telecommunications and provides all TV, radio, and relay services, is actively seeking communications engineers; in fact, wants them badly enough to pay first-class air fares to bring successful applicants and their families to Australia. The APO offers an ini-

tial three-year appointment, with the possibility of an extension or permanent job at the end. APO is a \$2.5 billion enterprise, the largest business in Australia, growing about \$350 million yearly, and is facing an acute shortage of trained help. Anyone with a degree in engineering who would like an interview, to be held near him, should write to L. Mead, Executive Officer, Australian Embassy, Washington, D.C.

### Satellite Will Take Education via Radio to Alaskan Villages

The U.S. Office of Education, the National Institutes of Health, and the National Aeronautics and Space Administration are joined in an experiment to bring education and health services to remote Alaskan villages via radio, using an Applications Technology Satellite already in orbit. Most of the villages to be reached have no telephone service. The satellite-radio net will distribute a wide variety of teacher-training material, health instruction, university courses for college credit, instruction in nutrition, in child development, programs on Alaskan culture and history, and information on career and training opportunities in Alaska.

### Association Actions

**National Association of Broadcasters** charged that a coordinated national movement was behind most of the complaints and petitions aimed at denying license renewals to radio and TV stations. NAB said it is opposed to a proposal that each station carry announcements each eight days throughout the year to stimulate comments from the public. NAB expressed agreement with some other proposals, including filing for renewal four months before expiration, rather than the present 90 days, and for pre-filing and post-filing notices. . . . NAB said that the FCC has no authority to order all television receivers to be specially designed to receive CATV, as requested by NCTA, because CATV is not "broadcasting." Without new legislation, the FCC cannot proceed on this, said NAB. . . . **UHF revenues**, said NAB, increased 28.2% from 1969 to 1970, with the per-station average going from \$729,400 to \$935,000. Of 62 stations responding to an NAB survey, 27 made a profit in 1970. Operators expect the average to go past \$1 million in 1971, a level at

which 70% of UF stations have been profitable.

**National Cable Television Association**, through its Chairman, John Gwin, expressed general strong approval of the FCC proposals of the past summer for the future of CATV. As *BM/E* pointed out in the editorial in the August issue, in essence the FCC proposes to let cable import distant signals if cable will also move promptly into those much-heralded, non-broadcasting communication services it is uniquely equipped to provide. "We will do everything in our power to insure the successful implementation of the FCC's hopes for cable TV," said Gwin, indicating that on the national level at least cable will accept the challenge. . . . NCTA has issued a revised edition of the "Code of Ethical Practices" for cable systems. A new section covers advertising standards, reflecting growth in the use of ads on cable. . . . **Irving Kahn**, Chairman of TelePrompTer, the country's largest cable operator, has been named head of the NCTA Satellite Committee, which will investigate and report on all aspects of the use of satellites in distributing cable programs. . . . NCTA is seeking a new **Government Relations Director** who can work with diverse groups in the industry and inform legislative and regulatory bodies on cable issues and the future of broadband communications. Association members or others should submit nominations to Bruce E. Lovett, Vice President, American Television and Communications Corp., 1629 K Street, N.W., Washington, D.C., 20006. . . . **Recent NCTA appointments** include **Don Anderson** as director of membership services, **Amos B. Hostetter** as Chairman of the Public Relations Committee, **William F. Karnes** as Chairman of the Engineering Committee, and **W. R. Brazeal** and **L. W. Kliever** to the Executive Committee.

**National Association of Educational Broadcasters** has formed an ad hoc task force to examine the state of instructional radio and develop guide lines for its future development, in the light of changes in education and in radio technology. Members are Kenar Charkoudian, KRVM, Eugene, Oregon; Dick Forsythe, WBAA, Purdue University; Claire Kentsler, WHA, Madison, Wisconsin; Elinor Richardson of the Los Angeles County Schools; and James Macandrew, WNYE, New York.



## AUDIO FILE:

FOR BETTER IDEAS  
FROM AUDIO ENGINEERS

# All-Talk Audio Processing

For years, many radio men have struggled with the normal situation of music and talk programming. Because of the difference between music and speech waveforms, accurate level control is a problem.

Recently, however, the all-talk format has become viable and it's possible to forget about music and set up equipment for speech alone. (Exceptions are musical commercials, but these occupy only a small fraction of the broadcast day.) What sort of audio signal processing would you do if your station went all-talk?

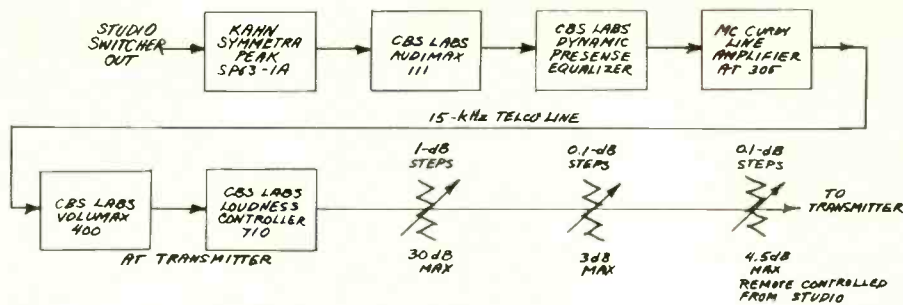
In New York City, WINS(AM) is all news 24 hours a day. Most programming is live (announcer in studio), but with a good amount of actuality tapes, feeds (live or taped) from other Group W stations, and remotes from mobile units or reporters on foot.

The WINS studios are in midtown Manhattan, while the remote-controlled 50-kW transmitter is across the Hudson River in New Jersey. To put the most intelligible signal into the station's coverage area, Chief Engineer Bruce Ratts uses the lineup of audio signal-processing gear shown in the diagram.

In the studio, the master control room switcher has six inputs from six studio consoles. There are 12 output lines. The first element in the chain is a Kahn Symmetra-Peak, which equalizes nonsymmetrical audio peaks, compensating for microphone polarity or any other similar defect in a tape or remote feed.

Next, a CBS Labs Audimax compresses dynamic range somewhat to fit audio within the window imposed by the amplitude modulation system.

(Continued on page 10)



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For complete details about SPOTMASTER cartridge units (stereo, delayed programming and multiple cartridge models, too), write or call today. Remember, Broadcast Electronics is the No. 1 designer/producer of broadcast quality cartridge tape equipment . . . worldwide!

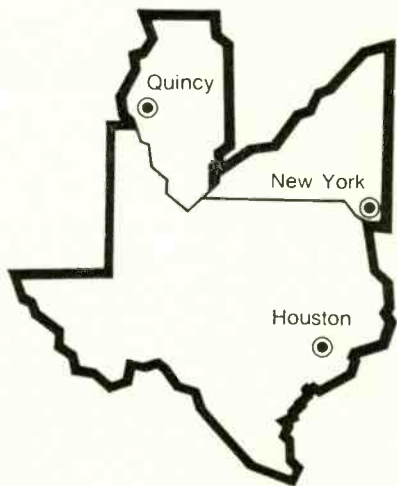


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**Audio File continued**

The CBS Labs Dynamic Presence Equalizer is useful because many news tapes and remote feeds have degraded frequency response due to less-than-optimum tape gear (dirty or mis-biased heads) or low-grade telco lines. The DPE boosts or attenuates midrange audio (2000-4000 Hz) which contains the consonants that supply most of the information in speech.

Last element in the studio chain is a McCurdy line amplifier. It drives a 15-kHz leased telco line out to the transmitter site.

At that point, a CBS Labs Volumax peak limiter establishes the audio ceiling. Some feel a limiter should be the last element before the transmitter, but WINS uses an exception to this rule—the Loudness Controller developed by CBS Labs. It makes the final dynamic judgment, preventing excessive loudness. Certain tape feeds and commercials sound louder than normal programming because of processing: shelf equalization, compression, echo, reverb. The controller insures that loudness won't exceed a predetermined level. As a peak-limiting device it doesn't increase low-amplitude passages, and holds high-amplitude segments within a certain level.

The last three elements in the chain are attenuators used to trim audio level to match the transmitter input. First is a rough attenuator, adjustable over a 30-dB range in 1-dB steps. Second, a fine attenuator covers a 3-dB range in 0.1-dB steps. Both of these are manual attenuators which are set at the transmitter whenever anything is changed.

The third attenuator is a motor-driven pot, remote-controlled from the studio. Range is 4.5 dB, in 0.1-dB steps. This attenuator is used for trimming working level from the studio, while observing the modulation monitor.

Finally, the equipment chain just described is one of two identical systems from studio to transmitter. And WINS has two transmitters and standby power, for maximum reliability.

There you have it—one station's idea of all-talk audio processing. How would you do it? **BM/E**



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## KDAL-TV moved out to move up to full color.

"The timing was perfect," says Ron Lund, Director of Photography for the Duluth station. "Management had already decided to move the entire station to a new building, and this fits our plans for a whole new photo department—complete with color processor.

"The Kodak ME-4 process gave us the flexibility we needed to stay on top of color news and sports. Now we can do more, and do it faster. We've had film come

in at 9:15 P.M., and had it on the air for the 10 o'clock evening news. And we've had tremendous community response to our documentaries. We've shot everything from an anniversary of a forest fire to local sports fishing.

"And it's paid off in other ways. We process quite a lot of commercials and industrial films. And we've installed the Kodak Silver Recovery System to add a little more to the profits.

"Color quality? Just great! And we've had excellent results with Kodak's packaged chemicals. In short, we're just glad we moved when we did."

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# INTERPRETING THE **FCC** RULES & REGULATIONS

## New Dimensions To "Fairness"

The United States Court of Appeals for the District of Columbia Circuit has just issued a decision which is reverberating around broadcast licensee's control rooms throughout the country. The Court has, in effect, added a new dimension to "fairness" by declaring that, as a general policy, a broadcaster *cannot* refuse to sell any of its advertising time to groups or individuals wishing to speak out on controversial public issues. That is, if a broadcaster sells time on its facilities to regular commercial advertisers, it must also sell time to groups or individuals who wish to speak on controversial issues.

There is still much controversy over the exact scope of the Court's order. However, the reality to you, the broadcaster, is that you may very well face some knotty legal questions in refusing to make time available to groups or individuals who wish to use your facilities to speak out on controversial subjects.

Before discussing the Court's pronouncements, a review of the broad precepts of the "Fairness Doctrine" is in order.

### Basic Fairness Doctrine

The Fairness Doctrine concerns a broadcast licensee's broad obligation to air all sides of a controversy of public importance. 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.

The Fairness Doctrine has evolved out of a series of cases. Its definitive policy statement appeared in the Federal Communication's 1949 *Editorializing Report*, and was the subject of the 1969 landmark case, *Red Lion Broadcasting Company, Inc. v. FCC*. The Commission believes 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 choose 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.<sup>1</sup>

What is meant by an "affirmative obligation?"

<sup>1</sup> 3 FCC 1246 (1969)

The Commission attempted to explain its interpretation in a letter to *Mid-Florida Television Corporation*:

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."

However, in view of the Court's recent decision, can it now be correctly stated that it is, in fact, "within the discretion of the licensee . . . to choose the precise means of achieving fairness?"

### The Court's Decision

According to the decision of the Court of Appeals in *Business Executives' Move for Vietnam Peace v. FCC, et al*, the broadcaster still retains considerable discretion in methods of achieving fairness. The Court simply says that broadcasters may *not* refuse to sell advertising time to groups or individuals wishing to speak out on controversial issues. Obviously, many do not agree with the Court's "simple" pronouncement; industry reaction has been swift and vocal—much of it adamantly against the Court's decision.

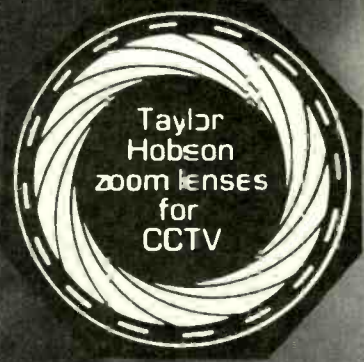
The case arose before the Court as a result of The Business Executives' Move for Vietnam Peace attempt to *purchase* time on a station in Washington, D.C., for broadcast of several recorded one-minute announcements which it believed "offered the public a unique viewpoint on what is no doubt one of the great political and moral issues of our time."

The announcements urged "immediate withdrawal of American forces from Vietnam and from other overseas military installations," and featured statements by leading businessmen and retired military officers.

The Washington radio station, over a period of eight months, repeatedly refused to sell any time to the business executives. According to

(Continued on page 14)

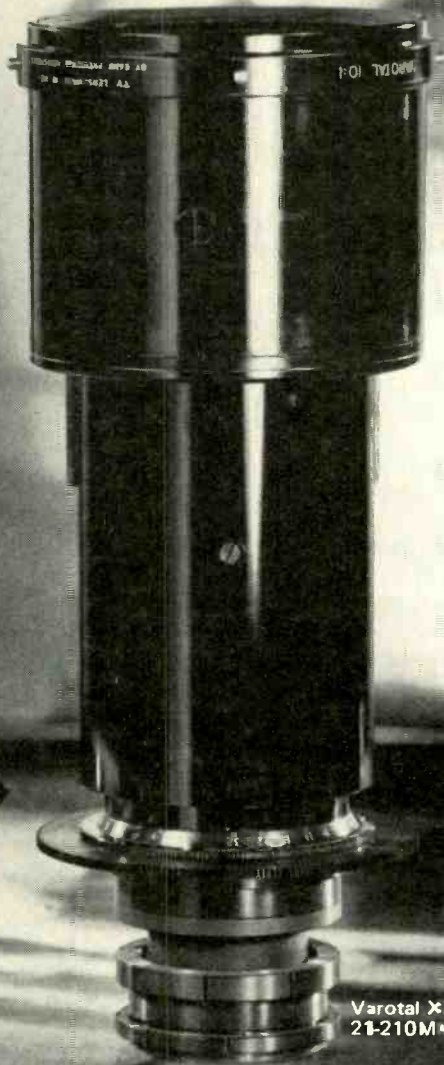




# the long and short of it



Monital 5 1 f3.8  
17-85MM Pocket Zoom

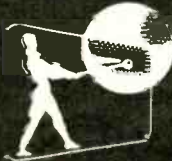


Varotal XXIII 10:1 f2.8  
21-210MM Zoom

The Varotal XXIII raises your CCTV transmission system to broadcast standards. The Monital pocket zoom is for less exacting standards. Between them you can choose from a wide range of Taylor Hobson CCTV lenses. They fit Plumbicon, vidicon and image orthicon cameras. They can be manually or remotely controlled. You can even think in terms of a constant speed servo iris. Close up and macro zoom attachments are just routine.

Write or phone for more details and prices, and remember that nothing in TV is possible beyond the capability of the lens.

\*Reg. TM of NV Philips of Holland.



## RANK PRECISION INDUSTRIES, INC.

<b>New York</b> 280 N. Rr. 303 West Nyack, N.Y. 10994 (614) 358-4450	<b>Illinois</b> 411 Jarvis Ave. Des Plaines, Ill. 60018 (312) 297-7020	<b>California</b> 5926 E. Wash. Blvd. Los Angeles, Calif. 90040 (213) 685-8590	<b>Canada</b> 1111 Finch Ave. W. Downsview, Ontario Canada (416) 830-4514
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## FCC continued

the Court, the station cited no particular objection to the planned announcements. Rather, the station relied solely upon an across-the-board policy barring all editorial advertisements, recognizing "its long-established policy of refusing to sell spot announcement time to individuals or groups to set forth views on controversial issues."

In essence, the Federal Communication Commission agreed with the station. Before the Court, the Commission argued that it is permissible for a licensee to follow a general policy of rejecting all editorial advertisements, because (1) the fairness doctrine should be interpreted to all rejection of paid controversial advertisements since licensees have a broad leeway to exercise their professional judgment as to the format for presentation of controversial issues. Therefore, acceptance of the particular format of paid advertising was by no means compulsory; and (2) the First Amendment was equally permissive and to do otherwise would create chaos in broadcasting.

Noting that the broadcast media "function as both our foremost forum for public speech and our most important educator of an informed people," the Court rejected the arguments set forth and noted that the narrow question at hand was whether such groups or individuals have a limited right of access to radio and television for *paid* public issue announcements, and whether the Commission's ruling that a *total exclusion* of such announcements was permissible.

In response to the argument that chaos would result from non-exclusion of paid advertisements, or that those groups with the most amount of money would tend to dominate the airwaves (since they could afford to purchase more air time), the Court indicated that regulations must be developed by the Commission and broadcasters. But in so doing, basic guidelines of immediate importance to broadcasters were developed. The Court declared,

Clearly, for example, broadcasters are entitled to place an outside limit on the total amount of editorial advertising they will sell. To fail to impose some such limit would be to deny the public the other sorts of programming which it legitimately expects on radio and television. Similarly, "reasonable regulation" of the placement of advertisements is altogether proper. No advertiser has a right to air his presentation at any particular point in an evening's programming. Nor does he have a right to clog a particular time segment with his messages. A relegation of all editorial advertising to 'non-prime time' or any other major discrimination in the placement of editorial advertisements would no doubt go too far. But there is still room for broad exercise of the broadcasters' discretion.

We need not define the precise control which broadcasters may exercise over editorial advertising. Rather, the point is that by requiring that some such advertising be accepted, we leave the Commission and licensees broad latitude to develop "reasonable regulations" which will avoid any possibility of chaos and confusion. The spectre of chaos and "mike grabbing" raised by the Commission and intervenors here is, as petitioners say, a "bogus issue." Broadcasters, after all, have dealt quite successfully with the scheduling problems involved with commercial advertising. We require only that non-commercial advertisers be treated in the same evenhanded way. Although many broadcasters already do allow editorial advertisements on the air, we have not been shown one reason, drawn from their experience, to suggest that chaos has resulted.

Beyond the mistaken suggestion of administrative apocalypse, the Commission and intervenors have raised a more plausible and important claim, involving the danger that a few individuals or groups might come to dominate editorial advertising time. Of course, the mere fact that wealthy people may use their opportunities to speak more effectively than other people is not enough to justify eliminating those opportunities entirely. It takes more money to operate a magazine or newspaper—or, for that matter, a broadcast station—than to buy a segment of time for an editorial advertisement. Yet we are not reluctant to provide strict First Amendment protection for the operators of magazines, newspapers and broadcast stations. The real problem, then, is not that editorial advertising will cost money, but that it may be dominated by only one group from one part of the political spectrum. A one-sided flood of editorial advertisements could hardly be called the "robust, wide-open" debate which the people have a right to expect on radio and television.

Again, however, invalidation of a flat ban on editorial advertising does not close the door to "reasonable regulations" designed to prevent domination by a few groups or a few viewpoints. Within a general regime of accepting some editorial advertisements, there is room for the Commission and licensees to develop such guidelines. For example, there could be some outside limits on the amount of advertising time that will be sold to one group or to representatives of one particular narrow viewpoint. The licensee should not begin to exercise the same "authoritative selection" in editorial advertising which he exercises in normal programming. However, we are confident of the Commission's ability to set down guidelines which avoid that danger."

In a scathing slap at the industry, the Court, in conclusion, declared as follows:

The principle at stake here is one of fundamental importance: it concerns the people's right to engage in and to hear vigorous public debate on the broadcast media. More specifically, it concerns the application of that right to the substantial portion of the broadcast day which is sold for advertising. For too long advertising has been considered a virtual free fire zone, largely ungoverned by regulatory guidelines. As a result, a cloying blandness and commercialism (sometimes said to be characteristic of radio and television as a whole) have found an especially effective outlet. We are convinced that the time has come for the Commission to cease abdicating responsibility over the uses of advertising time. Indeed, we are convinced that broadcast advertising has great potential for enlivening and enriching debate on public issues, rather than drugging it with an overdose of non-ideas and non-issues as is now the case.

Under attack here is an allegedly common practice in the broadcast industry—airing only those paid presentations which advertise products or which deal with "non-controversial" matters, and confining the discussion of controversial public issues to formats such as the news or documentaries which are tightly controlled and edited by the broadcaster. In the Commission's view, an attack on the permissibility of this practice "goes to the heart of the system of broadcasting which has developed in this country."

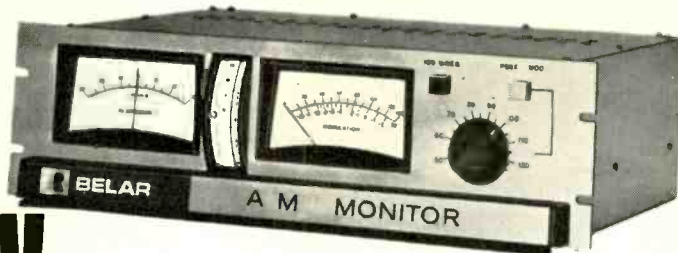
We disagree. The actual issue before us is relatively narrow and we decide it narrowly. We do not have to cut to the "heart" of our system of broadcasting; we leave undisturbed the licensee's basic right to exercise judgment and control in public issue programming and the sale of advertising time. All we do is forbid an extreme form of control which totally excludes controversial public debate from broadcast advertising time.

We hold specifically that a flat ban on paid public issue announcements is in violation of the First Amendment, at least when other sorts of paid announcements are accepted. We do not hold,

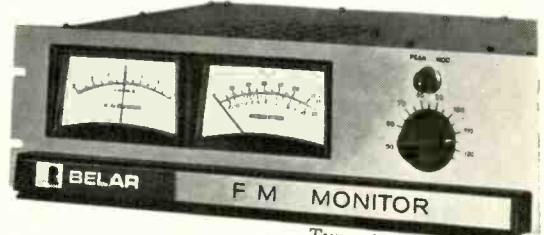
(Continued on page 50)



now . . .  
 a company  
 that has AM, FM  
 and TV frequency  
 and modulation  
 monitoring  
 systems.



Type Approval #3-176



Type Approval #3-129



Type Approval #3-146



Type Approval #3-162



Type Approval #3-181



Type Approval Not Required

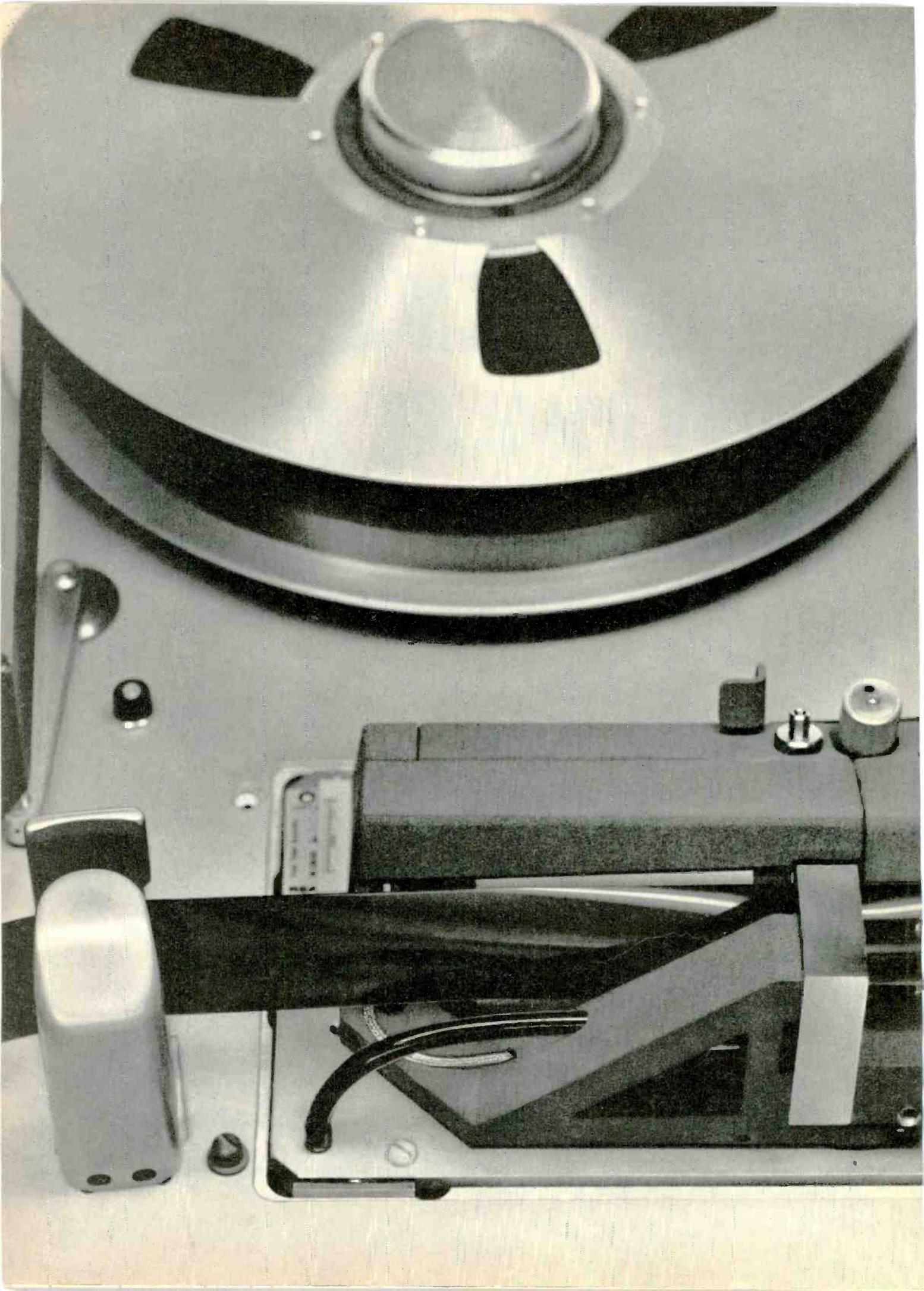
Now . . . Belar. Belar is the only company that has the necessary type approvals on all three monitoring systems. Belar accuracy permits use of the maximum power allowable and maximum power means maximum profit. Add to this that all Belar equipment is immediately available.

Isn't it time you stopped running around and finally settled for a company that can handle *all* your frequency and modulation monitoring needs? Contact Arno Meyer . . . he'll show you the way.



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Circle 108 on Reader Service Card





# RCA proudly announces the failure of its new headwheel at KENI-TV, Alaska.

At 3001 hours. We almost can't believe it ourselves.

When we introduced our new, long-life headwheel, we guaranteed it for 200 hours.

Reports back from the field indicate a general life average of more than 500 hours.

Some 35 users are already members of our 1000-hour club—and that used to be an incredible life for any headwheel.

And then there's that little beauty at KENI in Anchorage, Alaska that recorded beautifully right up to 3001 hours. We reworked it more than a year ago using Alfecon II—our new headwheel material.

What's it all mean? Well, our customers are pleased because they don't have to pay for new headwheels so often.

And there are fewer 11th hour decisions about whether to go into a taping session with a wheel that's nearing the end of its average life.

The new headwheel comes with all RCA VTR's, and, of course, the world's first Cartridge Video Machine, our TCR-100.

RCA is in business to help you get your job done more easily, and with more profit.

Our new headwheel is doing it.

The RCA logo is displayed in a bold, black, sans-serif font. The letters are thick and closely spaced, with a distinctive slanted top on the 'A'.

# ***Education in Kentucky— By Television***

by Forest H. Belt

The nation's largest instructional TV system builds for the future and operates for everybody.

VISIT THE LEXINGTON HEADQUARTERS of Kentucky Educational Television, as I did recently, and at first you'll think it's just another TV broadcast facility—minus the confusion. Studios, control rooms, and racks house tons of the latest telecasting apparatus. Technicians move quietly here and there. You'd hardly suspect you're in the center of the largest state education network in the United States. (In the world, only Japan's NHK network is larger.)

Touring the halls, offices, and studios, you realize KET is more than an aggregation of modern equipment. Kentucky Educational Television is a concept. A certain pride glows in the people who walk those halls, think in the offices and conference rooms, and manipulate that multi-million-dollar complex of electronics. They feel that running 16 transmitters hundreds of miles apart, tutoring 325,000 youngsters in 175 of Kentucky's 195 school districts, and putting television into the state's remotest boondocks are accomplishments.

A quick ramble through the technical installation helps you begin to appreciate what's going on at KET. The setup there stands as a model for other states planning and equipping ETV systems.

Director of engineering Ron Stewart conducted me around. "Only two ETV studios in the country are bigger," he said. Studio A measures 40 by 60 feet; studio B, 40 by 50. "Mississippi and Maryland built studios since these. We accuse them of copying our better ideas—a friendly rivalry." Ron chuckled. "But then, we did that too."

Ron showed me a receiver for Vega wireless mikes. "We also use a lot of AKG, Electro-Voice, and RCA mikes in the studio. Hey, see this wire?" He pointed to a thin insulated wire near the floor behind a wall drape. "This runs the perimeter of

the studio. It's a wireless cue line. Audio from the director's booth drives this huge inductive loop, and floor headsets pick it up." One of those better ideas.

Each studio accommodates three General Electric PE-350 color cameras. Accessories include Telesync prompters and crawl. Overhead on lazyboys hang enough Kliegl quartz lights to satisfy any director. An 800-amp patching and SCR-dimmer panel allows lighting technicians almost endless combinations for either studio.

The cameras feed custom-built GE switchers that have 20 inputs and 6 output buses. Each program or preview bus takes 7 composite inputs. Both studio switchers include chroma keying and Riker special effects. Master control takes 19 inputs to 4 output buses. Four sync generators are available to any control point by pulse-assignment switching. A VITS is inserted continuously so engineers at sites all over the state can check telco circuits and transmitter operation.

The control for each studio has dual-channel audio, an Ampex AG-440 tape machine, ORK-12/C turntable, and Spotmaster cartridge player/recorder.

We went next to the VTR room. Two VR-2000B Ampex high-band recorders are color-equipped; one has automatic timer and Editec. They and four VR-1200A machines have dropout compensators, intersync, Amtec, Colortec, and velocity compensation. The room they're in is special. Air is cleaned electronically. Humidity is held below 60%; temperature constant at 65°.

VTR engineer Wayne Bell explained: "All this extra care pays off in reduced maintenance. We almost never have an outage. We use 15-ips 10-mil heads, and I've been getting 500 hours or more on them; 300 hours was normal before." Wayne stores KET's extensive tape library in a room adjoining, which shares the special climate.







The telecine room at KET spreads three islands over a roomy floor. Two are alike, each with GE PE-240 color film chain, a pair of RCA TP-66 projectors, an RCA TP-7 slide drum, an RCA TP-15 multiplexer, and a CBS Labs image enhancer.

The orphan island mounts a GE PE-27 monochrome film chain, another TP-7 and TP-15, plus an International Nuclear colorizer with a Grass Valley keyer "... for cheap and dirty—or rather, cheap and clean—color in our ident cards and stuff like that," Ron explains.

He opened up a cabinet to show me an electric clock with digital readout. A little monochrome camera focused on the time numerals feeds a continuously updated time signal to the switchers. The time can be keyed into whatever program is on the line.

KET personnel run more than just a neat, clean operation. It is innovative. "A real bright bunch of engineers, I have here," boasts Ron Stewart. "We make up a lot of our own special equipment. I'll have to show you Fredd."

Fredd, it turns out, is the KET staff's own electronic animator. It's in the haywire state. "I probably shouldn't let you see Fredd like this. We've got him working; next we clean up his appearance and put him in a rack."

Fredd means *field reference effects display device*. "He can do just about any of those plasticizing-motion tricks you'd want to dream up. We're kind of proud of him. He cost us only a fraction of what a big commercial animator would."

Out back is parked a 30-foot Gerstenslager mobile van on a Dodge chassis. Clean, white, antiseptic-looking (on a recent tour of small towns, the staff got requests for chest X-rays), the van carries and controls three of those PE-350 color cameras (appropriated from the studios

as needed). A storage box holds 1000 feet of cables for them. The van's telecine island puts a Marconi film chain and RCA TP-7 slide projector through a GE "uniplex" optical system. An Ampex VR-1200A has Colortec and an electronic editor.

A 25-kW Onan generator supplies power when commercial current is insufficient. At home, the Onan is kept plugged into the station switchbox for auxiliary power; changeover takes only a minute or two.

A portable Kliegl quartz lighting system fills most remote-taping needs. A power hoist lifts camera or microwave antenna to the truck top for mounting on rails. Engineers can fire up a 6000-MHz Microwave Associates remote link for live telecasts.

#### **Mission: TV statewide**

The KET network was born September 1968, but gestation began 10 years earlier. Marrying education to technology became the self-appointed task of O. Leonard Press, who in 1958 was head of the radio-TV-films department at the University of Kentucky (UK). Out of much consulting with educators around the state evolved the ideal that drives KET today:

Kentucky's network should: 1. improve education in Kentucky classrooms; 2. make teachers more effective without working them harder; 3. reach every schoolchild in the state; 4. enrich the community around each school; 5. supplement college and university instruction; and 6. help state agencies serve Kentuckians. High goals, for sure. Press wrote proposals to convince the Kentucky legislature to get behind his plan.

The technical challenge excited an employee of Press's, the young chief engineer of UK radio station WBKY (FM), Ronald B. Stewart. Kentucky has hills at one end, mountains at the other, and

some pretty ragged country in between. To cover it all by television was a fascinating and difficult order. Stewart got out his maps and slide rule. Phase one was under way.

In 1960 the Kentucky general assembly agreed to a feasibility study. In 1962 it created the Kentucky Authority for Educational Television. O. Leonard Press became executive director of the Authority, and Ron Stewart was appointed director of engineering. The legislature authorized a bond issue to yield \$8.6-million. By 1963 Press and Stewart began working to prove the system they proposed would work. But they had five more years to struggle before the network would be ready.

Press methodically recruited employees. He expected them to understand his concept of an educational TV system. He expected them to work toward realizing it. His success reflects in the dedicated KET staff today.

Meanwhile, Ron Stewart bought transmitters, antennas, and studio equipment. He put together a staff of engineers and technicians to install and operate the gear. Ron's goal sounds presumptuous now: he figured some bright afternoon he would flip a switch and turn on a network that would send television simultaneously over Kentucky's 40,000 square miles. To anyone who has installed and fired up a uhf-TV station, one is headache enough. Ron and his crew had to install a dozen.

Ten 30-kW RCA transmitters, model TTU-30A, were placed at sites near Bowling Green, Elizabethtown, Hazard, Lexington, Madisonville, Morehead, Murray, Owenton, Pikeville, and Somerset. RCA TFU-30J pylon antennas were mounted on towers ranging from 100 to 950 feet tall. The antennas pushed visual erp up close to 500 kW. (One, at Pikeville in the eastern Kentucky mountains, pushes a strong lobe northward, sending 1.4 megawatts erp in that direction.) Two TTU-2A transmitters, working 2 kW into TFU-6J pylons for about 10 kW erp, went in at Ashland and Covington.

Some of the transmitter sites are virtually inaccessible except by jeep or helicopter. So . . . with tenacity typical of KET, jeeps, power wagons, and helicopters officiated at various installation stages. (Ron and another engineer fly the KET helicopter.) Meanwhile, the headquarters building back home in Lexington was going up—35,000 square feet of it, room for a staff of 70 or so.

And then, just as predicted, one bright sunny afternoon, September 23, 1968, Ron Stewart punched up an ID slide on island two. Governor Louie B. Nunn dialed a phone in his office in Frankfort and turned on the Kentucky Educational Television network for its first statewide broadcast. In 6500 classrooms, upward of 200,000 youngsters watched the governor deliver his dedication speech.

Thus phase two of Leonard Press's vision came to pass. Kentucky owned the largest and most modern educational television network in the country.

Kentucky's 1400 schools lie in 195 school districts. They vary in character from modern metropolitan through small-town to rural. Words like "disadvantaged" and "poverty" fit the Appalachian section of east Kentucky. West Kentucky is rural. The rolling central section, the Bluegrass, is farm country but it's not poor. Eight Kentucky cities boast populations above 25,000 and many towns have 10,000 or more.

No one kind of programming can adequately serve a population that diverse. So, the network is laid out in five divisions. Right now, all five carry the same programming. Later, as the need develops and program material becomes available, the network can suit interests in each region.

The flagship station, WKLE-46, rises atop a hill at Clay's Ferry, 12 miles southwest of Lexington. WKLE blankets the Bluegrass region, which is considered one division, with 525 kW erp.

Transmissions to other stations go by AT&T circuits. Early in their planning, Stewart and Press agreed network connections should be an operating expense, not an investment. A spokesman for South Central Bell says his company and AT&T have spent thousands of manhours and almost \$4-million interconnecting KET transmitters and studios.

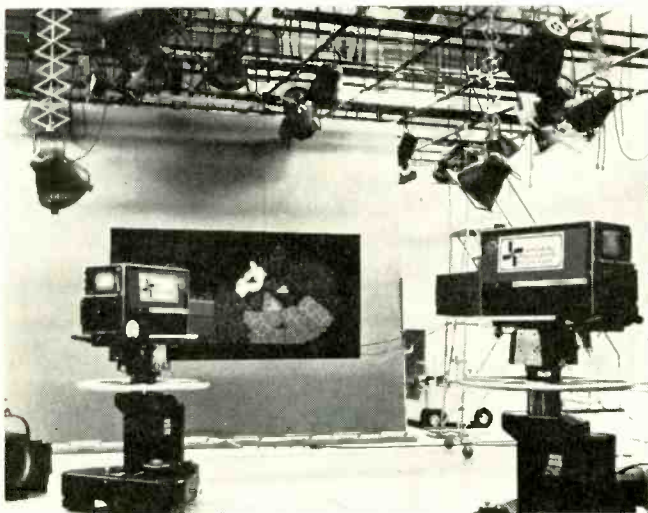
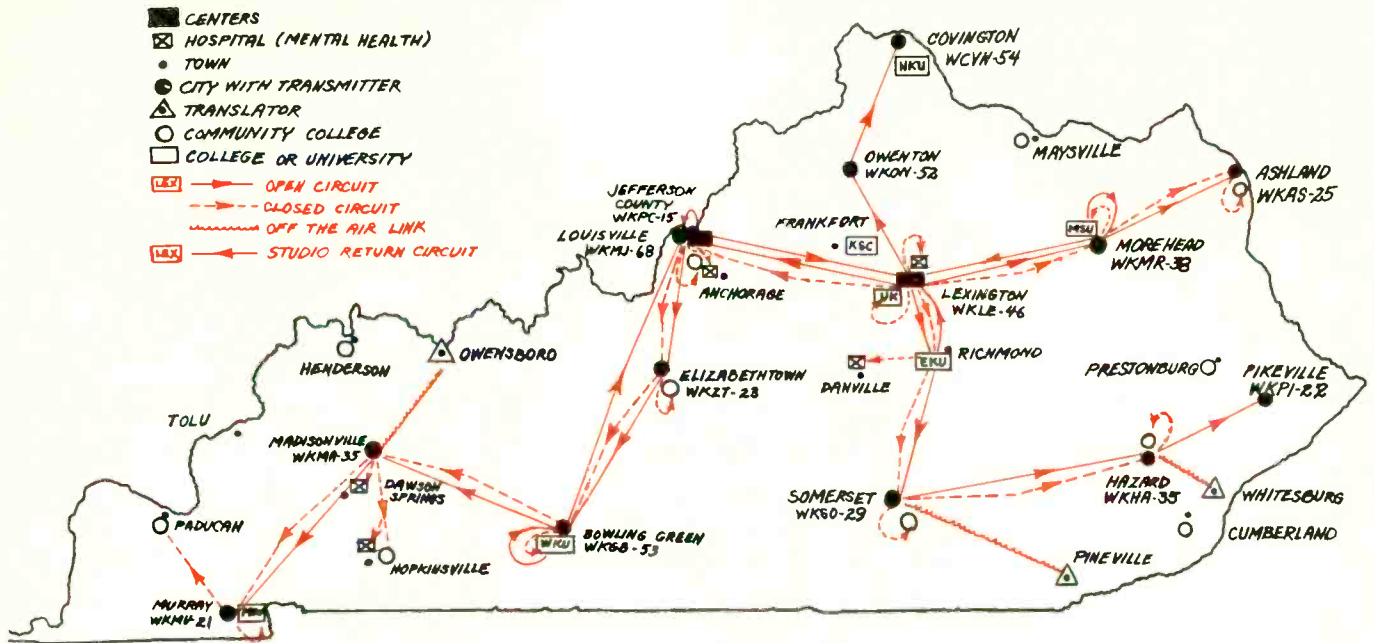
The western division is the longest. It comprises five transmitters. In telco sequence, they are: Louisville (WKMJ-68), Elizabethtown (WKZI-23), Bowling Green (WKGB-53), Madisonville (WKMA-35), and Murray (WKMU-21). (The Louisville station, with a GE model TT57-A transmitter running 30 kW into a GE TY106F helical antenna, was added since the network was turned on.) All these stations radiate 500 kW visual or more. A 100-watt uhf translator (W73AN) converts WKMA-35 signal to channel 73 to bolster coverage of the Owensboro metropolitan area.

The northern division is Owenton (WKON-52) and Covington (WCVN-54). WKON radiates 550 kW visual from a high location, and serves a broad area. WCVN concentrates its 10 kW erp into the Covington/Newport metropolitan area, just across the Ohio River from Cincinnati.

The northeastern branch hauls into river and mild mountain country. The stations sit near Morehead (WKMR-38) and Ashland (WKAS-25). The Morehead transmitter puts out more than 550 kW erp. Ashland, on the river near Huntington, West Virginia, gets by with 10 kW erp aimed into the river valley. Both stations will be supplemented later by translators, especially in weak spots along the river.

The southeastern region gives engineers the most trouble. Some federal funds—slightly over \$1 million—have supplemented KET dollars in this area, under the Appalachian Regional Development Act. Three transmitters spread the signal over the Cumberland Plateau and the Pine Mountain range. In sequence, the telco circuits go through Richmond to stations at Somerset (WKSO-29), Hazard (WKHA-35), and Pikeville (WKPI-22).





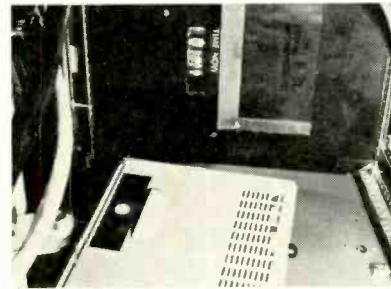
Studio A at Lexington center is plenty large for indoor ETV productions. Cyclorama was built to order and put in by Tiffin Scenery. Tracks switch electrically for a variety of arrangements.



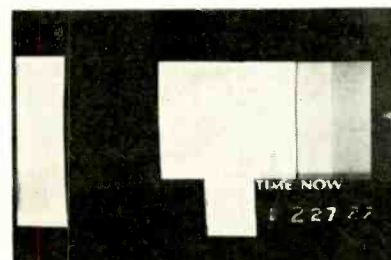
Climate-controlled video tape room keeps equipment and tapes in A-1 shape. Increases the life of both. VTR technician Del McGill makes a maintenance check of machines regularly.



Library of 750 video tapes and 200 films, plus some original footage in bulk cans, gets same steady humidity and temperature, and dust-free atmosphere, as the VTR room.



Real-time clock signal from digital clock with Nixie readout is picked up by inexpensive monochrome CCTV type (camera). Time can be punched up and superimposed on any program.







Field services truck surveys field strength with reference dipole on telescoping mast. Truck has own AC power to run test instruments inside. KET also surveys transmitter patterns with helicopter.

### Reaching everyone

Valleys in these southeast mountains create dead spots. Only translators and cable systems can reach into some of the deep canyons. Paul Smith of KET directs a crew of field-service engineers who solve these problems of poor reception.

Paul has outfitted a slick little Ford "Econoline" van with just about everything he needs to survey reception. A telescoping Andrew mast hydraulically pushes a standard reference dipole 30 feet into the air. Inside the truck, an Empire Devices model NF-105 measures field intensity.

It took a 100-watt Emcee translator, converting WKHA-35 to channel 73 (W73AP), to fill the Whitesburg area near the Virginia border. A worse shadow fell over Pineville, on the Pine Mountain ridge near the Cumberland Gap. Here's that story.

Bell County school authorities put in receiving equipment and discovered that only two out of 15 schools could get usable signals. Al Brock, in charge of visual aids in Bell County, got a couple of portable Ampex VTR's (a model 5000 and a 5500). The cable-TV company in Pineville put a pretty good signal into one school. So Brock went there and to the KET center in Lexington and taped the telecourses needed most. Then he hauled them to Bell County schools and played them for the students. Brock's Ford pickup became familiar up those Pine Mountain hollows.

Called to Bell County by the board of education, Paul Smith found a mere 50  $\mu$ V at the two schools that *could* watch KET telecasts. At Straight Creek Elementary, a worse case, he measured three ghostly microvolts from channel 29 in Somerset and nothing at all from Hazard.

A translator seemed the only answer. Ron Stewart decided on a 1-watt Emcee, converting Somerset channel 29 to channel 8. The translator



Engineer Paul Smith begins set of field tests with type-approved Empire meter. Jerrold model 727 backs up main instrument and serves when portable unit is needed.

(W08BL) is situated 2500 feet up a mountain. The impossibly rugged terrain forced Ron Stewart to fly materials in with the KET helicopter.

Eleven schools now get hot signals. A couple of distribution amps even had to have their ac modified. But the way terrain is in Kentucky's eastern mountains, four schools still sit in signal blackouts. Tests continue. Al Brock is taping again this year. But KET field services won't quit till every school in Bell County has television. It may take tall towers on hilltops, holding up yagis and preamps, but they'll do it.

A dozen or two more translators are scheduled already to fill in other deadspots around the state. Everybody is to get TV in Kentucky. O. Leonard Press promised.

### The halls of ivy

A 700-mile network of television for elementary schools and their communities seems laudable enough. But the KET miracle goes on to higher education. Almost that many *more* miles of telco channels link up a closed-circuit TV system between universities and colleges.

Often, the closed-circuit telco channels run parallel to the others. Eastern Kentucky U is at Richmond, on the southeastern branch. The closed-circuit line patches on through there to Somerset and then to Hazard; at both locations, short telco links tie community colleges into the closed system.

In the western region, a link from WKMJ ties Jefferson Community College into the closed-circuit channel. A link at Elizabethtown serves a community college there. At Bowling Green a line ties in Western Kentucky U. A tapoff at Madisonville routes closed-circuit telecasts down to Hopkinsville Community College. And Paducah Community College has a link from Murray.



Northeast, the Morehead connection ties to Morehead State U. Further out the same branch, a short link connects Ashland Community College to the Ashland closed-circuit channel. A link at Lexington connects the University of Kentucky.

The KET schedule calls for community-college connections soon at Henderson, Prestonburg, Maysville, and Cumberland. Kentucky State College at Frankfurt, North Kentucky U at Covington, and the University of Louisville all get tie-ins sooner or later.

Students at every public college and university in Kentucky can eventually take advantage of lectures, exhibits, and shows too costly for any one school to stage. These forward schools can share exceptional talent and teaching facilities. Furthermore, five state hospitals are hooked into the closed-circuit system. Upward of 3000 state mental-health employees receive training and orientation telecasts in hospitals at Anchorage (near Louisville), Danville, Dawson Springs, Hopkinsville, and Lexington.

Not many college or university telecourses have been produced by the national ITV libraries yet. KET is doing something about that, too. One step has been to equip the larger campuses with production facilities. Programs developed in these studios follow another 250 miles or so of telco return circuits, all terminating at the Lexington center. There, the programs are taped or stored. Or, they can be sent out immediately or later to other schools on the closed (or on the open) circuits. If preferred, they can be held for only selected regions.

You can trace return circuits on the map. The studio return from Western goes through Bowling Green and Louisville on its way to Lexington. A return circuit from Richmond pipes productions from Eastern. Morehead State and UK both have studios and return lines. Programs originating at WKPC-15, a cooperating station owned by Jefferson County schools, come to Lexington through a return link from WKMJ. The studio at Kentucky State College will be tied in later.

### **Roll your own**

With all that capability, it's no wonder KET is on the way to becoming a foremost producer of telecourses. While I was at KET, Ron Stewart (who is in charge of production too) and his staff were viewing rushes of film for a segment of "Images and Things." That's a new social-relations series for youngsters, developed by a consortium of educators and ITV people brought together by National Instructional Television, a supplier of taped and filmed courses. KET personnel are influential in NIT national consortiums, and presently are deep into planning a new televised health course.

KET undertakes some pretty large projects on its own. A film soon to be shown nationally follows a group of drug addicts through rehabilitation and back to the street. Renick McLellan, a young producer/director, shot about 40



Special Tyler camera mounting fits Airflex-M 16-mm camera into helicopter. Ron Stewart (left) and KET cameramen go to great lengths sometimes for an unusual bit of footage.

hours of color/sound film. When I met him he had just finished six months of cutting and editing. He had it down to a rough two hours and was mixing sound.

Ron, in the helicopter, has logged some exciting hours around the state shooting footage for fascinating specials dreamed up and produced "right down home."

### **Little TV schoolhouse**

TV education in Kentucky doesn't end at school, either. The state has 750,000 adults who didn't finish high school. Sixty half-hour TV lessons help them prepare for diplomas. "TV High School" is telecast two lessons a week. KET repeats each lesson three times at well-spaced intervals, so everyone has a chance to watch.

The courses encompass five subject areas: 1. English grammar, vocabulary, spelling, and use of the dictionary; 2. social studies such as history, geography, politics, and social concern; 3. science, physics, and chemistry; 4. literature, writing, poetry, drama, and criticism; 5. mathematics, of a kind people can use.

In its first year in Kentucky, the 1970-71 season, "TV High School" attracted nearly a thousand registered participants. Around 300 of those passed their General Educational Development (GED) exams for high school equivalency certificates. Many others watched and learned from the lessons, evidenced by letters of thanks to KET. The idea of getting a high-school diploma at home draws viewers in remote areas especially. This season enrollments are higher than ever.

That's a mere beginning, according to Kentucky education officials. Next comes a television university—and soon. Students would earn credits through any state college or university . . . but at home, by television.

## The Haves and Have-Nots

People in Kentucky, as in other places, often ignore what's good for them. Then, perversely, they envy the better things others have. Here's what one remote community did about its wants.

The large auditorium dwarfed the few parents and teachers scattered in seats near the stage. Bob Shy, utilization coordinator for Kentucky Educational Television, had been speaking.

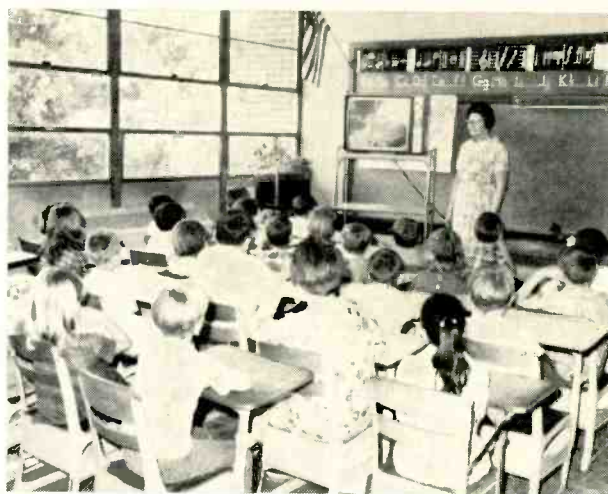
"Crittenden County should grab this opportunity," he told them. "You're only 35 miles from our Madisonville station. I can even show you how to apply for matching funds under National Defense Education Act (NDEA) Title III. Your children deserve the broadening influence of instructional television as we'll send it over the new KET network."

You'd have to know Crittenden County people to understand the lack of enthusiasm in his audience. Population 9000 at most, sleepy, still enjoying the past, Crittenden in 1968 felt too poor to spend school-tax money frivolously—and what could be more frivolous than TV? "Kids see enough junk on TV at home," one citizen grumbled.

But Bob Shy's words had captured the imaginations of a few. Helen Robinson, principal that year at Tolu Elementary, one of the county's four grade schools, caught the significance of what KET could offer youngsters. So did Nellie Lowry, president of Tolu's Parent-Teacher Association, and Elizabeth Weldon, school secretary. They set out next day to do something about this new idea.

Tolu is a tiny river town, barely on the map. But the folks there believe in their kids. What Tolu did about ETV has been repeated in several small Kentucky communities.

Teachers, parents, and students all pitched in to help. People from neighboring farms and towns were invited to pie suppers, bake sales, chili dinners, a PTA carnival. Young people sold



Pupils at Tolu Elementary, near the Ohio River in west Kentucky, are the only ones in their county with ITV. Work by parents, teachers, and youngsters helped pay for the installation.

popcorn at ball games. In just a few months, the TV fund grew to over \$700. Mrs. Robinson, anxious to put instructional television to work at Tolu, committed \$1000 of the school's operating funds.

Early in 1969, a contractor wired all the school's classrooms for TV, erected a 75-foot tower with a channel 35 yagi pointed toward Madisonville, and installed four monochrome receivers. He was paid with a Tolu Elementary School check for \$1700 and an NDEA Title III check for \$1216.

So, while other pupils in Crittenden County have-not, the 200 pupils at Tolu have a curriculum enriched by expert television instructors and by filmed geographic and historic "experiences." They learn social insights otherwise unavailable in a rural community like Tolu. Interest and a little work made the difference between the haves and the have-nots.

Way back in the planning years, Press and Stewart foresaw this eventuality. Every KET network station has room for another transmitter, and every tower can hold another antenna. The KET system will then be three complete state-wide networks: the closed net among higher education centers; an open net for elementary schools in daytime and for community "culture" and entertainment at night; and another open net to high schools in daytime, and broadcasting general and vocational education to adults at night. The third net includes Kentucky TV University.

England already operates a program somewhat similar. One proposal is that Kentucky rent British telecourses, to get TV University under way sooner. Meanwhile, KET and university committees are planning courses that will fit the college-credit-by-TV notion. They include nursing, public administration, black studies, use of language, and how to teach reading, science, and new

math. In less than 5 years, even a homebound Kentuckian may find access to schooling from first grade through college—right in front of his television set.

### Go thou . . .

Educational television in Kentucky sets a pattern any state could follow. Money will buy equivalent facilities and electronics. Careful and dedicated planning could get it all installed and working. But an important ingredient in Kentucky has been people.

The people at KET impress me with three qualities. One is competence; they seem to know what they're shooting for and they hit target regularly. Another is seriousness; they really honestly think what they're doing is important. The third quality is fun; they're excited and pleased at what they're accomplishing. If you can beat that combination, maybe you should be setting up an ETV system somewhere. **BM/E**



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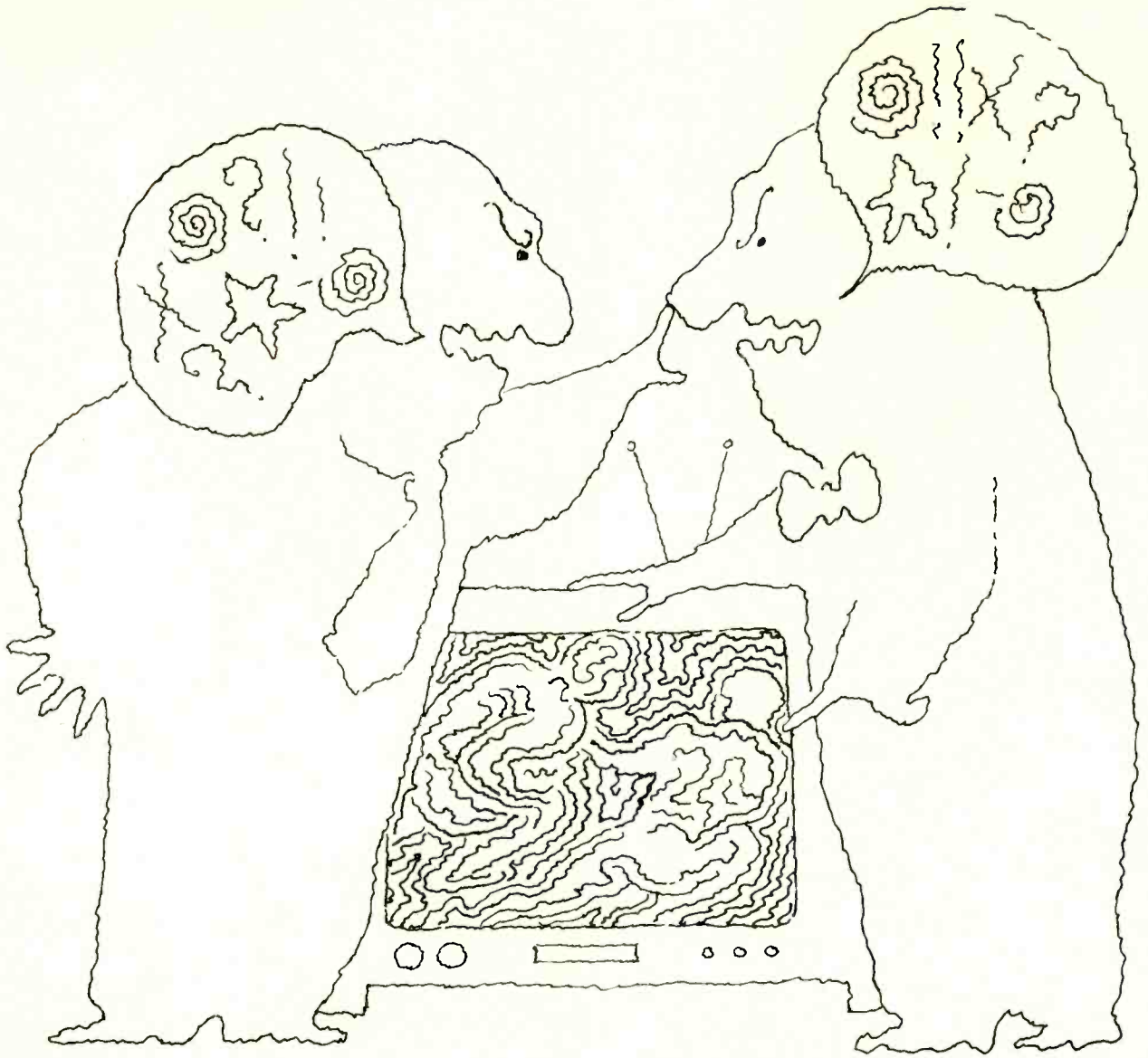
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# University Extension Via TV

by Robert Dymant

Thousands of employees are receiving in-plant college training without ever leaving plant. Courses being piped in via TV—a growing trend among industrial plants throughout the country.

DURING THE PAST FOUR YEARS several thousand professional employees of industries within a 60-mile radius of the Southern Methodist University campus at Dallas, Texas, have participated fully as degree-seeking students in SMU's on-campus engineering graduate courses—without leaving their places of employment.

Thousands more industrial employees are doing the same, taking a wide range of courses right at their industrial plant site. The same is true of industrial plants in Florida; the Buffalo, New York area; Ann Arbor, Michigan; Denver Colorado (see *BM/E* November, 1970); San Francisco Bay area and elsewhere. Industries are taking advantage of a growing trend of keeping their employees on the job, while keeping them posted on the latest industrial developments through educational programs being piped directly into the plant during the normal working day, without the employee ever leaving his place of employment. And, the trend continues.

Updating and upgrading educational experiences through continuing education programs is a way of life for many engineers who want to avoid falling behind the information explosion. Many engineers continue to work for advanced degrees. The process becomes easier when educational programs are piped directly to one's place of employment.

The Institute of Technology of Southern Methodist University was one of the originators of such a program via a closed-circuit talkback-equipped television network that enables industrially-employed personnel to participate fully as students in on-campus courses—without once leaving their respective plants to attend a class. Over four years of experience have shown this system to be highly satisfactory.

Potentially, every graduate course offered to on-campus students by the SMU Institute of Technology is available also to off-campus students via talkback TV.

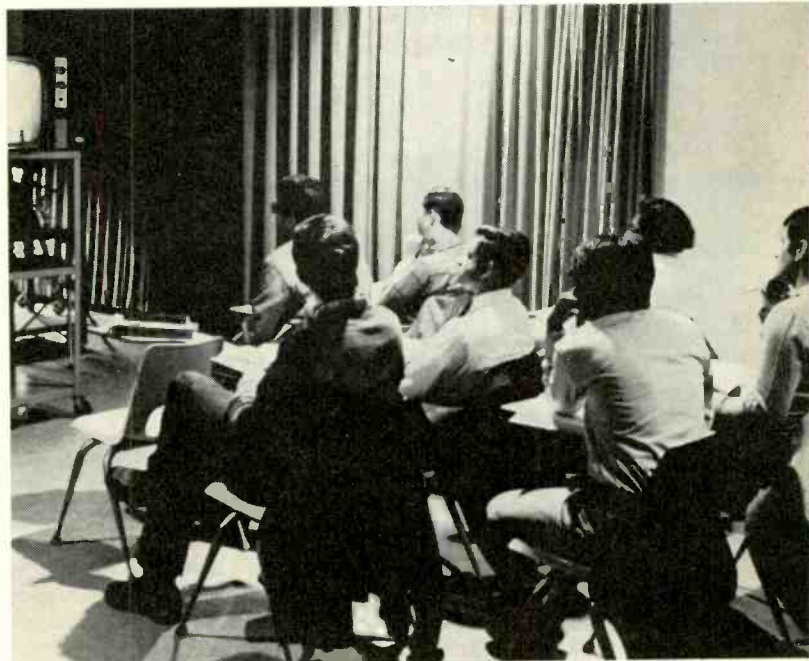
One industrial firm, Vought Aeronautics Division, LTV Aerospace Corporation, found that the TV instruction received by 92 of its employees during one academic year was rated as superior to conventional instruction by a range of from 10 to 90 percent of the students. Overall, talkback TV is judged to be superior to the conventional classroom. These results are charac-

teristic of those found in other surveys of student response to this system.

The future holds promise—at least as soon as the current economic slump ends—of expanded in-plant educational systems that will include more colleges and universities, both private and public, and more industrial concerns.

The Association for Graduate Education and Research of North Texas (TAGER), headquartered at SMU, is a non-profit corporation devoted to the advancement of higher education in the highly industrialized Dallas-Fort Worth region of Texas. The establishment of a television network among the industries and area institutions has been a great boon to the programs, particularly since many of the large industrial plants are located just out of convenient reach of university classes.

A typical SMU transmitting studio consists of two rooms—a control room and a studio/classroom. The two rooms were constructed so that an operator sitting in the control room can view action taking place in the studio, but under nor-



Thousands of employees throughout the country are receiving in-plant college training without ever leaving the plant. Courses are being piped in via TV—a growing trend.

## The Free-Enterprise Videotape Network Next?

The ITFS, microwave, or telephone networks described by Mr. Dymont are institutional approaches to distributing valuable educational material. And more is coming. A university-of-the-air is planned for Alaska by HEW. An adult Sesame Street is underway. Many state university educators are talking about emulating Britain's extensive university-of-the-air program which started this year.

But these distribution systems are not able to deliver the full load of valuable educational material that is now available. Thus we see the birth of free-enterprise videotape network. The semiconductor course developed by Texas Instruments, described on these pages, for closed circuit presentation is one example. Hewlett-Packard is trying to sell some 70 assorted videotapes it has produced for internal training programs to the outside public. RCA Institute is now offering a complete engineering series on videotape to industry and community colleges. These courses were originally developed to update the corporation's engineering staff.

New companies are forming to produce and distribute material to cable TV. Videomation, Inc. is one such company which has tied in with some educators with John Hopkins University affiliations to produce courses directly for the public. The Videorecord Corp. of America has lined up 30 franchised dealers and seven area distributors to commence selling in 1972 training materials to hospitals and business and industry using either EVR or videotape.

TeleMation has set up a production company to produce and sell videotape courses to industry. It is applying expert production techniques to its efforts to make difficult subject matter as clear (and interesting) as possible. All of these courses use workbooks. Some companies, such as The Videorecord Corp., Hershey Video, and Data-Plex are creating programs that are inter-active. (See "Making ITV Accountable") By designing programs that deliberately involve the student, and anticipate student responses, live feedback is not essential.

mal conditions the instructor cannot see or hear from the studio into the control room.

In the studio/classroom there are two television cameras, both completely remote-controlled from the control room. One camera is mounted on the rear wall of the classroom and provides a picture of the instructor and the classroom. The other camera is mounted over the instructor's head and takes a picture of whatever is placed upon his desk. Normally a specially-designed pad is placed in camera view and the instructor uses this pad as he would use a blackboard. Both cameras are equipped with a remote-controlled 10:1 zoom lens. In case of equipment failure or instructor preference there is a blackboard available behind curtains at the front of the room.

The types of lighting used in the studio/classrooms are completely different from the type of lighting normally found in television studios. The instructor is illuminated to the 225-ft-candle level by fluorescent tubes. The students' areas are individually lighted by incandescent fixtures recessed in the ceiling. With this method of lighting, students, the instructor, and the television cameras can coexist comfortably.

All audio, like the video, is completely remotely-controlled from the control room. Standard microphone complement consists of a control-room microphone, an instructor's microphone, and students' microphones hanging from the studio ceiling.

All studios have special effects generators that can be used to place the instructor's picture and the overhead camera's picture on the air simultaneously.

The signal from each studio is sent to the TAGER distribution point via microwave, where it is distributed among the industries and institutions that request the programs.

TAGER Talkback TV is in operation between SMU and industrial classroom locations at Bell Helicopter, General Dynamics, Texas Instruments, Ling-Temco-Vought, Inc., and many others.

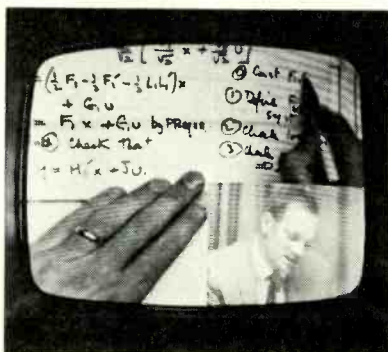
GENESYS, the University of Florida's weapon against technical obsolescence in industry, has been in operation for over six years. During this time the system has been expanded and improved. Two-hundred two advanced degrees have been awarded. GENESYS is the acronym for the University of Florida's Graduate Engineering Education System. It is a closed-circuit television network with talkback.

There is little doubt that GENESYS works. The comprehensive exam results prove that the material can be absorbed even though the classroom instruction is different.

The need for advanced graduate work and retraining by thousands of men in industries in the Florida area now gearing up for consumer-oriented programs, rather than just space, is overwhelming and acute for industry. The lack of such opportunities endangered the companies' competitive position, as well as employees' pro-



Stanford University's network is a four-channel system (ITFS) which telecasts classroom lectures to part-time student engineers at company locations. Monitors show the classroom scene as well as lecturer's notes.



At SMU, notes on monitor are taken by overhead camera; head shot by rear classroom camera. Both are zoom cameras. This is what plant employees in the Dallas-Fort Worth area see right at their place of employment.



professional competence, which, in turn, reduced the competitive strength of their companies. GENESYS is now helping solve this problem.

The concept of cost effectiveness indexes is vital to modern industrial management, and communities which desire to maintain and expand their industry must develop a low educational cost of effectiveness index. GENESYS TV does just that. The TV network clearly maximizes course availability and permits the enrollment of many students who would otherwise be excluded from organized instruction. Students using the remote points must register in the regular way and pay all of the standard fees. Companies pay for the receiving classroom.

Stanford University, Stanford, California, is another educational facility working hand-in-hand with industry in providing in-plant educational courses. Stanford University's new Instructional Television Fixed Services (ITFS) network is a four-channel system which telecasts classroom lectures to part-time student engineers at their own company locations.

More than 200 enrollees in companies from San Francisco to San Jose are now taking week-day classes from 8 a.m. to 4:14 p.m. via the television network at their company locations.

In addition there are more than 700 enrollees in noon-hour and evening courses being given over the network. These are non-academic courses sponsored by the Association for Continuing Education, composed of companies participating in the Stanford ITFS network.

The Standard ITFS network first went on the air in April, 1969, and now has more than 26 firms participating. The member firms pay the entire cost of the network operation, prorated on the basis of gross sales. Some companies have found the network costs less than the time lost when engineers have to come to the campus for classes.

There has been some research, as well as a great deal of experience from operating courses, which indicates that televised lectures, when used in combination with an audio talk-back system and regularly assigned homework, outside reading, and tests, are just as effective as face-to-face teaching methods.

In October of last year, the University of Michigan at Ann Arbor started a new television link between special classrooms at the University of Michigan's College of Engineering and industrial subscribers in the Detroit area.

The system offers firms within about 25 miles of downtown Detroit the convenience of receiving continuing employee education courses in their own plants. The closed-circuit microwave network offers 19 graduate level courses—with full academic credit—in business administration and mechanical, industrial and electrical engineering.

Students in the remote industrial classrooms are involved in the classroom activity in every way except bodily. Again, a two-way telephone

link makes it easy for students to ask the instructor questions and to participate in class discussion. A courier service will pick up and distribute class materials, tests and homework.

Production costs of the typical instructional TV network are not high. Scripts or rehearsals are not used. Instead, a professor merely agrees to meet his regular class in one of the TV classrooms instead of a conventional room. There, he is encouraged to substitute a pad of paper for the blackboard. An overhead camera fitted with a zoom lens picks up what he writes or draws on the pad. TV monitors in the Ann Arbor classroom and in remote classroom act as "electronic blackboards" for students.

A second camera in the back of the classroom allows the instructor to use the blackboard if he prefers. Other equipment lets him show slides, transparencies and motion pictures on the TV monitors.

The instructor's desk is equipped with a small monitoring screen. It also has telephone lines

### ITV for Executives

A few weeks ago a senior vice president of one of the country's largest publishing companies strode onto the stage of a small meeting room in the offices of Communispond Inc., 420 Lexington Ave., New York, N.Y. He was at session number one of a new kind of course in business communication. His assignment was to give a ninety-second talk to fifteen executives from other companies who were also in the program.

Duck soup for such a man you say. Of course it was. He had made hundreds of important speeches and presentations during his business career. And it showed. He was at ease, he was articulate, and he was to the point.

But never before were his previous speeches accorded the scrutiny that this effort got. The instructor was grading it against a list of fixed criteria. The fifteen "students" were grading it on a more subjective basis. And a television camera was taping every word and movement for the most severe critic of all, the speaker himself.

Later when both the speech and critique were finished, the senior vice president was aghast. "Have I been doing that all my life?" he asked. "Have I really been doing that?"

The "that" was not a devastating thing—it was simply that he could not talk without clutching or touching the lectern. Television showed him to himself.

The course developed by Communispond, a division of J. Walter Thompson Advertising, has proved worthwhile to over 300 top executives who paid \$425 to take it for many reasons other than the use of videotape. But the use of videotape as a means of revealing one to oneself was symbolic of an essential aspect of the course—that communications means responding as well as talking. In this sense the Communispond program is a sensitizing course designed to improve the business leader's ability to relate and work with others. You don't believe it's possible. Would you like to see an ITV documentary?

that permit a teletypewriter hookup with the U of M's computing center.

The overhead camera can be moved in ceiling-mounted tracks to pick up the teletypewriter as it "talks" with the computer.

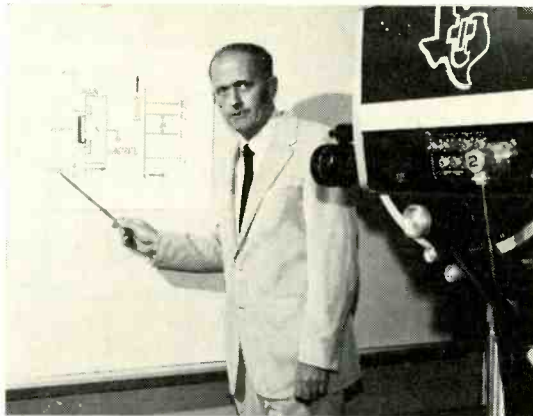
GEMS-ITV, an acronym for Graduate Engineering, Management and Science Instructional Television, is the University of Buffalo's program to assist Western New York industries. GEMS-TV, now getting underway, will bring the classroom to local industrial and business firms via a closed-circuit television network. The project, a combined effort of the University's Faculty of Engineering and Applied Sciences and the School of Management, is similar to the programs underway elsewhere.

Dr. Lauren Hitchcock, Director of GEMS-ITV and a University professor of engineering at the University of Buffalo, is responsible for the numerous technical and economical aspects of the project. Dr. Hitchcock notes that while



Talk back allows the employee taking part in the program at the plant site to ask questions of the instructor back at the studio.

### World's Largest Training Course on CCTV



Last month Texas Instruments undertook to update an entire industry in a new technology in just three days. To do so it hired the closed circuit General Electric Command Performance Network with its big-screen displays in 17 cities. The subject was how electronic engineers could use state-of-the-art metal-oxide-semiconductor technology in large-scale-integrated circuits to design hand-held calculators and other advanced electronic equipment.

As we go to press we don't know the enrollment but it's likely to be the largest single class ever assembled for such a purpose. More than 600 registrants (at \$195 each) are expected. The cost to use the network is less than sending instructors to these locations but of more importance to Texas Instruments is the speed in which important material can be disseminated to the industry. The cost to attendees is reduced since there is minimal travel expense involved.

The course consists of ten concentrated, rehearsed and edited lessons on videotape, plus several hours of practical live discussion with instructors. The course was developed in conjunction with the Electronic Science Dept. of Southern Methodist University.



The plant employee is visually and audibly participating in the live classroom, electronically. Here Dr. Lauren B. Hitchcock, of GEMS-NET, gets ready to reply to a question from a plant employee.

participating companies will share in the expense of setting up the program, the savings for industries concerned will more than make up for the initial investment:

"Since it takes valuable time and energy for full-time employees to travel to campus for graduate courses, we calculate that industries will be saving from \$3000 to \$30,000 per year—depending upon the numbers enrolled—after the project gets underway.

"Furthermore, should a crisis arise at the plant, employees will be easily accessible if they are needed."

A graduate engineer or scientist has a "half-life" of about 10 years—half of what he has learned will be obsolete in a decade. It is clear that the traditional means of providing professional education to production executives, plant managers, mechanics, foremen, chief engineers, and production engineers in industry, is sometimes not keeping pace with this acceleration in the growth of knowledge. In-plant courses piped in via TV, coupled with Talkback, is one way of keeping up.

**BM/E**



# Making ITV Accountable

Can ITV be made cost effective?  
 Can it be truly integrated into the curriculum?  
 Is eliciting a student response the answer? Who says so?

PERHAPS SOME DAY educators will declare visual literacy as an objective. When they do begin to acknowledge that visual literacy is the natural route to learning for that generation of kids whose chief governess has been commercial TV, then, hopefully, film and the electronic medium will take its place with the lecture and the book.

But as long as television continues to be a 6MHz bandwidth channel for primarily *verbal* communications, it will remain a thousand times less effective than it need be from a spectrum utilization point of view. But more importantly, it will be wasteful of human and dollar resources as well.

Recognition of the importance of visual literacy may help integrate TV into the daily curriculum, but it is not the real answer to making ITV more effective or efficient. Designing the TV program for *active learner participation* rather than passive viewing, gets closer to the answer, say the learning theorists, and they are beginning to be heard.

Modern learning theory demands that instructional designers get a desired response as a consequence of a planned stimulus. The surest way of getting the desired response is to use reinforcement, i.e., let the student know immediately when he is responding correctly. And if an acceptable response is not obtained, it means revising the stimulus until you do get what you set out to get. The outcome is known. This is accountability.

Until recently, instructional TV course designers rather ignored stimulus-response and reinforcement concepts. The TV expert was there to advise on production techniques. It was assumed the course teacher knew what the content should be. The TV specialist's job was to work in the use of visuals to make the teacher's point more vivid. No one asked if *that* point was a good one or the right one to make in the first place.

This team approach to ITV has not been unsuccessful. Students have generally learned as much from TV teaching as from conventional teaching, and if the program is done exceptionally

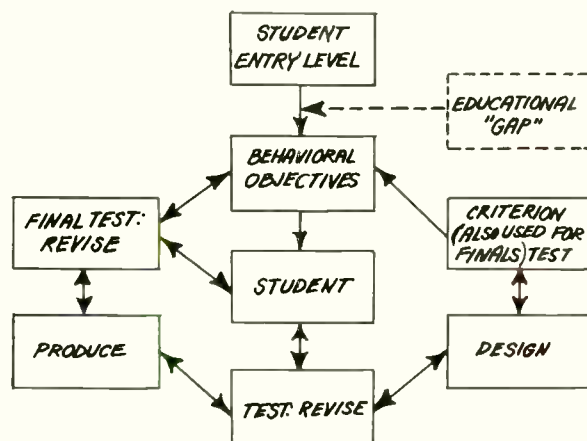
well, the TV presentations are enjoyed more.

Although ITV has not been unsuccessful, neither has it been very successful. Rarely has a TV course been better than that taught by a teacher in the classroom. The role that TV plays in school today is merely supplemental. Only in the case of a serious teacher shortage, is it used extensively and then as a next-best substitute.

ITV is not looked upon as a real alternative or as a first logical choice medium. As an enrichment device, it's been nice; as a means of closing an educational gap, its been a stop-gap.

But now that we're coming into an era of accountability, ITV could come into its own. Accountability has been described as a focus on the *output* of education, not the *input*; on *what* does a youngster learn—not on how many teachers were used, how many books ordered, etc.

When the score is kept this new way—on output—the individual teacher, as a fount of all information and learning, is on the spot. So, of course, is TV but now the evaluators are going to measure something different. They're not going to



To make ITV accountable you have to measure student input and output. To get an intended output, you need behavioral objectives and a process to attain those objectives.

measure marks obtained by TV-taught students versus marks obtained by live-teacher taught students. Instead, they are going to measure what a student knew before instruction and what he knows after. In other words, accountability means an analysis of the entire instructional system will be performed. The designer of effective instruction becomes an expert at a process that has built into it, self-correction. The process includes setting an objective for the learner (behavioral objectives), diagnosing what the student can do now (criterion testing), designing and prescribing learning activities, measuring results (more criterion testing), and then modifying and altering the learning activities until objectives are met.

Because this is a process requiring clearly stated objectives and measurement of knowledge or skills before and after learning activities, the effectiveness of learning activities is always under close scrutiny. When performance incentives are added, i.e., when compensation to the person in charge of learning is based on gains scored by the learner, the learning agent soon becomes adept at picking effective learning activities. King Nelson, president of the Institute for the Development of Educational Auditing, recently told an American Management Assn. audience that when accountability and incentives are combined (performance contracting) entire programs are altered within a time span of six months or less.\* Normally it takes well over a year for a program to be evaluated and in most schools a hard evaluation that leads to a deliberate, marked change in approach is rarely made.

#### Answers to ITV effectiveness

Thus, the process of instructional design, which takes a systems look at learning achieved (also known as instructional technology or programmed instruction), does make it possible to answer the question, "Can ITV be made cost effective?" The answer *can be* affirmative for not all but many situations. The question really has to be posed for every learning-activity choice that has been conceived as a means of achieving the stated objective. TV must be measured against a teacher's live presentation, standard textbooks, programmed texts, motion-picture films, film strips with or without audio, etc., etc.

Since the question of ITV effectiveness has to be asked hundreds of times, i.e., for every objective, we can now also answer the question, "Can ITV truly be integrated into the curriculum?" The answer is again yes, but it depends on the situation. A videotape sequence may become a vital segment but it may be only one segment of many that go to make up a course. (The word *course*, is archaic.) What we are really after is getting the learner to master a series or sequence of behavioral objectives. For any given objective, TV may be the one-and-only cost-effective answer. For another, it is an extravagance.

\*The Individualized Learning Letter, Vol. 1, No. 4, 67 East Shore Road, Huntington, N.Y. 11743.

#### Positive reinforcement needed

As soon as one orients his thinking to the systems design point of view (stating achievement objectives and measuring student performance all along the way to see if the objectives have been obtained), one has to accept the fact about learning that has been posited by behavioral scientists to wit: behavior is lawful and a systematic delivery of positive reinforcement following a specific behavior will produce an increase in that behavior.

The process is one of programmed instruction, characterized as a step-by-step method. A small unit of information is presented. A response is elicited. The material is designed so that it is easy to make a correct response. As soon as a response is made, the student gets immediate feedback—which is usually positive because the right answer was made easy. Once this positive reinforcement has occurred, the learner is well on his way to acquiring the behavior that is desired in the first place.

How to incorporate immediate feedback as a positive reinforcement step poses a big problem in TV. In the classical Skinnerian approach, the pattern is small sequences followed by a method of eliciting overt responses (usually questions). Following this routine is a means of providing immediate feedback to the student—telling him if he gave the correct answer.

As Corki Williams, writing on this subject, "Instructional Technology Accountable and Effective," in the June-July issue of MERP Memo (Medical Educational Resources Program, Indiana Univ. School of Medicine) says, "there is no rule that requires that the sequence style must follow Skinner's minute sequencing." Miss Williams continues, "In fact, the trend has been toward designing longer sequences according to the amount of material the target audience can digest in one dose."

In TV this may be several minutes of straight presentation followed by some opportunity for an overt response.

Since no behavioral scientist or instructional system practitioner is willing to say that a response is unnecessary, we must answer the earlier question, "Is eliciting a student response the answer?" in the affirmative.

#### Who says so?

The first ITV practitioners to take seriously the notion of soliciting a response—of making the viewer an active participant and not a passive observer, were those who used television to teach psychomotor skills. This was to be expected because the outputs are easier to measure. Many skills involved in dental health fall in this category and Dental Health Center, San Francisco, which is part of the Public Health Service, HEW, is actively using TV both as a tool in doing behavioral skill analysis and also as a final presentation mode for some skills.

In fact, Jack Handley of the Dental Health Center has produced a two-hour video tape en-



titled "Teaching: Exploring the Process" which covers seven steps to systematically designing teaching products that effectively meet pre-established educational criteria. (The seven steps: formulating objectives in terms of student accomplishments, making criterion tests, selecting subject matter to meet objectives, designing the course, teaching it, testing results, and final revision.)

The videotape hammers home the point that the stimulus must belong to the real world, that there must be a response, and that the student must receive knowledge of the results. At one point the script declares, "Response is the key word—it indicates a total change in emphasis. Before, the student spent a great deal of time listening to us . . . now he practices doing . . . our attention shifts from showing him how to watching him do . . . and helping when needed." Providing knowledge of results is the most important single improvement that can be made in the instruction process, the videotape tells us.

The Dental Health Center expects to get authorization to proceed on a giant systematic approach to designing new audio-visual materials to facilitate the training of thousands of dental auxiliaries (aides) needed by the nation in the seventies.

A pioneer in the application of programmed learning principles to television is Dr. Ed Eisman of the Naval Amphibious School, Coronado, San Diego. Eisman says, "People learn in many different ways but common to all these ways is an interaction between the learner and the material to be learned, or, in other words, learning involves responding to stimuli."

Eisman says the problem is that TV is not normally thought of in stimulus-response terms—except by those who write TV commercials. The stimulus is considered by educators when the display is determined but no consideration is given to the response.

Eisman organizes his TV instructional material to go from simple to complex concepts and he gets his students to make frequent overt relevant responses to which he provides feedback. Eisman also says the stimulus has to be relevant; if the objective is reading a flash light code or disassembling and assembling the M-1 rifle, the visual has to be on flashing lights or the rifle and *not the instructor talking about* these items.

It is not difficult to envision how one could incorporate response modes into TV instruction that is teaching simple motor skills. But Eisman has used the approach in teaching concepts. For example, a student is given a copy of an intelligence estimate and the objective is to teach him how to use the report.

In videotapes on teaching Vietnamese phrases to security guards, the student is told to respond out loud when he sees the guard's lips move.

In other tapes, the attitudes the students develop are measured. The Naval Amphibious School uses three specialists in videotape preparation: The content specialist, the television production



The Responsive TV system by Data-Plex Systems forces interaction between the program and the learner. A problem is posed and the student must make a response. The next TV frame is a function of that response. The picture above presents information. . . .

. . . below is a frame which ask the learner to pick an answer. Operating the response box is Dr. Mary C. McLaughlin, Health Commissioner, N.Y.C. Dept. of Health. Inventor Charles Morchand is pointing out a detail. Drs. Harris and Swart are looking on.



specialist and the learning theory specialist.

Criterion tests are always prepared after objectives are written, to measure the degree that objectives are attained. A major portion of time spent in developing ITV that meets programmed-instruction principles is devoted to the tryout-revision phase—the validation process.

Eisman believes that ITV can be cost effective and he cites an Air Force Logistics Command study that shows \$3 million in savings over five years for a training objective involving 9 million student hours annually. The \$3 million calculation included a saving in instructors' time plus students' time (since students were paid a salary) minus the

television system implementation costs.

For ITV or any instructional systems-technology approach to be cost-effective, teacher time has to be cut. Two years ago, *BM/E* reported on a major research effort by the New York Institute of Technology in developing a cost-effective method of teaching sophomore-level physics to midshipmen at the U.S. Naval Academy. The final report is now being written. Evaluation shows that an automated self-instructional program can teach and that instructor's time can be saved. Whether or not such a system will save money in the long run depends on how long the run is. Courses that are fairly stable such as introductory physics and math need not be changed frequently and para-professionals in conjunction with self-instructional systems can save professional salaries. NYIT uses such systems for several groups of undergraduates at its Westbury campus.

The NYIT research does not demonstrate any great value or virtue for ITV per se. Videotape segments have been used to teach single concepts and the medium has been effective. But no clear cut evidence emerges to show that videotapes were superior to various other a-v or illustrated textbook approaches.

A modest but more pointed experiment to find how effective ITV is in terms of saving teacher time is underway at the Baldwin Public Schools (N.Y.) under the direction of Dr. Howard Schivera, Director of Instructional Communications. There is no significant funding available to Schivera to permit him to gear up for an elaborate experiment, nor is Schivera going to prove that ITV can be used in the core curricula area. What is being demonstrated, though, is that you can write several behavioral objectives and prepare a program that can be administered by TV monitors and clerks in the classroom either in lieu of a teacher or as meaningful instruction prior to a teacher's arrival.

As a consequence, it is conceivable that the total professional time spent in the classroom could be cut. What Schivera is shooting for is a system whereby teachers become more effective. A teacher need not be tied to a classroom and a group of youngsters but can be a resource person for many youngsters. Modern media can be used to teach content and handle rote learning situa-

tions—the teacher is used for more human activities such as conducting group discussion.

Unfortunately there is very little TV material available on the market that meets the tests of a learning-theory specialist—Schivera couldn't find material to fill even two days. The Baldwin demonstration was planned around using TV for two-and-one-half hours each day. Actually only 40 minutes of TV time was needed because the bulk of the time was allocated for making responses to the TV stimuli and performing other reinforcing activities. After viewing over 100 films and tapes, Schivera and his associates, Emil Maurer and Ann Edson, found only four or five that met their criteria of clear behavioral objectives. None really provided appropriate criterion tests that could be administered to determine if objectives were met. The task then was to find and select items that could be appropriately adapted to a locally-produced effort that contained behavioral objectives and criterion testing.

The target population was fifth graders. The topics picked covered music, drugs, conservation, perception, poetry (Haiku) and values guidance. The first step was to write behavioral objectives. For example, the program on drugs required that the student be able to identify and label correctly at least 8 out of 12 still frames on a photo quiz. The still frames (stimuli), taken from the kinescope or film, were printed on sheets of paper. Verbal concepts that related to photos were handed out to be matched to the photos (the response). A quick guide to scoring these sheets was provided (feedback). A chief criticism of the TV material previewed by the Baldwin group was the irrelevant visuals. Too much film did not have visual integrity, and this made it difficult to design response modes.

In the music program, activities included making simple musical instruments from a prepared kit. The conservation program included as a work activity, filling in a cross word puzzle and making responses which could be self-checked by the student using the Data Scope teaching device.

The Baldwin demonstration was, in a sense, an extension of the Rochester experiment of the year before (Using ITV to Cut Instructional Costs, *BM/E*, Nov. 1970). One of the problems encountered in Rochester was allowing for the right amount of time for student activity. Baldwin pre-tested its program with a small group of children and modified the program when necessary. Musical interludes and musical clues were used for pacing, clean-up time, etc.

The two days proved to Schivera's satisfaction that TV programs could teach a great deal. He is skeptical, however, about instituting a daily diet of TV fare; he is sure effectiveness would drop. However, new programs to build reading skills are being prepared and Baldwin Public Schools will garner more information this coming term on how to use TV that is accountable.

#### Dialogue with TV

All of the examples that we have discussed

#### Involvement ITV from ITC

A number of videotape courses that are designed to get active student participation are available from The Instructional Television Center, School Board of Broward County, Fort Lauderdale, Florida. Several courses in phonics, oral expression and handwriting get both verbal and written participation. Constant reinforcement is stressed.



thus far assume that TV transmission is one-way and open ended, any response that is elicited from viewers in no way affects the actual TV program. This need not be so. Data-Plex Systems, Inc. (*BM/E* Nov. 1970, page 12) has developed a patented method of controlling the TV program as a function of which 16 different push buttons on a response box were pressed by the viewer.

For example, when given a driver education question, "When driving on wet pavement and you see a sign 'danger ahead slow down' should you:

Take your foot off the accelerator and slow down gradually (press X) or—Apply brakes carefully (press Y).

If you pressed button Y the screen switches to a printed message telling you that you are incorrect and you see a picture of a car going into a spin.

If the person next to you (with his own response box and TV set) pressed X, he would see a car safely reducing speed.

How is this achieved? All of the answers are transmitted simultaneously on a single channel. What the individual does when he presses a key is to blank out portions of the screen and leave visible only that section that shows the appropriate response for that key.

A screen can be divided into four sections with four different correspondingly appropriate voice messages or it can be subdivided into 16 sections each with a different alpha-numeric printed display.

The program material can be live (over-the-air or close-circuit), or it can be all prerecorded on a ½-inch videotape player.

Although 16 different printed responses are possible simultaneously, a multiple choice question would typically have two, three, or four answers. A correct answer is followed by reinforcement and further information. If an incorrect segment comes up as a result of pressing a wrong button, the viewer can be told to press a different button or he can be told the correct answer and given a clarification.

The buttons are arranged four-in-a-row in four rows. Branching can be introduced by posing a new question in the response to a previous question and then telling the student to press a button in the second or third row. (The second row answer can be allocated to branching from correct answers and the third row to answers branching from incorrect responses.) Thus every student could be on his own individual path. In planning a program, rows 1 and 2 are generally used for written alpha-numeric print-out responses. Row 3 and row 4 are generally used for graphic response. Still or motion pictures can be optically placed in a quadrant format (row 3) or a half-split format (row 4).

A drama could go in four directions at any moment. The viewer can choose actions to take place—such as directing a puppet—or he sees life presented before him as a result of his actions such as the view through an airplane cockpit during maneuvers.

## Programmed Learning Video

Videotape presentations that go hand-in-hand with programmed learning workbooks have been developed by Hershey Video Systems Inc., John Hancock Center, Chicago, Illinois. Courses are designed to help students pass tests prepared by the National Association of Security Dealers, The New York Security Exchange, and the FAA. Neither the videotape or workbook is sufficient by themselves. This is by design—not so much as a pedagogical consideration but rather as a practical one. If Hershey Video were to sell only videotapes the cost would be high and usage small. If they sold only workbooks, the course would be be dry and the volume would have to be high to be profitable. To get the best of videotapes and workbooks, including proven programmed learning effectiveness, Hershey Video has come up with a cost of \$50 (typically) for a 12-hour course. But for this price you obviously don't get to keep the videotape. This combination, the company says, sells better than would either a textbook or TV course because it is effective.

A current customer is the Harlem Hospital Center of New York. They have a program on Family Planning which includes instruction on how to use birth control methods—the opportunities for participation stagger the imagination!

Hoffman-La Roche Labs use the method for sales training and the method is about to be tried by the West Hartford Public Schools. The company is developing, in conjunction with Ira J. Singer, Assistant Superintendent in Charge of Instruction and Special Services, a program entitled "Taking That First Picture" which will be available on West Hartford's Dial Select system.

Charles A. Morchand, president of Data-Plex and inventor of the system trademarked ResponsiveTV, says the responsive box, which can simply be hooked to the antenna terminals of any TV set, costs about \$285. This cost will drop to under \$100 in large production. The response box has an output jack which can be used to feedback into a two-way cable system information on switch settings. It can thus serve as a cable TV polling device.

These few samples are certainly sparse, and we hope other groups are beginning to apply the systems concept to achieve accountability. Hopefully those that attended the NAEB workshops conducted by General Programmed Teaching of Palo Alto will be encouraged to try their hand at writing behavioral objectives and designing programs that elicit responses and provide feedback. A source of future information on programmed television instruction specifically for public schools will be the Central Midwestern Regional Educational Laboratory, Inc. at St. Louis, Mo., Lanny E. Morreau, program director. Morreau has a grant to work in this area and his research should prove valuable to those who want to make ITV accountable.

**BM/E**

# Broadcasters Tell About Their Cost-Effective Buys

Some very cost- and quality-conscious broadcasters answered *BM/E's* invitation in the May issue to share with us their experiences in cost-effective equipment buying. There are some important guidelines in the accumulated experiences described here.


THREE POWERFUL APPROACHES to cost-effective purchasing emerged as the most important among those related by station operators who replied to *BM/E's* invitation in the May editorial:

**Automation**, both in bookkeeping and in programming, can make spectacular savings if carefully adjusted to the station's needs.

**Equipment surveys**, before buying, should be fairly wide-ranging among the multitude of alternatives today for almost any equipment function, because very often a somewhat unorthodox choice will save a lot and do the job as well or better than the "standard."

**Reconditioned equipment** should always be considered when the budget is tight; it can be liter-

(Continued on page 45)



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DATE	DESCRIPTION	AMOUNT	DEBIT	CREDIT	BALANCE
7/1-7	...	5.00	100.00	--	...
7/21	...	...	...	...	...
7/21-27	one-minute announcements	...	...	...	...
7/27	...	...	...	...	...

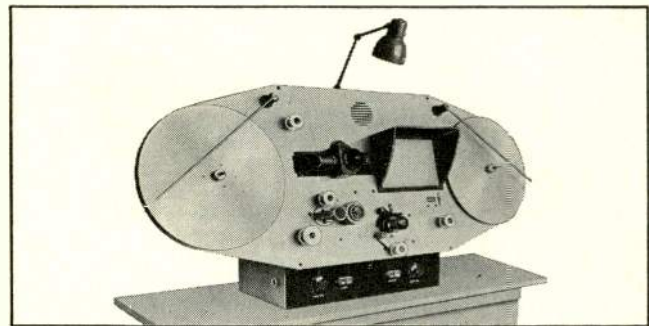
Account due on 15th of month following purchase 1% per month carrying charge added to all past due amounts

"Hurry! 10 classes. Most ideas ... and fast results!"

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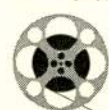
Invoice at KWCO is simply an electrostatic copy of account ledger card. Saves typing and mistakes.

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16mm and 35mm PROFESSIONAL PROJECTORS  
for fast, safe, high speed viewing and inspection of motion picture film



- The ideal machine for film quality control, timing and correction, and release print inspection. Handles negatives, fine grains and prints.
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Write for LSC Velette literature or request a "no obligation" demonstration.



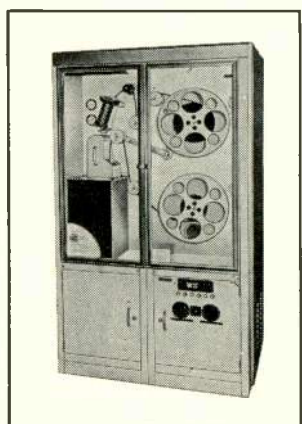
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for MOTION PICTURE FILM • MICROFILM • MAGNETIC TAPE

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Ultrasonic energy is the most effective and economical way to completely clean motion picture film, microfilm and tape without mechanical scrubbing and wiping. Ultrasonic energy performs the entire cleaning operation.

- Restores clarity and sound to maximum quality.
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- Costs only 1/20 of a penny per running foot to operate.
- Used by every major motion picture lab in the world.

Descriptive brochure will be sent on request

10041



# BROADCAST EQUIPMENT

## New and significant

For more information, circle boldfaced numbers on Reader Service Card.

**Low-cost color TV camera** combines new silicon diode tube with Plumbicon tubes, to give both superior red response of silicon tube and excellence of Plumbicon in green and blue channels. IVC-150 is claimed to produce excellent pictures under field conditions with light below 10 foot-candles. The camera can be used as a self-contained unit with built-in sync generator and color

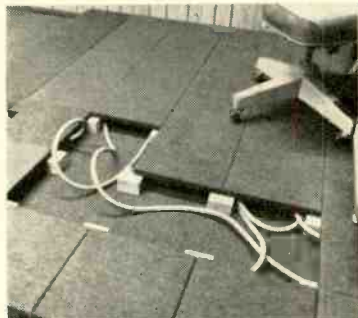


encoder, and in nonbroadcast applications can be operated from external drive pulses while continuing to use internal encoder. Adding an external encoder brings it up to full FCC and EIA broadcast specifications. From \$14,800. INTERNATIONAL VIDEO. **275**

**Audio tape duplicator** makes copies and allows on-line tailoring of audio signals in any 150-mil or 1/4-inch tape format—open-reel, cassette, four- or eight-track cartridges. Pre-set plug-in head stacks and guides allow quick change to desired format. Up to three slaves can be driven. The Model AD-15 has servo-controlled reel and capstan drives, referenced to a precision oscillator to hold speed within  $\pm 0.08\%$  from beginning to end of reel. Signal-to-noise ratio is within 3 dB of the master. System can produce up to 168 1200-foot copies in one eight-hour

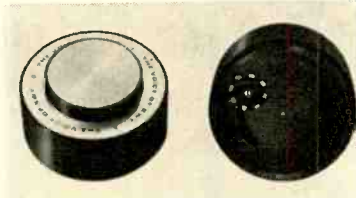
shift. \$5000 to \$16,000. AMPEX. **276**

**Access floor for cabling** provides space under block-supported floor panels for power, control, or signal cable runs. Mini-Floor can be installed in a few minutes by laying support



blocks and panels on top of existing floor, can cover a whole room or any selected part. It has a factory-applied carpet finish. Forms platform approximately 3 inches above original floor. About \$2.00 a square foot. MINI-FLOOR COMPANY. **278**

**Tiny, cylindrical AM radio** can be pre-set to receive any chosen



station, is intended to help station attract advertisers and build ratings and audiences. Station Master also has full-band AM tuning. Price allows it to be used as self-liquidating promotion piece. CONCEPT PLUS. **279**

**Sweep-frequency test tape** is in 8-track cartridge format, includes all necessary correction factors for direct reading on oscilloscope screen. Model 113T Tape covers 60 Hz to 15 kHz, has marker pulses at 1, 3, 5, 10, and 15 kHz. Under \$7.00. PACIFIC TRANSDUCER. **281**

**Communications headsets** weigh less than 8 ounces, can be had either with soft foam ear-en-

veloping cushions, or with ventilated cushions that let wearer hear local speech as well as head-



phone output. Astrolite headsets come in 24 variations, with single or double phone, carbon or dynamic mike. TELEVISION ASSOCIATES. **280**

**Non-interfering sweep-frequency test set** includes two units for automatic testing of cable systems, has two operating modes. Model CT-1000 Cable Transmitter originates test signal at head end, with frequency range of 5-300 MHz,  $\pm 1.0$  dB, Sweep frequency is 30 Hz, continuous. Output return loss is 10 dB minimum, and temperature range is 0° to 140° F. The Model CR-1000 Cable Receiver is a portable unit which displays the entire swept frequency re-



sponse on a large, 5-inch oscilloscope screen. In the second operating mode, the CR-1000 can be used as a spectrum analyzer, independent of the CT-1000 Transmitter. One mark of capability in this mode is the measurement of undesired beats at least 60 dB below the video carrier level. AVANTEK. **313**

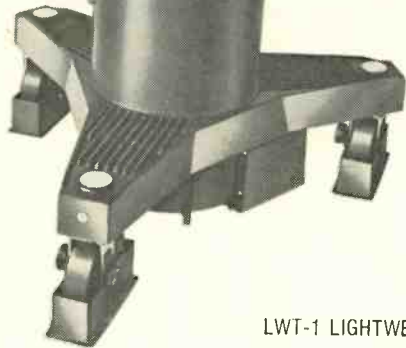
(Products continued on page 38)

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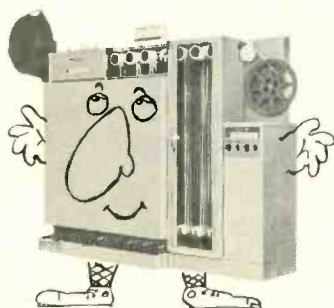


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Circle 111 on Reader Service Card

**Compact, solid-state time-weather-message channel** uses an optical scanning system to feed weather data to a built-in pre-focused TVC-500 vidicon camera, which provides both video and RF outputs. TMW-5 is mounted in a small, table-top box. It gives a continuous digital display of time, except when a message is being televised. Temperature, wind speed, and



wind direction are picked up by outside sensors, automatically displayed in rotation for five seconds each. Messages are written, drawn, or typed on 3x5 in. transparent cards, inserted into cabinet on message board. Message time is adjustable, 5 to 15 seconds. A side port allows a Carousel slide projector to be substituted for the message card. By-pass switches allow operator to skip any display as desired. \$1450. JERROLD.

277

**Microphone combining "shotgun" and cardioid characteristics** is highly resistant to wind noise, has very long reach for efficient outside work. MKH-415 is a condenser mike, also has high pop resistance and extended, flat frequency response, allowing performers in studios to be close-miked without need of a windscreen or bass filter to compensate for blast or proximity effect. It uses a combination of pressure-gradient and interference design principles, with supercardioid pattern below 2 kHz; above, the pattern is beam shaped. \$396. SENNHEISER.

282

**Circularly-polarized FM antennas** are normally adjusted for equal power radiation in horizontal and vertical planes, can be had with other splits on order. Dual-Cycloid is high-power model; Dual-Cycloid II is medium power; Dual-Cycloid III is low power; and Directional Dual-Cycloid allows for special radiation patterns. Null fill and beam tilt are available for the first two models. Antennas are available in any number of bays from one to 16. Icing protection can be provided with accessory heater elements of varying wattage, with manual or automatic controls. GATES.

283

**Quartz lighting kit**, designed especially for location TV, motion picture, and photographic work, has three lights: a 600-watt focusing broad, and two 600w quartz focusing spots.

(Continued on page 40)



# Shopping for lenses? Compare Canon!

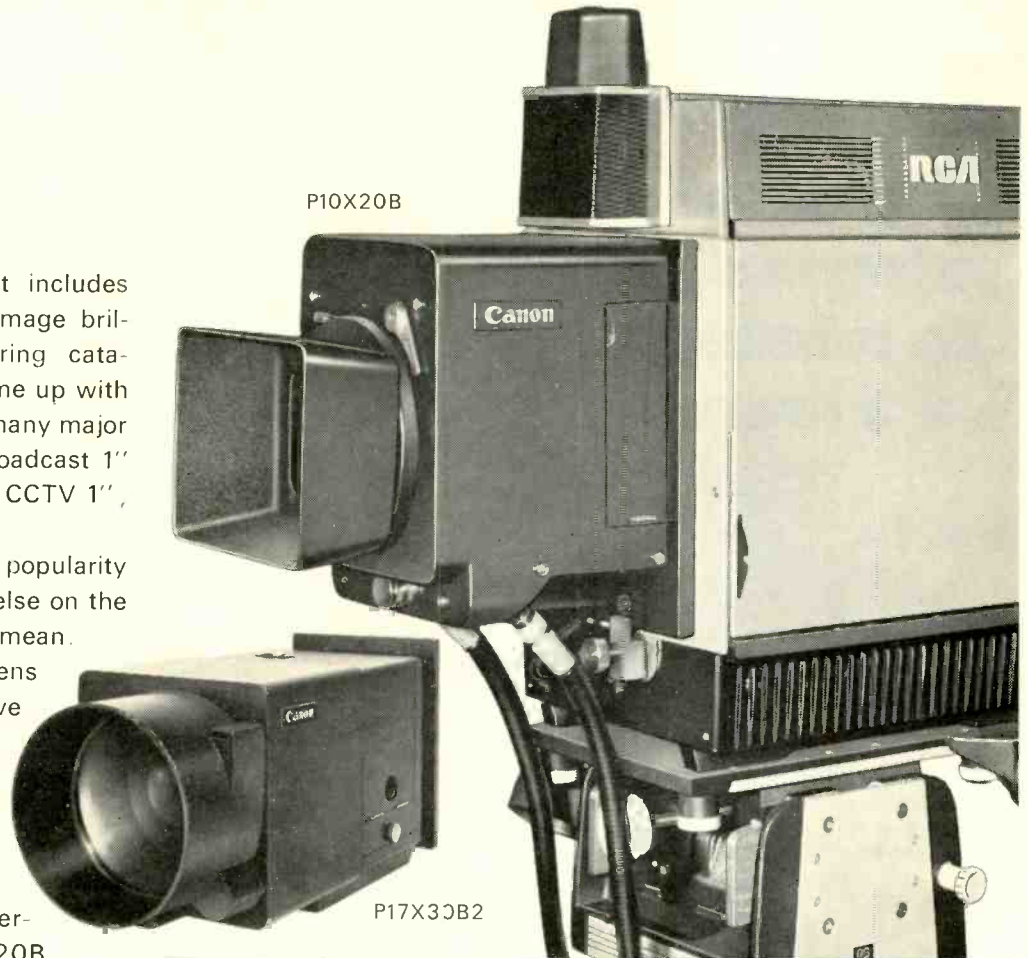
Draw up a checklist that includes price, specifications and image brilliance, then start comparing catalogues. You'll probably come up with the Canon answer, like so many major camera producers—for broadcast 1" or 1 1/4" PLUMBICON® or CCTV 1", 2/3" vidicon.

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The Canon TV Zoom Lens P17X30B2 has an impressive 1:2.5 relative aperture at focal length range (440-500mm), in spite of its 17X zoom ratio. At 30—440mm it's a remarkable 1:2.2, offering the same performance as our P10X20B, specially designed for maximum versatility with three different range extenders.

Both are ideal for a variety of situation, including dim lighting and open areas like field events.

Here are some other examples of the wide Canon line:



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1 1/4" PLUMBICON	P17 x 30B2	30—500mm	1: 17	F 2.2
	P10 x 20	20—200mm	1: 10	F 2.2
1" PLUMBICON	PV17 x 24B	24—400mm	1: 17	F 1.8
	PV10 x 16	16—160mm	1: 10	F 1.6
	PV10 x 15B	15—150mm	1: 10	F 2.0
1" Vidicon	V10 x 15	15—150mm	1: 10	F 2.8
	V6 x 16	16.9—95mm	1: 6	F 2.0
	V5 x 20	20—100mm	1: 5	F 2.5
	V4 x 25	25—100mm	1: 4	F 1.8
2/3" Vidicon	J10 x 13	13—130mm	1: 10	F 2.8
	J 6 x 13	13—76mm	1: 6	F 1.9
	J 5 x 15	15—75mm	1: 5	F 2.1
	J 4 x 12	12.5—50mm	1: 4	F 1.8
Servorized/Motorized				
	Name	Range of Focal Length	Zoom Ratio	Maximum Relative Aperture
1 1/4" PLUMBICON	P10 x 20B4	20—200mm	1: 10	F 2.2
1" Vidicon	V10 x 15R (DC)	15—150mm	1: 10	F 2.8
	V6 x 16R (AC/DC)	16.9—95mm	1: 6	F 2.0
	V4 x 25R (AC/DC,EE)	25—100mm	1: 4	F 2.5

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performance plus  
the convenience  
of a compact**



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**The  
Professionals**

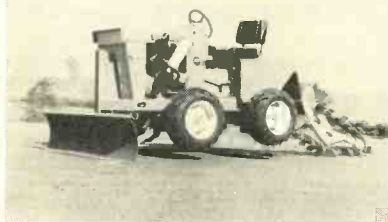


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Fully-Hydraulic Backfill Blade



Hydraulic Power to Spare!

Three 600w lamps are supplied. Featherlite Quartz Lighting Kit also includes three stands, Gaffer Grip, extension cords, and carrying case that fits under airplane seat. **CENTURY STRAND. 284**

**Line-layer attachment** goes on Fleet-line Trencher, buries cable, flexible tubing and wire up to 30 inches deep, even in hard, dry soil. P-80 Line Layer operates at speeds to 4,000 feet an hour. Skid shoes hold both sides of cut in place. **DAVIS. 285**

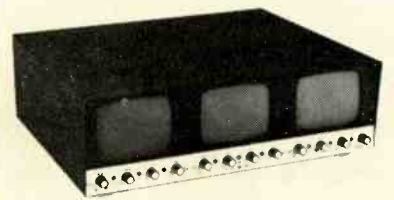
**Vertical-interval production switcher** is designed for CATV, educational TV, remote studios. VS-153A is remote-controlled, has full-color programming capacity, 11 video inputs with basic single re-entry effects and mixing. Special effects: inserts from each corner, full horizontal and vertical wipes, internal and external keying. \$2895. **DYNAIR. 286**

**Portable color VTR** uses 1/2-inch tape, rotary two-head system, has horizontal resolution of over 230 lines. FV-3500 takes 7-in. reels, is



available with electronic editing, has signal/noise ratio above 40 dB. **Jvc AMERICA. 287**

**Triple, five-inch monitor** shows three different video programs simultaneously on three 5-in. screens mounted side by side. Setchell Carlson Triple



Five can be rack or table mounted, has resolution of 540 horizontal lines, fast AFC for good display of helical scan signals. \$695. **SC ELECTRONICS. 288**

**High-speed RF coaxial switches** come in both 3/8-in. and 6/8-in. rigid coaxial line sizes, have cycle time of less than 500 milliseconds, usually about 250 milliseconds. 61000 Series uses rotary solenoids for high speed, operates to 1000 MHz, with 55-70

(Continued on page 42)



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dB isolation, handles high power compatible with transmission line size. MICRO COMMUNICATIONS. 289

**Electronic videotape timer** reads down to an individual frame, for accurate timing and editing of 15-ips tape. Series 800 Video Tape Timing System displays hours, minutes, seconds, and frames on Nixie tubes. It can drive up to five remote displays. From \$1335. HOLLAND ELECTRONICS. 290

**Cue and identification board** provides both aural and visual cues for a full 10-second count down. Electronic Q Board has large, center-located read-



out that permits zoom to full screen; and speaker to alert personnel. \$395. LAIRD TELEMEDIA. 291

**Video hard-copy unit** makes permanent facsimile copy of static TV signals. Model 4602 is completely self-contained, needs only connection to power source and to video. It handles video signals from 0.2 v to 3 v, p-to-p. \$3750. TEKTRONIX. 292

**Video hard-copy unit** is a proprietary modification of Tektronix Model 4601, converting standard TV signals to narrow-band format acceptable to the fiber-optics, line-scan CRT of Tektronix 4601. CVI Model 4601 has resolution of 600 lines or better, table-top mounting, can be connected to wide-band or narrow-band video source. \$6000. COLORADO VIDEO. 293

**Extended range field-strength meter** measures all UHF, VHF, and FM channels, plus mid-band and super-band CATV channels. Model 747 is portable, all solid-state, and is fully integrated, with a single input and single-knob tuning. \$450. JERROLD. 294


**Zoom lens for TV cameras** is rated f/1.8 and comes in 10:1 and 6:1 versions. Ultrafast TV Zoom Lens can also be had in either manual or motorized form. A wide selection of matching accessories and controls are also ready. WOLLENSAK. 295





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# NEW LIT

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

**Bulletin on audio connectors** describes new PF series of "Q-G" (quick ground) units, which come with 3, 4, or 5 contacts, mount directly on a gooseneck or mike stem. Switchcraft. **200**

**Condensed 1971 catalog** covers signal generators, frequency synthesizers, RF power amplifiers and amplifier modules. RF Communications Inc. **201**

**Automatic logging systems, compact audio control systems, and multiple cartridge playbacks**, are covered in a series of bulletins, each two pages. International Good Music. **202**

**Random-access audio and video retrieval systems** are covered in a brochure which describe philosophy and design of computer-controlled system for schools, universities, industry, medicine, government. Am-

pex Corporation. **203**

**Broadcast color film camera** is covered in Bulletin 1500, with features, ordering information, specifications. Cohu. **204**

**Catalog of cable connector components** shows units for RG-6/U and RG-59U coax, as well as for aluminum and autoseized aluminum CATV connectors for polyethylene and polystyrene foam cables. LRC Electronics. **205**

**Collection of papers on flying spot film scanners** includes four technical treatises on design and use of scanners for 16mm and 35mm film, and associated equipment. Rank Precision Industries. **206**

**Catalog of glass-bonded ferrite magnetic recording heads** includes descriptions and complete specifications of models for all standard track formats. Ferroxcube. **207**

**Exposure meters**, brochure includes tutorial material comparing incident with reflected light methods in photography. Photo Research. **208**

**Study on causes of unionization** is based on research at several hundred companies for which author was consultant, describes what actually promotes unionization. Write A. A. Imberman, 209 South LaSalle Street, Chicago, 60604, for copy.

**Product selection guide** covers digital multimeters, oscilloscopes, digital measuring systems, data collection terminals, card and industrial readers. Hickok. **210**

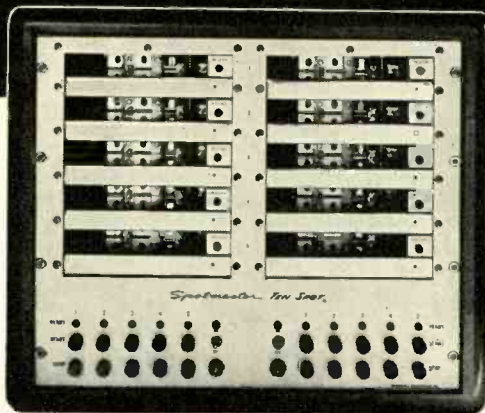
**Bulletin describes color film processor** which can operate with CR-100 chemistry or standard ME-4 process. Called "Little Max," unit includes dryer with complete RH and temperature control. Technology Incorporated. **211**

**Tunerless CATV converters** brochure shows mid-band and super-band models which can add seven channels each to system, along with block diagrams of use in various single- and dual-trunk applications. AEL Comm. Corp. **212**

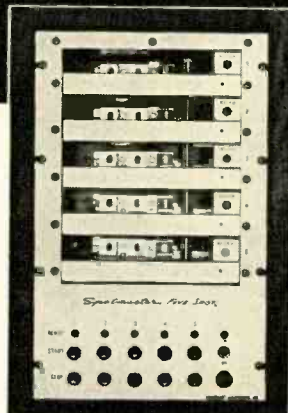
**Real time-time compression spectrum analysis** is studied in detail in a 12-page technical bulletin by Dr. Ira Langenthal, Director of Research, Signal Analysis Industries Corp. Saicor. **209**

**Guide to Radio and TV Broadcast Engineering Practice** is a handbook for engineers which covers operation, maintenance, troubleshooting, FCC regulations, use of consultants, etc. \$2.95. TAB Books, Blue Ridge Summit, Pa. 17214.

## Spotmaster Multiple Cartridge Playback Units



Ten • Spot Model 610B



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### Cost-Effective Buys continued

ally "as good as new," and cost very much less.

These are hardly startling discoveries, but it is eminently worthwhile to see these principles actually at work—that constitutes a strong reminder that the principles are there, available to everyone.

Kwco in Chickasha, for example, has made a thorough application of automation to bookkeeping, traffic, and programming. The whole bookkeeping and traffic operation, reports Manager McKee, centers on an SCM Coronstat 88 copy machine. With the help of the 88, and some consolidation of bookkeeping and traffic records, one full-time employee does both jobs more easily and more accurately than two persons did in the preautomation period. And the station's business is up 40%.

Bookkeeping is all carried on a ledger card for each account to which all charges and payments are posted. The monthly invoice is simply an 88-model copy of the ledger card. The basis of the traffic system is a master journal with a column for each day of the month and lines for each account. The journal shows in one composite location every account running during the month, the number of programs, the announcements, the

#### Fifty-Dollar Winners

Winners of \$50 each for getting in the first five letters:

**Michael McKee**, Sales and Operations Manager, KWCO, Chickasha, Oklahoma.

**Don Michel**, President, WRAJ, Anna, Illinois.

**Morton C. Flora**, Chief Engineer, WTWA, Thomson, Georgia.

**David P. Hebert**, Chief Engineer, KXRO, Aberdeen, Washington.

**Jerry W. Milligan, Sr.**, Vice President and General Manager, WULA, Eufaula, Alabama.

days they ran, the number of times per day, the time periods, etc. The journal also shows in the composite location the rate information for each account and the total amount of money spent.

(Continued on page 46)

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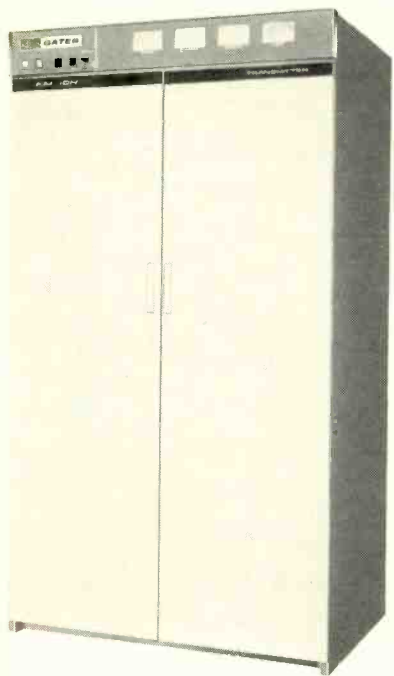
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## Cost-Effective Buys continued

Here again, the copying machine gives the book record complete versatility: copies of the journal pages can be furnished to sales, programming, traffic and book-keeping, each department getting vital information in this way.

The daily program log is also prepared from the traffic journal. Since the format changes little during a month, a program log can be made up for the first day of the month and copied on the 88 for the other days, with minor hand-posting to make changes or additions later.

In the programming end, KWCO uses two IGM Instacarts to operate 118 hours a week with *one* full-time announcer. The program format is "... fast paced MOR music, information, and a lot of advertising—in fact, we are mostly talk," says Mr. McKee. One Instacart holds all the commercials. On the other, 42 of the 48 trays hold the music, which plays in sequence and then repeats. The rest of the trays hold news, weather, network back-fill, etc.

"The Instacart lets us walk away from our routine announcing tasks and do more productive things," explains Mr. McKee. "We sound better and more consistent . . . Of 8 full-time people, 5 are in sales full or part-time. Sales are up and employment has stabilized."

### Equipment choices that saved

Which tape recorder, microphone, modulation monitor, console etc., do you buy? The experiences of *BM/E's* correspondents emphasize strongly that it pays to look the field over. Probably many stations in smaller communities would have microphone requirements somewhat like those of WRAJ, which has 4800 people in its service area. President Don Michel reports that a need for two auxiliary mikes was admirably met with two Sony condenser models, the lavalier ECM-16 and the larger ECM-19B, at \$29.95 each.

He finds the sound far superior to the "garden variety of dynamic microphone," and except for a little less fullness in the bass, practically identical to condenser mikes at \$200 and up.

Mr. Michel also has high praise for the Sony TC-80 cassette re-

(Continued on Page 47)

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## Cost-Effective Buys continued

corder with built-in electret microphone and automatic control of recording level. "Most of the network people have standardized on these, but most smaller town broadcasters have not used them," he says.

Tape machines turned up in several other letters as the focus of big saving through slightly un-



WINS science reporter Roger Field uses Sony TC-80 to interview Blair Benson, CBS-EVR.

orthodox choice. Morton Flora of WTWA says that he found himself with three worn-out reel-to-reel machines, and an urgent need for at least two machines in the station's operation. A transmitter power increase from 250 to 1000 watts, with several items of new equipment to go with it like a CBS VoluMax and AudiMax, left little immediate financial maneuverability. On the advice of the consulting engineer, WTWA bought two Wollensak reel-to-reel machines (model not specified). "Both Wollensaks have been in operation for about a month and have proved to be perfect for our reel-to-reel needs," he says. "With the money saved on the Wollensak purchase we were able to order a third tape cartridge playback."

Jerry W. Milligan, Sr., of WULA reports a parallel experience. "I looked for tape machines that we could use in recording our own tapes, and also use in an automation system. I chose two Revox 1302 recorders, complete with remote controls, at a cost of only \$608 each—quite a saving over many models, and the performance is simply great."

Mr. Milligan lists several other illuminating choices in a station overhaul that was budgeted for a total of \$20,000 and included adding an FM station to an existing AM station. The FM modulation monitor was a factory-reconditioned unit, which cost \$1000 less than a new one. For a recording

(Continued on page 49)

BRAND-NEW—Indispensable for Anyone in TV News—Or Who Wants to Make the Transition from Radio to TV—Or Improve Local Organization via CATV.

# Television News Handbook

By David Dary, Professor of Broadcast Journalism, William Allen White School of Broadcasting, Univ. of Kansas.

Whether you're involved in TV news activity now, or have a sincere desire to be, here is an all-in-one guide to TV news department operation—how to gather, write, produce, and present TV news.

Learn what it takes to be a TV news reporter, cameraman, or news director—particularly as related to local station origination, and regardless of the size of the station budget. Here, in one concise, compact volume is the expertise of an experienced journalist who has "lived" TV news, working with two major networks in various capacities, plus setting up and managing the news department for a midwest radio-TV group, and is now professor of broadcast journalism, actively teaching the subject. Regardless of your status—working or would-be newsman, or even station manager—you'll benefit from the behind-the-scenes insight incorporated into this work, an amalgamation of all the practical knowledge and experience gleaned from dozens of top-flight experts. If you're now in radio news, and aspire to step up into the higher-paying and more exciting world of TV, this new book will start you up the ladder. If you are associated with the growing number of CATV operations becoming involved in program origination, you'll find a wealth of information to help you in planning and improving the quality and format of your programming.

You'll become familiar with the typical TV newsroom, the qualifications of each staff member, and the functions each fulfills. The author explains how work is scheduled and equipment is utilized to realize efficient, effective news gathering. All the sources for TV news are revealed to help the practicing or budding journalist quickly establish his contacts or "beat." Interviewing techniques are covered in detail—basic "blueprints" for on-camera as well as off-camera confrontations. Since the ultimate value of news depends on the reporter's evaluation, the author goes into detail on what is really news and why it is news, then explains how to write news copy for the ear. Then you'll learn how to add "visuals" and how a newsman "writes to" newsfilm and how other visual aids are employed to complement and clarify TV news stories. Examples of scripts will acquaint you with the presentation techniques and formats followed by leading stations in coordinating voice and video production. Various sound recording techniques are described, also, along with motion picture cameras—both sound and silent types—newsfilm shooting techniques, film processing, and editing.

As you observe a TV newscast being put together—the planning and organization required—you learn how each staff member contributes to the overall production. In fact, the author has included a "log" of a typical TV news day showing how each detail is handled from assignments to stories, from coverage preparation and integration of various elements into a concise on-the-air presentation. Attention is given, also, to on-camera reporting techniques and the demands placed on the reporter. 192 pps. 11 Chapters, plus Appendix and Index. Hardbound.

**INTRODUCTORY  
PRICE \$7.95**

## Television News Handbook

David Dary

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### CONTENTS

A History of TV News: How it all started, network news, commercial application, first televised political convention, first regularly scheduled news programs, the war years and post-war years, newsreel film, TV News in the 60's and 70's—The TV Newsroom: News director, assignment editor, reporter, newsfilm cameraman, newsroom scheduling, equipping the TV newsroom—TV News Sources—Wire services, wirephotos, local news sources, interviewing techniques, public service monitors, National Weather Service, local newspapers, mail handouts, stringers and tipsters, local angle, future file—TV News Writing: Evaluating news, writing for the ear, clarity, style, for broadcast news writing—Adding the Visuals: Types of visual material, TV news script form, writing to news film, examples of news film stories, toher visuals—Newsfilm: Film sizes and types, optical and magnetic sound recording, "tools of the trade", silent and sound cameras, accessories, shooting newsfilm, film processing and editing—Putting the Newscast Together: Planning and organization, a typical TV "news day", film board—TV News On the Air: On-camera delivery, voice and diction, eye contact, news "set", on-camera movement, personal appearance, on-camera problems and how to solve them—Video Tape Users: Video tape characteristics, editing video tape, uses of video tape in news programs—Laws, Courts & TV News: Privacy, libel, privileged information, state laws, Canon 35, Fairness Doctrine, Section 315, understanding court procedure, types of court action, glossary of legal terms—Editorializing: Why stations editorialize, types of editorials, editorial staff, editorial subjects—Typical TV News Script—News Operation Check List—U.S. & Canadian Radio-Television News Director's association Code of Ethics—NAB TV News Code. Index.

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## Cost-Effective Buys continued

console, he bought a Sparta A-15B five-mixer model. This board was actually used in the control room while that position was reworked. For the permanent control room board, he needed a dual-channel model, with a fairly large number of inputs, and general versatility. After looking over a number of new and used models, he bought a "factory engineering model" of the Bauer 910-D at about half the regular price.

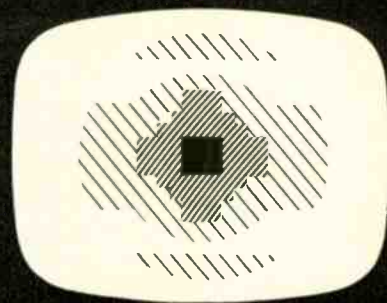
For transmitter and antenna, "I wanted the station to have the best we could find for a 3 kw operation... I got the Sparta-Bauer 2.5 kw transmitter and the Jampro circularly polarized antenna. In my estimation that's a combination that's hard to beat." He also bought a used Sparta cartridge machine, one that had just been completely overhauled at the factory. He had a local engineer build a small automation system that controls the two Revox recorders and the cartridge machine. "We met our \$20,000 figure and still have quality equipment," he concludes. "It took some careful planning, but the results are very pleasing."

Another console choice that proved highly cost-effective was reported by Andrew Jackson, Director of Engineering, LIN Broadcasting Corp., Louisville, Kentucky. "Recently one of our stations needed a remote radio studio facility," he writes. "A survey brought to light the MTM unit manufactured by Bogen. With the purchase of their compensated input cards—\$10.00—the total cost came to \$175 for a six-input, 500-ohm output console with cue switches on the turntables, tone control-equalizer, microphone muting circuit, separate monitor gain and all solid state... the unit has proved to be quite satisfactory."

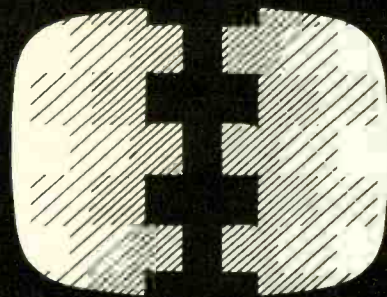
We are reminded that the vacuum-tube-to-solid-state switch is still an ongoing affair by the letter from David P. Hebert of KXRO. The station's Gates BC5-P2 transmitter used six 8008 mercury-vapor rectifiers in the high-voltage section, and they had to be replaced about three times a year, at a cost of \$216 total. Hebert re-

(Continued on page 49)

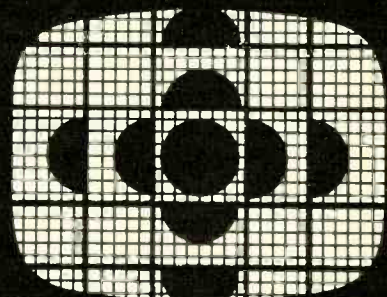
# new cinematic techniques for TV



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**Cost-Effective Buys** continued

ports that he recently replaced the 8008's with six Wilkinson Electronics solid-state rectifier units, model 18-3, which supply about 275% of voltage reserve and 200% of current reserve. "We have had superb high-voltage regulation since the transition," he says. "And the economics of the move were also quite advantageous." The solid-state rectifiers will have an indefinite life, and cost a total of \$360. Thus they will start saving money before two years are over, and save the full cost of the rectifiers thereafter.

A much more elaborate form of cost-saving equipment is the Crossreed electronic private automatic branch exchange installed by West Michigan Telecasters, operators of WZZM in Grand Rapids, Michigan. The Crossreed exchange is the heart of a private communications system, using push-button dialing phones, and having many convenience features that are said to be unique in private branch equipment. For example, the system will automatically call back when

a line that was busy is no longer busy; either outgoing or incoming calls can be transferred to another extension by dialing the new number; the user can dial up a conference and add other parties to the line; he can connect any phone to any of the 65 others in a mere fraction of a second. Dean Switzer, vice president of TPI, says that the system will save more than \$100,000 over a 20-year period, as compared with renting the most sophisticated Bell PBX system, which lacks some features of the Crossreed system. Crossreed is made by Stromberg-Carlson and was installed by Telephone Power, Inc., of Grand Rapids. The system uses solid state components and sealed reed switches, virtually eliminating service.

Obviously, numerous other station operators have made cost-effective purchases that parallel those described, or come in other categories not covered here. But those mentioned should remind us that really substantial savings are there to be had. You just have to look for them with care. **BM/E**

# the new mcmartin consoles



*now..... NEWER THAN NEW*  
THE B-802-S1 DUAL CHANNEL STEREO MODEL AND THE  
B-802-S2 FOR STEREO AND SIMULCAST MONO OUTPUT

**B-802-S1.....\$3450.      B-802-S2.....\$3400.**

The B-802-S1 provides dual "line level" stereo outputs. The VU meters are switchable to either output pair. In addition to the "split-board" stereo capability, the B-802-S1 permits FM stereo programming, and by utilizing either of the second channels, independent AM mono feed.

The B-802-S2 is designed for FM/AM simulcast operation. The FM stereo programming is actively combined, with no deterioration of separation, to provide a continuous line level mono AM output monitored by a third VU meter.

The B-802-S1 and B-802-S2 join the growing family of McMartin audio consoles...incorporating flexibility and human engineering to meet the broadcaster's needs...today...and tomorrow!

MONAURAL  
B-801.....\$2,350.  
STEREO  
B-802.....\$3,200.  
DUAL CHANNEL  
B-803.....\$2,650.

For details, contact:  
**Broadcast Product Manager**

**McMartin**  
mcmartin industries, inc.  
605 north thirteenth street  
omaha, nebraska 68102

Circle 123 on Reader Service Card

# This is the world's finest and largest selling turntable.



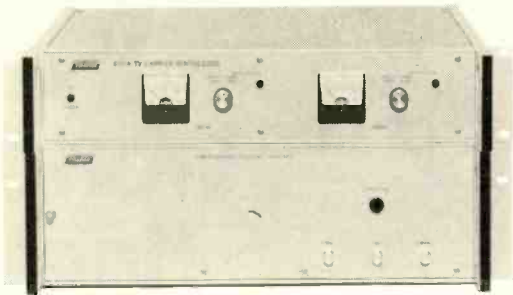
## Gates CB-77

For complete details on the CB-77 12-inch turntable, write Gates, 123 Hampshire St., Quincy, Illinois 62301.

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A DIVISION OF HARRIS-INTERTYPE

Circle 124 on Reader Service Card

# the Tracor 6500 Carrier Generator System



## stops "grade B" coverage loss

Co-channel interference is essentially eliminated adding solid audience to your coverage.

With a TRACOR 6500 Carrier Generator System driving each transmitter, co-channel carriers are held so constant (within 0.05 Hz) that visibility of the beat pattern is reduced 16 db. The inherent stability of atomic frequency standards also eliminates the need

for constant adjustment . . . making the 6500 ideal for remote-site operations.

For more information, contact TRACOR, manufacturers of the 6500, Carrier stabilization systems, sub carrier sync systems, and video failure alarms.



**Industrial Instruments Division**  
6500 Tracor Lane, Austin, Texas 78721, AC 512/926-2800

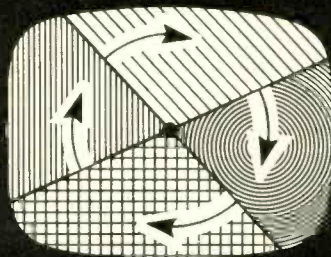
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Circle 125 on Reader Service Card

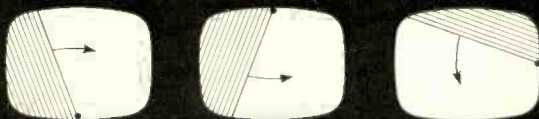
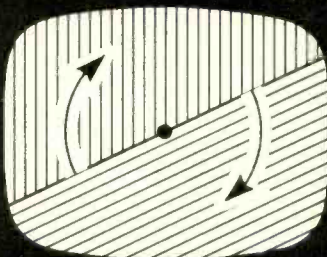
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### ROTEC

Rotating  
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Rotating  
split



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Enjoy the competitive edge in your market with these exclusive production techniques.

Write or call: 812/332-7251



**SARKES TARZIAN, INC.**  
Broadcast Equipment Division  
Bloomington, Indiana 47401

Circle 126 on Reader Service Card

## FCC

continued from page 14

however, that the planned announcements of the petitioners—or for that matter, of any other particular applicant for air time—must necessarily be accepted by broadcast licensees. Rather, we confine ourselves to invalidating the flat ban alone, leaving it up to the licensees and the Commission to develop and administer reasonable procedures and regulations determining which and how many "editorial advertisements" will be put on the air.

## Conclusion

In sum, all broadcast licensees are faced with the requirement that they must make paid advertisements available to groups or individuals wishing to speak out on issues of public importance.

Guidelines must yet be established by the Commission. The Commission may even elect to attempt to have the Court's decision reconsidered.

As a practical matter, many stations may welcome the source of additional revenue such "advertising" may produce. Nevertheless, the broadcast licensee must proceed with caution before considering to refuse to sell air time to such groups or organizations. In all cases, your legal counsel should be consulted. **BM/E**

*Spotmaster*

## Compressor-Limiter Amplifier

**(The Great Leveler)**

You can stop riding gain now, even when a shouter and whisperer are on the same talk show. The Model CLA 20/40 Compressor-Limiter Amplifier does it automatically . . . instantaneously . . . for both AM and FM. Switchable controls permit symmetrical (FM) or asymmetrical (AM) peak limiting; pre-emphasized or flat response; compress/limit, compress only, or compress/limit off. Automatic gain control range is 40 dB dynamic, and the compression ratio is better than 10:1. All solid state, plug-in modular construction assures trouble-free reliability. Write for complete details.

**BROADCAST ELECTRONICS, INC.**  
A Filmways Company  
8810 Brookville Rd., Silver Spring, Md. 20910



# BM/E CLASSIFIED MARKETPLACE

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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 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

## BUSINESS OPPORTUNITIES



## CATV FRANCHISE

The City of Richmond, Virginia (Population 249,000) is requesting bids for a 20-year exclusive CATV franchise to be awarded in early 1972.

Address inquiries to:  
City of Richmond  
Director of General Services  
2907 North Boulevard  
Richmond, Virginia 23219

## POSITIONS WANTED

Negro announcer, 9 yrs. experience, top forty or soul . . . present employer is informed of this ad . . . seeking major market opportunity . . . Rick Ricardo, 6516 N. University #1305, Peoria, Ill. 61614 . . . (309) 691-8763.

## EQUIPMENT FOR SALE

NEW FILM CAMERA FOR TV NEWS. 16mm CP-16, extremely lightweight, crystal-control camera specifically designed for the TV news cameraman and documentary filmmaker. Incorporates Auricon centerplate mechanism, single system sound, magnesium body, maximum portability and comfortable hand-holding balance. Write for specs and price. Orders now being taken by Alan Gordon Enterprises, 1430 Caluenga, Hollywood, Calif. 90028. (213) 985-5500.

## SURPLUS EQUIPMENT

- 3—TEAC A-4000SU four track play deck, automatic reversing, used for one year. Very good condition. \$160.00 ea.
- 1—Collins P-150 cart mach. Needs a little work, sold as is. \$75.00 will work with 216C-1 record unit.
- 2—Collins P-150 cart. mach. Needs a little work. Was working when removed from service, sold as is. \$50.00 ea.
- 1—Collins COPY (Home Brew) R-150 record unit for P-150 working condition. \$45.00.
- 1—Collins 216C-1 record unit for above P-150 good condition. \$100.00.
- 1—Tape-O-Matic 728 recorder, good condition \$50.00.
- 1—Herald 3-channel mixer, good condition \$20.00.
- 1—Ampex 450 play deck, switching not wired with amplifiers \$150.00.
- 1—Magnecord control panel, PT-6V, good condition, \$50.00.
- 2—Invicta 701 recorders, excellent condition barely used. \$50.00.
- 1—Zenith Fix-Tune FM receiver. MONO (100 to 108 MHz.) needs work \$15.00.
- 7—Collins FM antenna rings, one mounting section tuned to 107.1 MHz. \$200.00. Any reasonable offer will be considered.
- 1—Gates MO-2890 AM frequency monitor, tuned for 1400 Kc., remote metering extension included, working when removed from service. \$250.00.

NOTE: Equipment may be held for sale by phone call but sale must be confirmed in writing by purchasing agent.

WSJM INC.  
414 STATE ST.  
ST. JOSEPH, MICH. 49085  
TEL: (616)-983-3992

## EQUIPMENT FOR SALE (cont'd)

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. R.D. 3, Middleburg, Pa. 17842. 717-837-1444.

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. Onamp Labs., 172 So. Alta Vista Blvd., Los Angeles, Cal. 90036.

FM ANTENNA—ten bay circularly polarized CCA FM antenna type 6811. Antenna matching transformer included. Only 18 months old and part of present system producing best multiplex sound and finest stereo separation. Can be tuned from present frequency 100.7 MHz. Station going to higher power. Contact John Kreiger. KASE, 705 N. Lamar, Austin, Texas 78703. (512) 478-8521.

FIELD STRENGTH METER. 540 KHz to 5MHz, Ten microvolts to 10 volts per meter. New solid state design, long battery life. Stable, accurate calibration. Free literature. Solar Electronics, 901 No. Highland Ave., Hollywood, Cal. 90038.

ELECTRO-VOICE microphones and all accessories; stands, windscreens, etc., sold at competitive broadcast wholesale prices. We can also handle your Electro-Voice microphone repairs. PROFESSIONAL AUDIO SERVICES, P.O. Box 1953, Fort Worth, Texas 76101.

Heliac-styroflex. Large stocks-bargain prices-tested and certified. Write for prices and stock lists. Sierra Western Electric, Box 23872, Oakland, Calif. 94623. Phone (415) 832-3527.

4—650 ft. towers \$6500.00 each. Many more. Ground wire 85¢ per xx. lb. Bill Angle, Box 55, Greenville, N.C. 27834. Tel. 919-752-3040.

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.

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.

CAPSTAN IDLERS for AMPLEX 300, 35 440 Series, self aligning with replaceable ball bearings, \$22.50 net. VIF INTERNATIONAL, Box 1555, Mtn. View, Ca. 94040.

Our latest used equipment bulletin is out! If you have not received your copy, write us. The Maze Corporation, P.O. Box 6636, Birmingham, Alabama 35210.

## EQUIPMENT WANTED

Do you have "leftover" TR-22D modules after hi-banding? Would you donate them for use in Medical Education (TRT-18 update)? University of Michigan, Medical Television, #6432 University Hospital, Ann Arbor, Mich. 48104. Tel. 313-764-2275.

## MISCELLANEOUS FOR SALE

ATTN: BROADCAST STATION HISTORY BUFFS: Learn the history of your station. Air-date, ownership, location, power, etc: Send for free catalogue listing profiled stations. Price: Only \$5.00 each AM; \$2.50 each FM; accurately researched by pro. \$10.00 for custom profile. STATION PRO-FILE, P.O. Box 982, Hollywood, Cal. 90028.

## MISCELLANEOUS FOR SALE (cont'd)

Are you sure there's not an FM frequency available for your area? **COMPUTERIZED SEARCH** takes the guess work out. \$300.00 per location. Engineering Associates, Inc., Post Office Box 510, Versailles, Ky. 40383, 606-873-8311.

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First phone through tape recorded lessons at home plus one week personal instruction in Washington, D.C., Atlanta, Boston, Detroit, New Orleans, Minneapolis, Seattle, Denver, Portland, Los Angeles. Proven results. Our 17th year teaching FCC license courses. Bob Johnson Broadcast License Training, 1060D Duncan, Manhattan Beach, Calif. 90266. Phone 213-379-4461.

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What was going on behind the 3X2500-A3's? Was there some hanky-panky in the rack panel? Who is raping American broadcasting? Read the KTAO program guide and find out. Intro rate: \$3 for 20 issues. Or, for \$7.50 the guide plus The Myrkin Papers, the first literate statement on radio in the U.S. KTAO, Los Gatos, California 95030.

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## Only 8½ inches wide.



We've taken the world's finest tape cartridge playback system and reduced both cost and size. Two units now fit in the space formerly occupied by one!

The Compact Criterion, developed for crowded control rooms, retains the features that made the Criterion tape cartridge system the industry standard for excellence. New features include: single-card electronics for mono or stereo units and air-damped solenoid for whisper quiet operation.

For complete information on the Compact Criterion playback unit, write Gates, 123 Hampshire Street, Quincy, Illinois 62301.



Circle 127 on Reader Service Card

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**Charles C. Lenz Jr.**  
Advertising Director

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New York, New York 10016  
212-685-5320  
Charles C. Lenz Jr.

#### WESTERN STATES

**Thompson & Healey Inc.**  
1111 Hearst Building  
San Francisco, California 94130  
415-362-8547  
William J. Healey

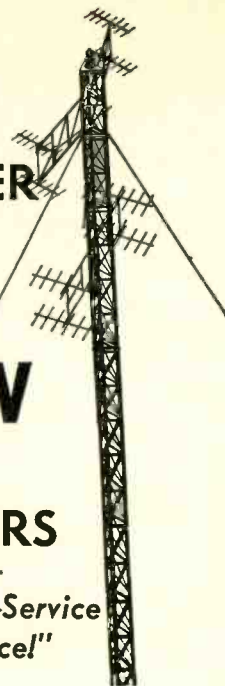
6290 Sunset Boulevard  
Los Angeles, California 90028  
213-466-8321  
Art Mandell

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Yes, quality, service and price on CATV systems are the reasons for Fort Worth Tower's position as the industry's leading supplier. Experience gained as a pioneer supplier of CATV enables Fort Worth Tower to provide you with a quality product at a price that is reasonable and attractive.

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

12 issues       6 issues  
 3 issues         1 issue

NAME .....

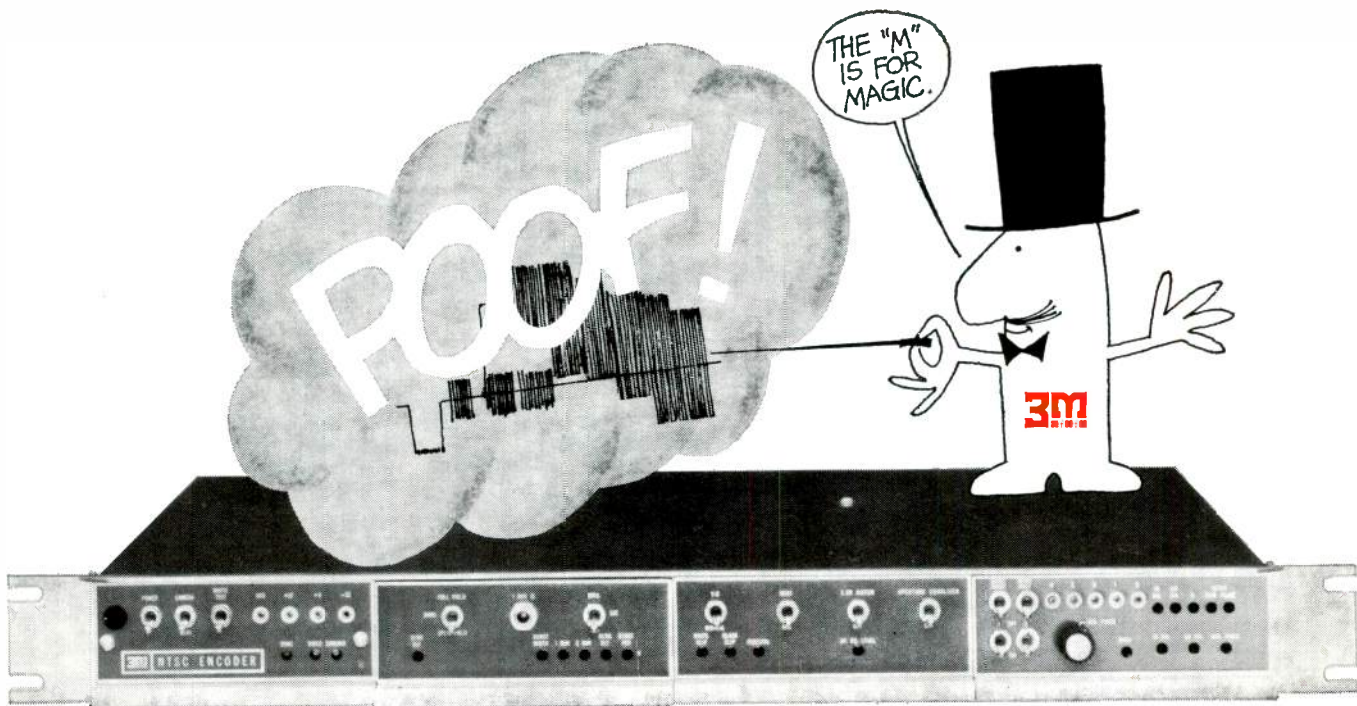
Station or Co. ....

Address .....

City ..... State .....

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





# Presto! Change-o!

Before your very eyes, the flick of a switch converts the output of any 3- or 4-channel camera, no matter what its price, into an encoded signal that meets all applicable EIA and NTSC specs!

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Its amplitude-dependent aperture equalizer provides noise-free picture crispness.

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And maybe best of all, its price is lower than you'd expect.

As we said, like nothing you've ever seen before, so why not let us show you? Ask for a demonstration. There'll be no hocus-pocus, no mumbo jumbo — we let the 3M color video encoder speak for itself.

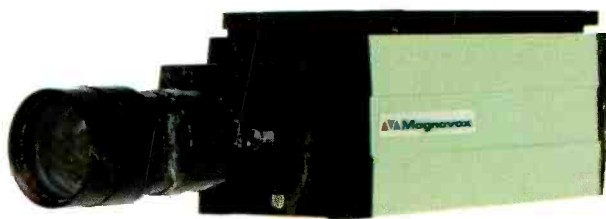
We've made more believers that way. Mincom Division, 3M Company, 300 South Lewis Road, Camarillo, California 93010. Telephone (805) 482-1911.

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Mincom Division **3M**  
COMPANY

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most versatile  
COLOR cameras?  
MAGNAVOX...  
WHO ELSE!**



**The Magnavox Series 200 (Self-Contained) Color TV Camera.**  
Smallest. Lightest. Lowest-cost. No registration problems.  
Uniquely simple to operate (only 2 controls).



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Smallest. Lightest. Lowest-cost. No registration problems.  
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