

# BROADCAST **ENGINEERING**

March, 1976/75 cents

## **NAB Convention Preview** Page 24

### **Film vs. Electronic News**

### **Random Access To Film**

### **Small Market Workshop**



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with standard layer and  
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and fixed light bias.

**P8133** Coaxial Leddicon  
with extended red layer  
and variable light bias.

**P8130** Coaxial Leddicon  
with standard layer and  
fixed light bias.

- 24 NAB Docks In Muddy Waters.** The annual convention will be held in Chicago from March 21 to 24. Article covers points likely to be hot topics at the convention. **Ron Merrell.**
  
- 33 Convention Exhibit Floor Plan.** BE divides the exhibit area into four sections and shows booth placement as a guide to convention attendees.
  
- 40 NAB Product Review.** A roundup of new products that will be introduced at the convention. This feature will be continued in the May convention wrap-up issue.
  
- 48 NAB Exhibitor List.** These are the manufacturers who answered our pre-show questionnaire with information on products to be featured and those on display for the first time.
  
- 70 Film vs. ENG: A State Of The Art Comparison.** The author compares operating flexibility and costs of news film and the new ENG equipment, another high interest issue at NAB this year. **Ron Whittaker.**
  
- 82 Cutting Into Random Film Handling Costs.** WBRE-TV uses a cartridge film machine to solve their film handling costs. **George Andresky.**
  
- 90 A New Approach To FM Peak Control.** Our Audio Editor tests and reviews the new Thomson CSF Volumax. Includes spec comparison and on air tests. **Dennis Ciapura.**

### About the Cover

Gary Moore and production assistant Juliet Wybrants during taping session of "To Tell The Truth" at NBC-TV studios in New York. Cover supplied courtesy of RCA.

### Departments

Direct Current .....	4
Industry News .....	8
SBE Journal.....	12
New Products .....	40
Globecasting .....	132
People In The News .....	141
Ad Index .....	168
Classified Ads.....	169

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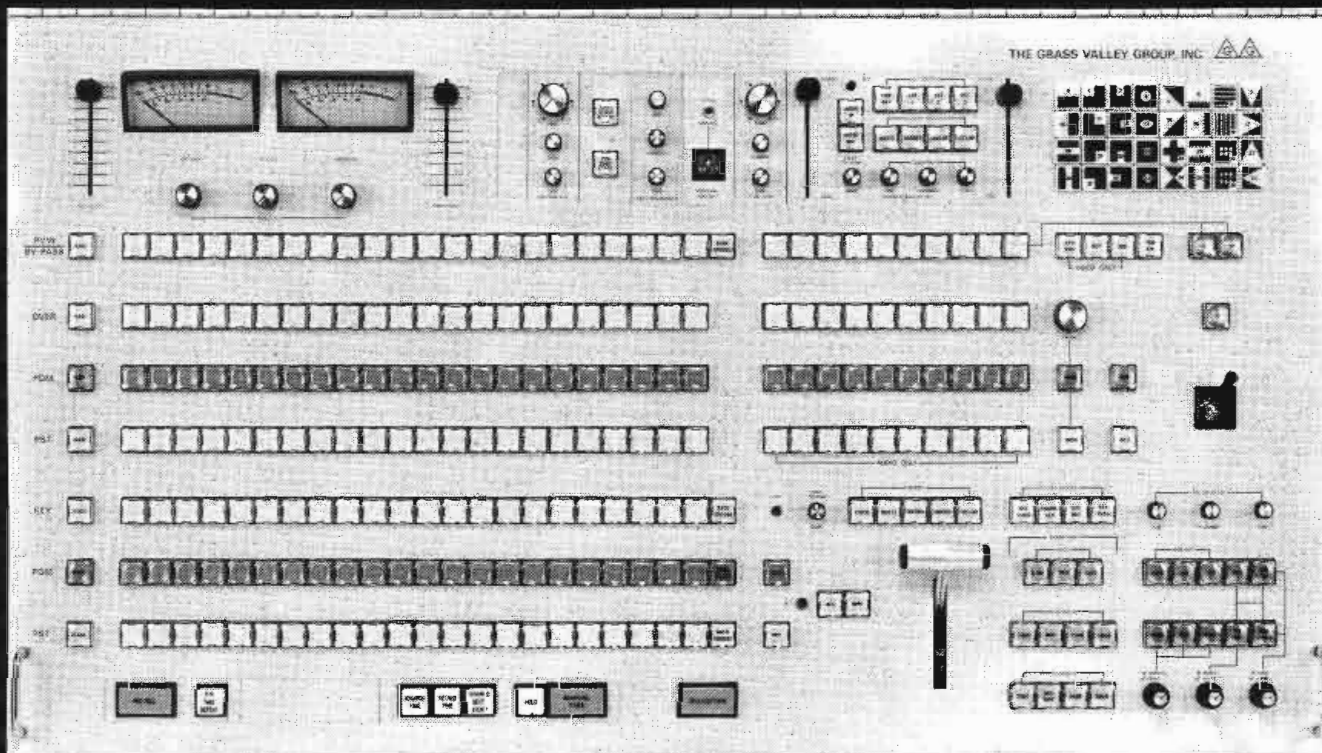
Robert E. Hertel, *Publisher*

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# DIRECT CURRENT FROM D. C.



March, 1976/By Howard T. Head and Harold L. Kassens

NAB time has rolled around once again and as we prepare to stand shoulder-to-shoulder with all our industry colleagues, we realize they expect us to cast a spell like a modern necromancer and foretell the shape of the future for a year to come. With this poetic (if slightly inaccurate and ungrammatical) prelude, we cast our magic dust into the Bicentennial fire and bring you our 1976 . . .

## POMPOUS PREDICTIONS

### VHF TV Drop-Ins

The FCC is barely starting to recover from a deluge of thousands of pieces of paper filed by over 150 well-divided partisans, those favoring VHF TV channel drop-ins and those equally opposed. At stake is a fundamental change in the way that VHF TV channel assignments are made. Commission will reach a decision in the coming year because of high industry interest.

### ENG Congestion

Electronic News Gathering (ENG) is still one of the hottest new things on the TV horizon today. Its successful use, however, depends on liberal access to the frequency bands necessary for relaying purposes. These are becoming crowded in the larger markets, and it is only a matter of time until interference complaints will multiply. This is likely to lead to the setting up of industry frequency coordinating committees for the auxiliary bands.

### AM Stereo

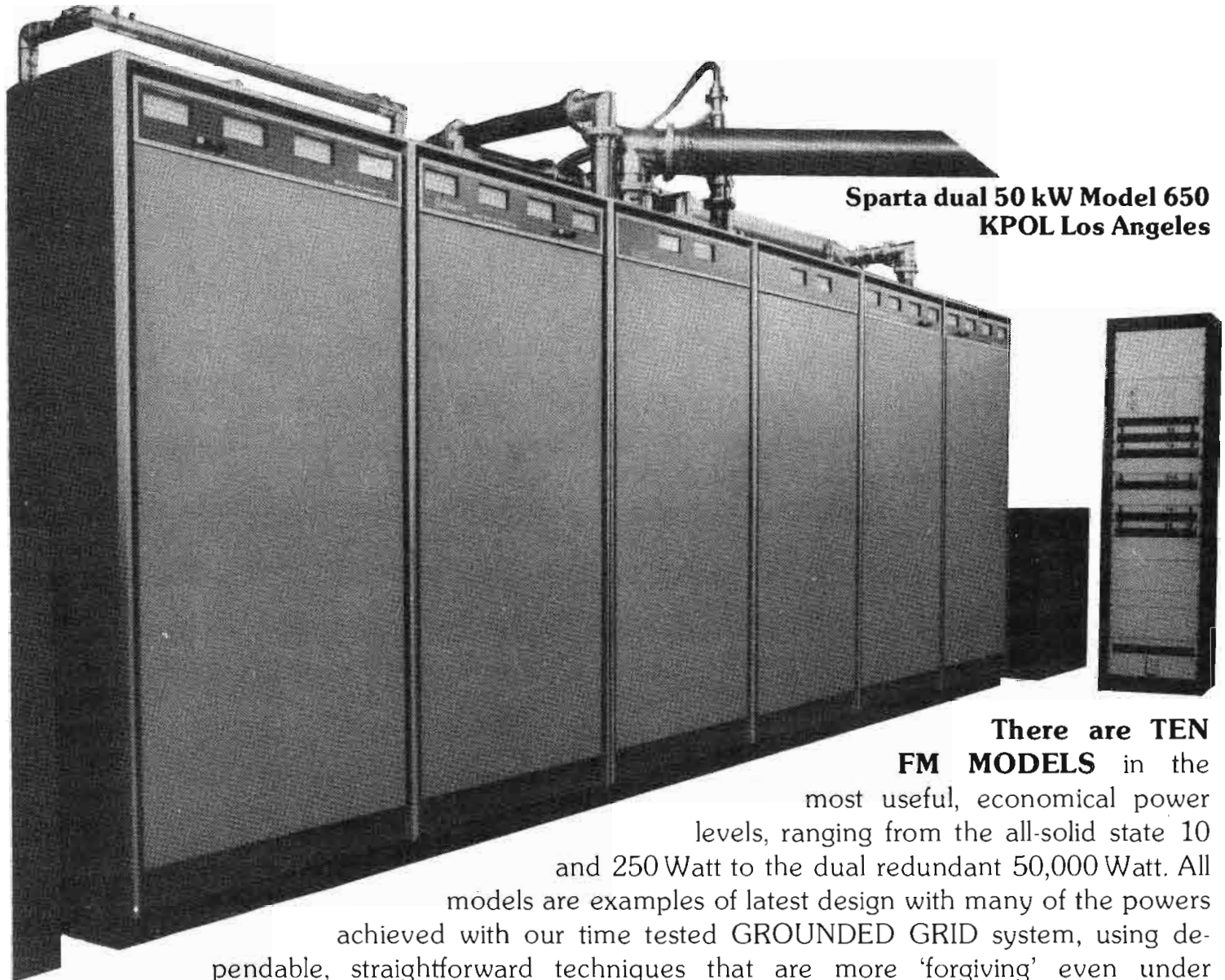
The new industry committee to standardize a system of AM stereo broadcasting is already hard at work, and three competing systems are presently under study. In addition, a fourth system not submitted to the committee for consideration is under test and will be actively promoted. The committee is working hard to complete its report by the end of the year and may have this report in the Commission's hands by next year's NAB convention. However, don't look for early Commission action, since the Commission will have many other problems confronting it.

(Continued on page 6)

# HORSEPOWER!



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# DIRECT CURRENT FROM D. C.

(Continued from page 4)

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## Expansion of FM Broadcast Band

Various schemes will be considered for adding additional FM broadcast channels to the present 100 channels each 200 kHz wide in the 88-108 MHz region. These will include proposals for narrowing the bandwidth from 200 to 150 kHz (already in use in Europe) and the establishment of additional FM broadcast channels in the UHF band in the general vicinity of 500 MHz.

## TV "Receiver of Tomorrow"

The Commission will let a research contract for the design of a prototype TV receiver exhibiting improved performance over today's typical receiver. Primary emphasis will be on UHF performance--higher sensitivity, lower noise figure, greater linearity, improved tuning, better antenna performance, and other goodies. The Commission will also be urged to have the receiver include extras such as automatic channel identification and captioning for the deaf.

## AM Clear Channels

The Commission has launched its Notice of Inquiry as to what to do with the remaining dozen Class I-A AM clear channel channels which have not yet been duplicated. The clear channel licensees would like to keep the channels intact, while new applicants would like to build secondary stations on the clear channels. Nobody is pressing this real hard so look for things to simply drift along during the coming year.

## Land Mobile Grabs of TV Spectrum Space

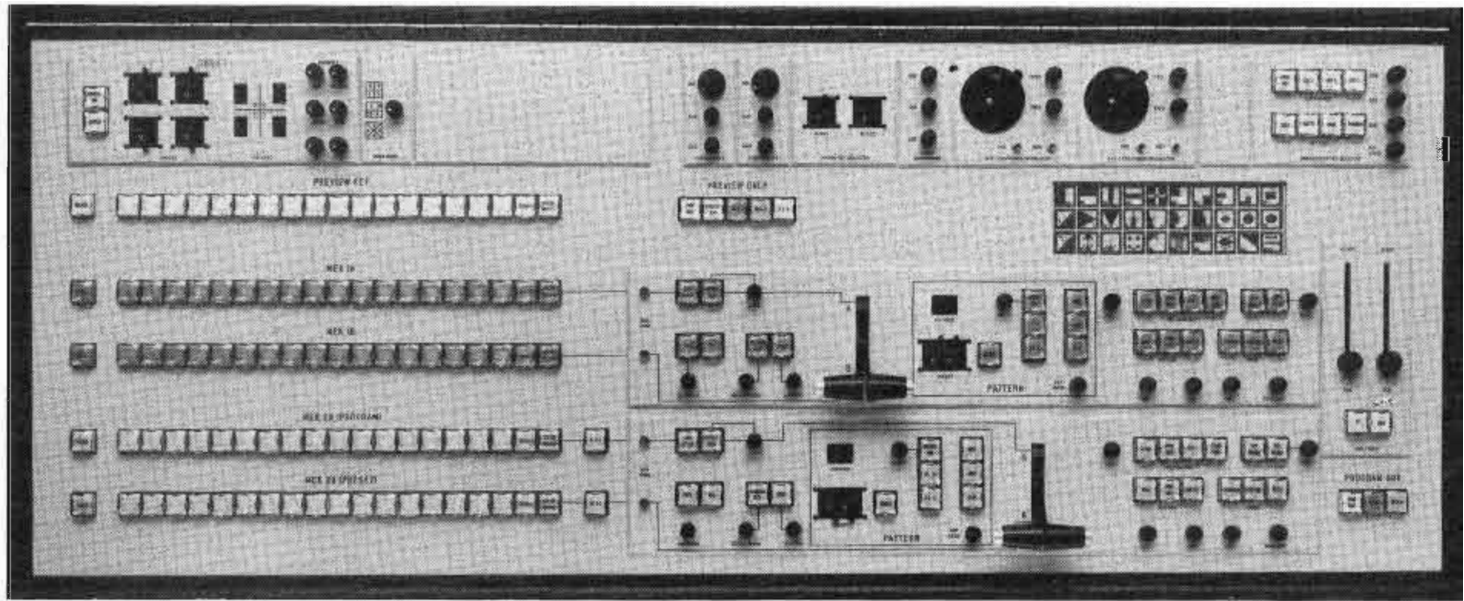
The land mobile people are already sharing UHF TV Channels 14-20 in some markets, and a few years ago were handed the top 14 UHF channels outright. They will continue to press their demands for access to more TV broadcast spectrum space. They have already asked for outright allocation of over 200 MHz in the middle of the existing UHF TV band, increased sharing or outright reallocation of the lower portion of the UHF band, and even sharing of the VHF TV band or outright reallocation of VHF TV spectrum space for TV and land mobile.

## Circular Polarization for TV Broadcasting

The Commission has pending a petition to authorize circular polarization for TV transmissions on a regular basis. Some work has been done at VHF in Chicago, and further work is under way on UHF at Modesto, California. The UHF work will be reported to the Commission within the coming year, but the findings will be inconclusive. Further work is needed at VHF and some additional testing has been undertaken at Chicago. However, it isn't likely that definitive results of the further VHF testing will be completed in the months to come. Look for little forward action on this topic between now and this time next year.



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- Wipe to a Key or Wipe Key
- Mix to a Bordered Key
- A-B Mix Behind a Chroma Key
- A-B Wipe Behind a Chroma Key
- A-B Wipe with Borders Behind a Chroma Key
- Mix-Wipe or Bordered Wipe to a Preset Wipe Behind a Chroma Key
- Mix or Dissolve to a Luminance Key Over a Chroma Key
- Wipe to a Luminance Key over a Chroma Key
- Mix, Wipe or Dissolve to an Electronic Spotlight Behind a Chroma Key
- Mix or Wipe to a Quad Split, with or without Borders, Behind a Chroma Key
- Luminance Key over a Quad Split behind a Chroma Key
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# INDUSTRY NEWS

## Canadian Broadcasters Set May Convention Dates

The Western Association of Broadcast Engineers has announced their 1976 dates and location for the 26th Annual WABE Conference.

The 1976 Western Association of Broadcast Engineers Conference will be held May 3rd, 4th and 5th at the Hotel Bessborough, Saskatoon, Saskatchewan. This year's conference will open May 3rd with two three-hour seminars on digital electronics. The seminar will be in conjunction with the Southern Alberta Institute of Technology, Calgary. Senior Instructor, Wayne Gedlaman will teach the course and there will be a forty-page handout which will cover all phases of the

seminar and will be of use for future reference.

The seminar and handouts are open to all registered delegates and there is no extra charge.

May 4th and 5th will be regular WABE Conference days with two full days of technical papers presented by experts in their field from Canada, U.S.A. and Europe. The exhibitor's rooms will occupy at least three floors of the Hotel and will be open from the evening of May 3rd through May 4th and 5th.

Registration fees before April 15th are \$25.00 per person, \$30.00 per person after April 15th. There is no fee for exhibiting except the normal hotel room costs. All at-

tending the Conference must register.

For further information in regard to exhibiting, accommodation or presenting a paper, please contact General Chairman, Alex White, W.A.B.E., Box 412, Regina, Saskatchewan, Canada S4P 3A2.

## ITVA Will Meet In Anaheim

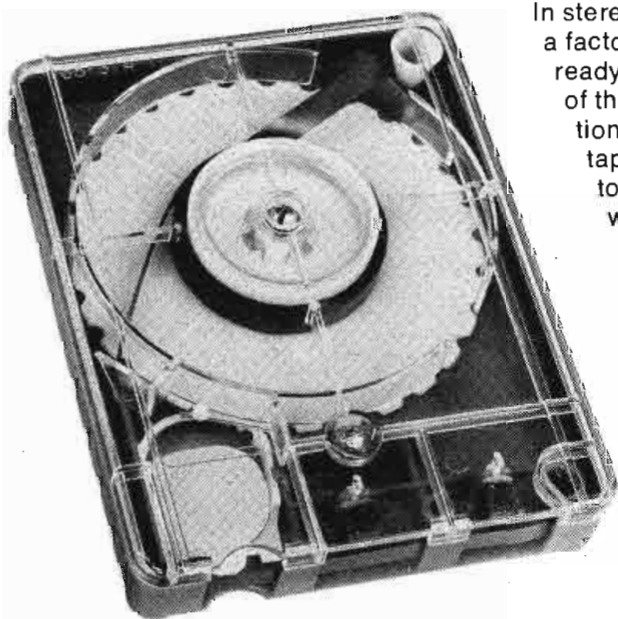
"Effective Programming—The Next Step" will be the theme of the 8th Annual International Conference of the International Industrial Television Association (ITVA), March 27-30, 1976, Anaheim, California.

At the conference, industrial and instructional production and management people will hear from many of the leading authorities and innovators in visual communications today. "Video communications

(Continued on page 10)

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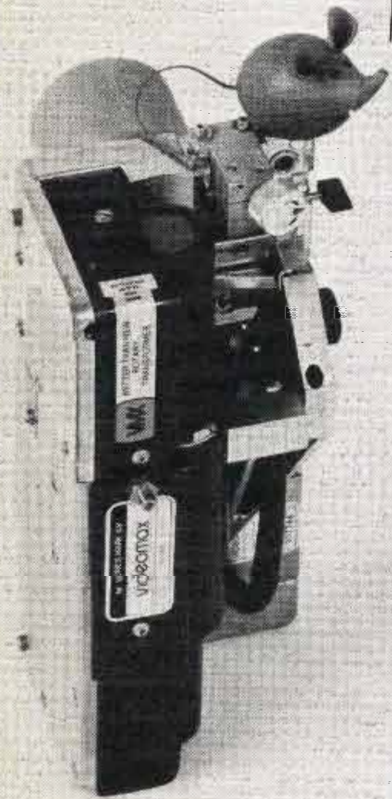


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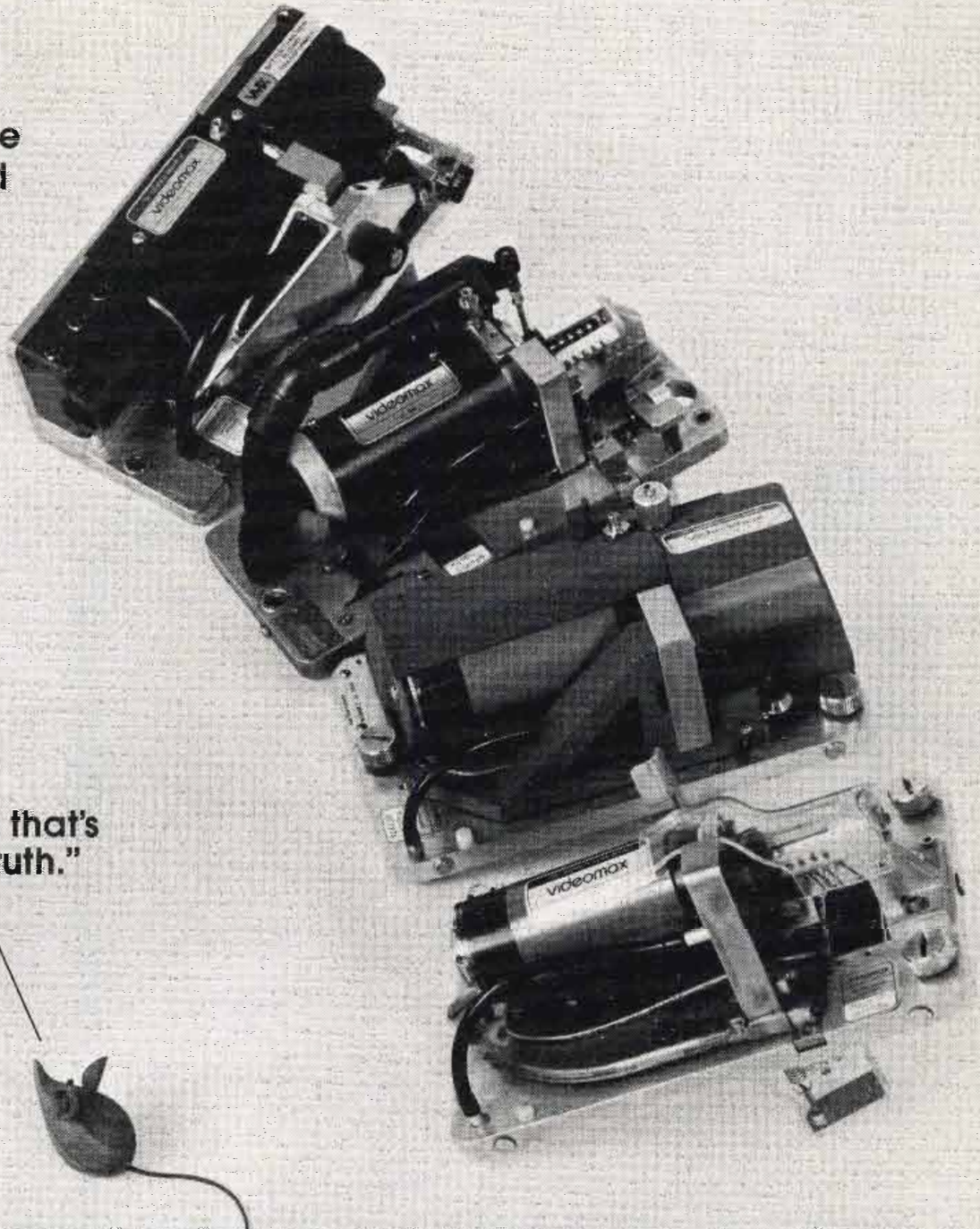
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passed the 'survival' stage some time ago," said Herb Wolff, conference chairperson. "Now we must focus on effective **programming**—in terms of both instructional impact and dollar cost."

The ITVA Conference dates coincide with those of the national convention of the Association for Educational Communications and Technology (AECT). Attendees of the ITVA Conference will have an opportunity to attend sessions of AECT as well as view more than

500 audio-visual exhibits at the Anaheim Convention Center.

Keynoter for the ITVA Conference will be Dr. Robert F. Mager of Mager Associates, Inc., well-known author and consultant on the subject of setting and achieving instructional objectives. Mager will examine effective use of video in the craft of instruction.

The influence of television on human behavior will be discussed by George Comstock, head of a Rand Corporation research team

which recently completed an extensive study of the phenomenon. Dr. Richard Lamberski, Senior Production Specialist at Pennsylvania State University, will show attendees how to evaluate audience response to visual stimuli. Other speakers will demonstrate the impact of computerized animation and three-dimensional television on non-broadcast programming; the use of satellite transmissions for video distribution; recent developments in electronic news gathering (ENG) techniques and systems; and effective use of low cost sets for television.

Winners of the 8th Annual ITVA Videotape Competition will be announced at a special Awards Banquet March 28th; regional and international winners will be available for private viewing throughout the Conference.

The highly popular Breakfast Workshops featuring discussions of production and programming problems; job descriptions and salary levels, etc. will again be offered.

Further information on the ITVA Conference can be obtained by contacting Herb Wolff, Conference Chairperson, New England Video Services, 501 Boyston Street, Boston, Ma. 02117.

### Three Stations Share New FM Antenna

Three FM radio stations in Miami, Fla., will begin broadcasting early this year from a new multiple-channel broadcast antenna custom-designed by RCA Broadcast Systems.

The Miami installation marks the first time three FM broadcasters have used a common antenna designed with ring radiators for pole or tower-leg mounting, according to R. L. Rocamora, Manager, Antenna Engineering and Product Management, for the RCA activity.

The eight-bay BFL unit will radiate circularly polarized signals for stations WINZ-FM, WYOR-FM and WBUS-FM.

Rocamora noted that the new design provides a multiple-station antenna at a lower cost than for an equivalent panel-type unit. Low wind-loading of the new antenna also permits mounting on a less expensive tower, he added.

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BOOTH  
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FULL RANGE OF  
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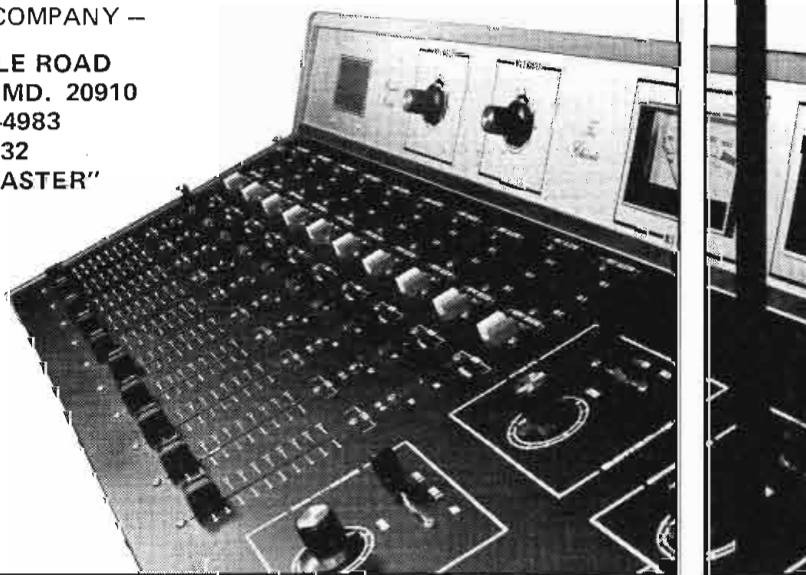
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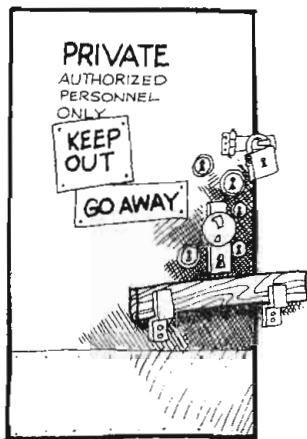
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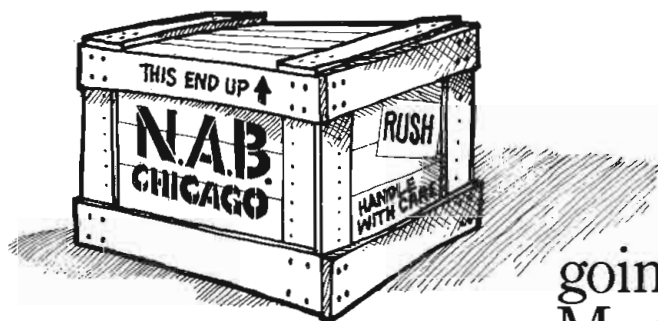
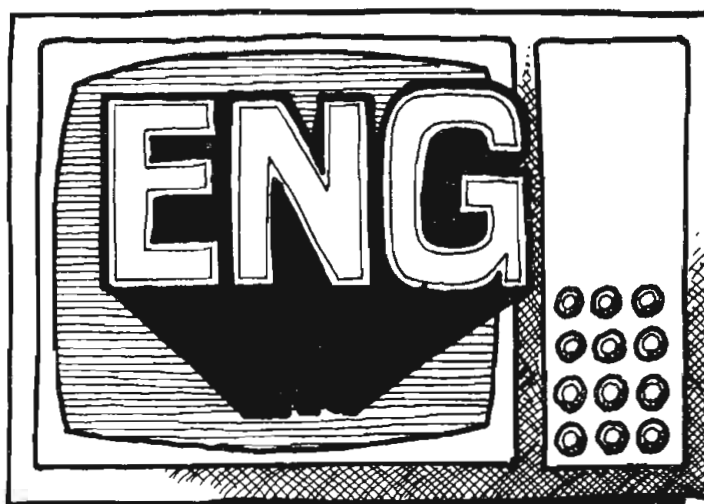
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# A second **SECRET** has been uncovered!



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As you know, we were going to surprise you in March with two new systems. Now you know.

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## See You At The Convention!

The Society of Broadcast Engineers will meet Sunday, March 21, at the Hyatt Regency Chicago, 151 Wacker Drive. At 12:30, the Board of Directors will meet in the Atlanta Room. The Annual Membership Meeting will be held in Regency Room A from 3:00 until 5:00. Finally, from 5:00 to 7:00 that evening, there will be a reception in the Toronto and Hong Kong Rooms.

### Billing Schedule for SBE Dues

The December issue of **The Signal** stated that all members whose numbers are below 3299 will be billed during March, 1975, and

members holding numbers higher than 3298 will not receive notices until 1976. Please don't think you're home free if you have a membership number below 3299... the notice should have read March, 1976, in the first instance and 1977 in the second.

### Tid Bits

Vince Flanders, assistant secretary of SBE, reports that he's still having trouble mailing newsletters. Apparently, many addresses are incorrect, since the post office returns nearly 130 copies after each mailing. If you're one of those still not receiving a **Signal**, please notify him as soon as possible.

Josh Socolof [see address below] is looking for more people to join him in the formation of a Chapter in the Oklahoma City area. If you are interested in what an SBE Chapter can do for you, please call him at (405) 525-5595.

### Chapter 2: Northeastern Penn.

Chapter 2 met Monday evening, February 2, to hear Ed Karl, engineering representative for Gates-Harris Intertype, speak on their recently announced one-kilowatt, all solid-state AM transmitter. Karl, a National Director for SBE and a member of the Certification Committee, also held a question/answer session on the Certification proposal, of which Chapter 2 had recently voted total endorsement.

### Chapter 9: Phoenix, Arizona

January's program, on the FCC's new Rules regarding the two-tone EBS system, featured representatives from TFT. TFT, who worked with the FCC in defining the new two-tone equipment specifications prior to last August's announcement, reviewed the system with members and reported on the new

(Continued on page 14)

# THIS 2504 is automatic video

## EQUALISATION

(for N.T.S.C. Operation)

by **Mathey**

**BOOTH 203**  
Television  
Equipment **TEA**  
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**The 2504 can be used:**

- to establish lines between Remotes and Stations
- at station input to clean the signal before station processing
- in station feed to transmitter to clean signal prior to transmission
- in relay transmitters where the signal is demodulated to base band
- in closed loop mode round a transmitter to correct transmitter drift

**AUTOMATIC CONTROL**  
Needs an I.T.S. signal (The unit can be adjusted to operate on the V.I.R. signal if preferred)

**MANUAL CONTROL**  
If I.T.S. signal is not present — Switch to "Manual" and correct each parameter needing correction for top picture quality

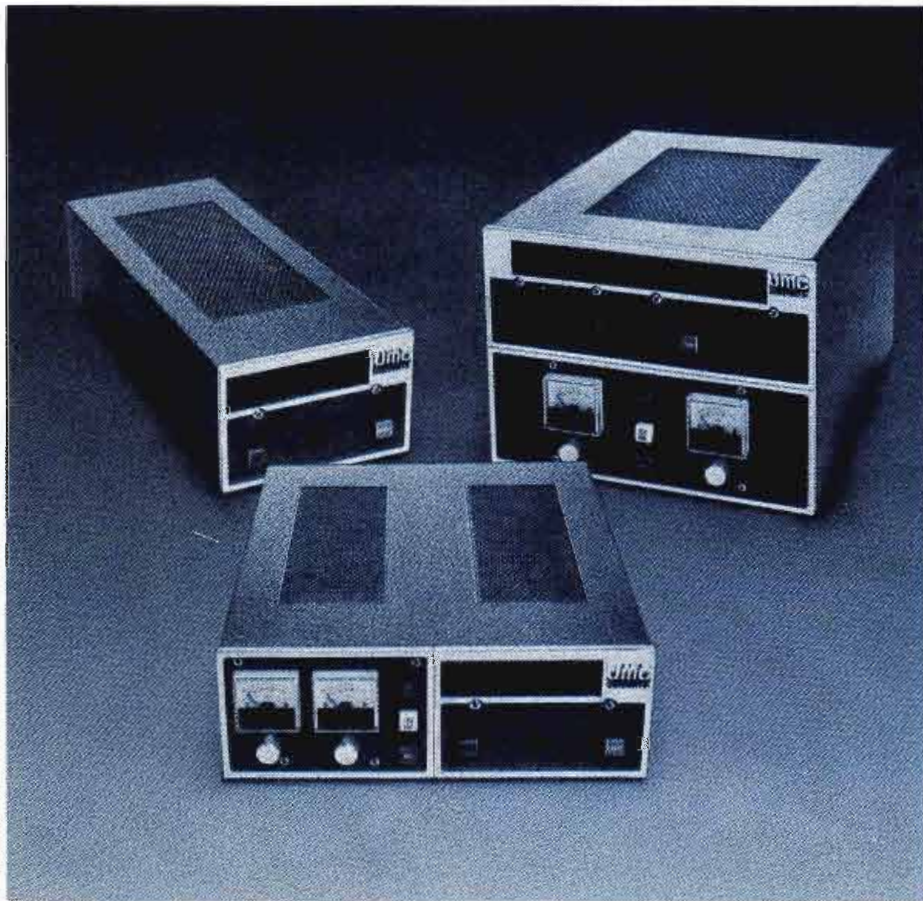
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The long wait for a superior broadcast audio cart machine is over. We've built all the most wanted features into our complete new line of mono and stereo A, B, and C-size cartridge tape recorders and reproducers. Compact size, reduced flutter and wow, and lowest operating temperatures are just some of the many advantages. And Beaucart meets the new NAB standards, too.

What makes this hot new machine the coolest cart machine you can buy? Beaucart was designed by the manufacturer of the quality BEAU motor and incorporates our low profile, patented pancake hysteresis synchronous direct drive motor. You've never seen anything like it. And you've never seen a cartridge machine like Beaucart either.

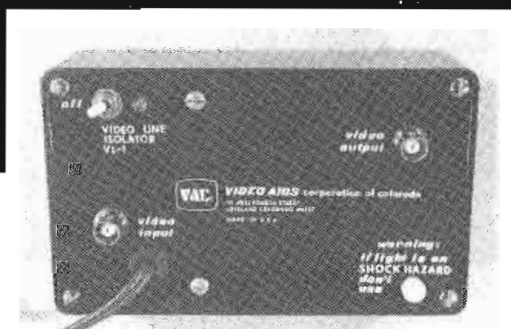
For complete information and pricing, write or call today. And look for us at Booth No. 712 at the Chicago NAB Convention.

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## SBE (Continued from page 12)

*In response to requests for a complete Chapter listing, we include the following:*

CHAPTER 1—BINGHAMTON, NEW YORK. Bill Sitzman, Jr., Chairman, Independent Broadcast Consultants, Inc., Box R-181, Freeville, New York 13068, (607) 273-2970.

CHAPTER 2—NORTHEASTERN PENNSYLVANIA. John Kowalchik, Chairman, RCA Solid State Division, Crestwood Road, Mountaintop, Pennsylvania 18707, (717) 474-6761, ext. 635.

CHAPTER 9—PHOENIX, ARIZONA. Leon Anglin, Chairman, SBE, P.O. Box 615, Phoenix, Arizona 85001, (602) 285-7333.

CHAPTER 11—BOSTON, MASSACHUSETTS. Bob Molloy, Chairman, 66 Bellevue Street, Manchester, New Hampshire 03103, (603) 669-1250.

CHAPTER 15—NEW YORK, NEW YORK. John Lyons, Chairman, WWRL, 41-30 58th Street, Woodside, New York 11377, (212) 335-1600.

CHAPTER 16—SEATTLE, WASHINGTON. Bob Ingalls, Chairman, 5441-187th Avenue, N.E., Redmond, Washington 98052, (206) 543-7774.

CHAPTER 17—MINNEAPOLIS/ST. PAUL. Lance Raygor, Chairman, Route 1, Box 337, Chisago City, Minnesota 55013, (612) 373-4807.

CHAPTER 20—PITTSBURGH, PENNSYLVANIA. Jim Hurley, Chairman, WTAE-TV, 400 Ardmore Blvd., Pittsburgh, Pennsylvania 15230, (412) 242-4300.

CHAPTER 21—SPOKANE, WASHINGTON. T. O. Jorgenson, Chairman, Technical Director, KXLY, W. 500 Boone Avenue, Spokane, Washington 99201, (509) 328-9084.

CHAPTER 22—CENTRAL NEW YORK. Gary Hartman, Chairman, WSYR, 1030 James Street, Syracuse, New York 13203, (315) 474-3911.

CHAPTER 25—INDIANAPOLIS, INDIANA. Donald Morgan, Chairman, WTTV, 3490 S. Bluff Road, Indianapolis, Indiana 46217, (317) 787-2211.

CHAPTER 26—CHICAGO, ILLINOIS. Bob Churchill, Chairman, SBE, 121 W. Wacker Drive, Chicago, Illinois 60601, (312) 729-5215.

CHAPTER 28—MILWAUKEE, WISCONSIN. Dave Dezurick, Chairman, WRJN, 4201 Victory Avenue, Racine, Wisconsin 53405, (414) 634-3311.

CHAPTER 32—TUCSON, ARIZONA. H. J. "Bart" Paine, Chairman, Chief Television Engineer, University of Arizona, College of Medicine, Tucson, Arizona 85724, (602) 882-6644.

CHAPTER 33—CINCINNATI, OHIO. Louis A. Williams, Chairman, 2092 Arrowwood Place, Cincinnati, Ohio 45231, (513) 851-4964.

CHAPTER 34—ALBUQUERQUE, NEW MEXICO. Fern A. Bibeau, Chairman, KOB, P.O. Box 1351, Albuquerque, New Mexico 87103, (505) 243-4411.

*(Continued on page 21)*





# SS 3159

The SS3159 stereo disc reproducer provides complete facilities for professional stereo reproduction of disc recordings. It is completely self-contained with SP10D turntable, tone arm, plug-in pickup cartridge, equalized preamplifiers, audio cue switching, power supply and pedestal assembly.

The turntable offers the highest quality, lowest noise operation available. It adds virtually nothing to the original sound as recorded on the disc. And with the advent of quadrophonic discs, it's imperative that vertical as well as horizontal "rumble" be reduced to a minimum.



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# SS 7800

The SS7800 Series of modular audio consoles provides complete professional facilities for mixing and shaping today's complex audio material.

In addition to complete program mixing, monitoring and control, SS7800 Series consoles provide PA feeds and comprehensive Solo/Cue, Echo-Send/Receive, Fold-back and talkback system facilities. A full range of options is also available including Equalizers, Compressors, Program Assign with Pan, and Remote Controls.



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# On March 21, Sony will reveal a major commitment to the broadcast industry.

That date is the opening of the 1976 National Association of Broadcasters convention in Chicago.

At the show, Sony will exhibit eight new video products specially designed for the broadcast industry. They represent the largest investment in broadcast equipment ever made by Sony.

But the new products are only part of the important things we will introduce at N.A.B.

**A new organization.** Formed specifically by Sony to serve the broadcast industry and headed by Dave MacDonald, our team of broadcast specialists is knowledgeable, experienced and eager to apply our technological leadership to your problems.

**A new service policy.** Sony recognizes that the broadcast industry cannot afford "downtime." At the show, we'll explain how we plan to service our equipment quickly and efficiently.

**A new name.** Sony Broadcast will begin to appear in many places. It's there to assure you that we're dedicated to the product and service standards necessary for the broadcast industry.

What this all adds up to, of course, is a major commitment on the part of Sony to the broadcast industry.

## Sony Broadcast

A division of Sony Corporation of America. 9 West 57th Street, New York, New York 10019

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For Demonstration Only Circle (77) on Reply Card

# Studio Lighting. We supply everything but the electricity.



STRAND CENTURY presents four complete lighting and control system packages for television studios. Our studio package literature provides you with a wealth of information.

It's the easy way to light your studios with great STRAND CENTURY products at a very affordable price. Send for our data: Strand Century Inc., 20 Bushes Lane, Elmwood Park, NJ 07407. 5432 West 102nd St., Los Angeles, Calif. 90045.



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A COMPANY WITHIN THE RANK ORGANISATION

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## ***NAB Still Shoots for Renewal Legislation***

The Board of Directors of the National Association of Broadcasters has reaffirmed its objective to obtain license renewal legislation that provides stability and a license term of more than three years.

The Radio Board and the Television Board adopted this resolution:

"The National Association of Broadcasters reaffirms its commitment to licensee stability and a lengthened license term for all broadcasters. However, should the Congress decide first to direct its attention to renewal relief for the radio industry, NAB would support such appropriate legislation."

The Board expressed its continuing concern over the advertising of personal products and adopted a resolution directing the Television Code Board to keep the matter under close review. It said such advertising should be handled in good taste and must be limited to specified hours—from 9 a.m. to 4 p.m. and after 10 p.m. on weekdays and after 10 p.m. on weekends, local time, and from 8 a.m. to 3 p.m. and after 9 on weekdays and after 9 a.m. on weekends in the central time zone.

The Board endorsed broadened guidelines for children's advertising that incorporate under one umbrella various Code Authority rules on the subject. Included is a stipulation that feature films not suitable for family viewing can not be advertised in or adjacent to programs designed primarily for children under 12.

In another action, the Board chose Robert D. Gordon of WCPO-TV, Cincinnati, O., as its chairman to succeed Walter E. Bartlett of AVCO Broadcasting Co., Cincinnati, who is scheduled to resign from the Board on March 1. Kathryn F. Broman, Springfield (Mass.) Television, was chosen to replace Mr. Gordon as vice chairman on that date.

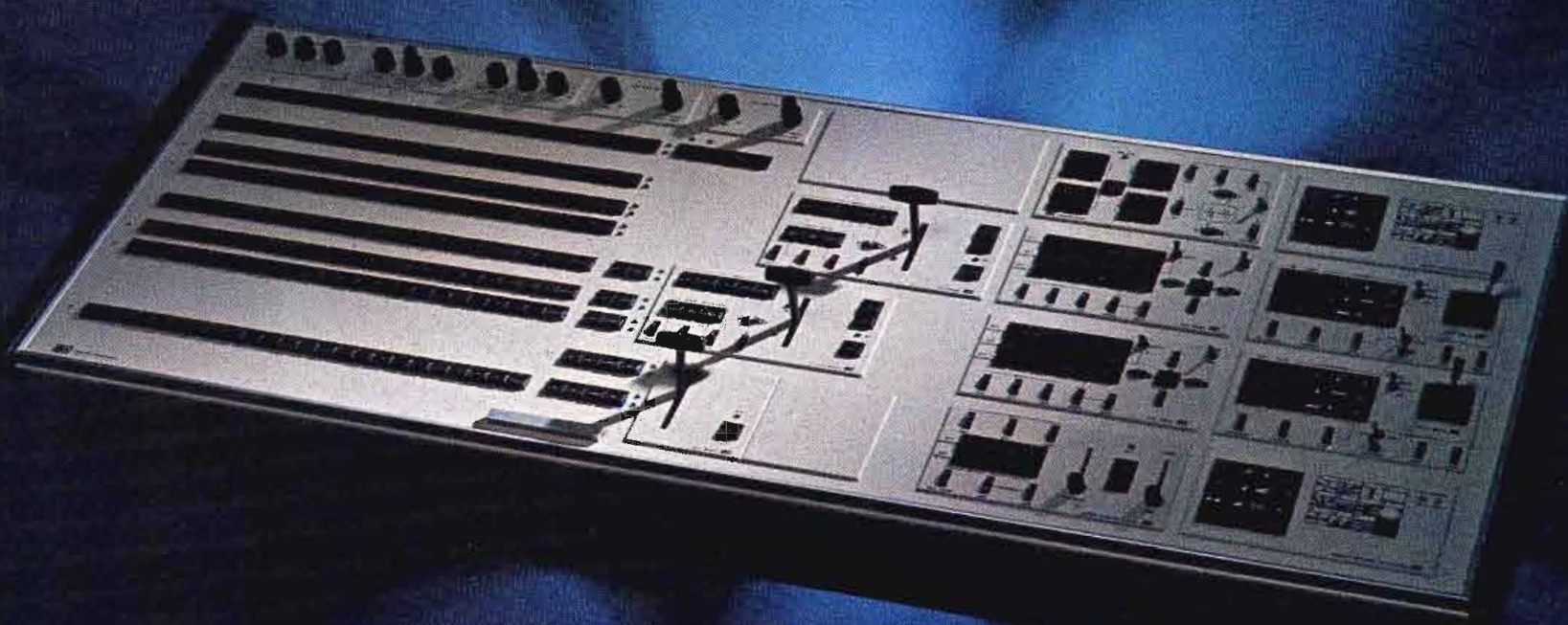
Bartlett's resignation became necessary because of the purchase of AVCO's Cincinnati station, WLWT, by Multimedia Broadcasting Co., Greenville, S.C. NAB Board Chairman Wilson Wearn is president of Multimedia and NAB By-Laws provide that only one representative from the same station or group may serve on the Board. FCC approved WLWT's acquisition as of March 1.

The Board revised its method of computing the dues of NAB's TV members.

It dropped the old hourly program rate schedule in favor of a formula based on market size and the nature of operations. A network affiliated VHF station in the number one market would pay the highest dues while an independent UHF in the smallest market would pay the lowest. An escalator clause tied to industry revenue increases over a three-year period would be used to adjust the dues annually.

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# smart switcher



## CDL has just raised the standard for video production switchers. Again.

The CD-480 is the first totally new full scale production switcher from CDL in 7 years. It offers every wanted feature, from superb Chroma Keying to Rotating Wipes with Colored Borders and Soft Edges.

We applied unique technology to create an operator's "dream". A *single* CD-480 Effects Amplifier can perform production sequences that are not possible even on a conventional *triple* M/E switcher.

The CD-480 is not just a new switcher, but a completely modular production system.

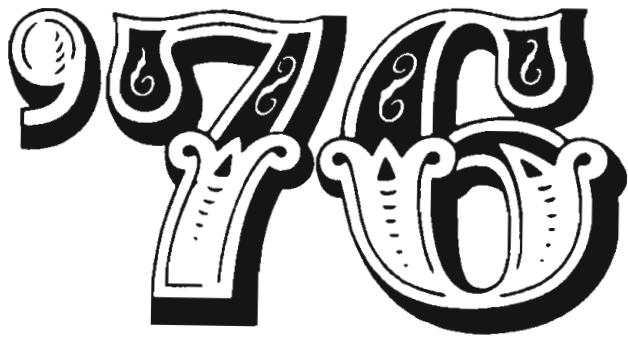
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For more than a decade and a half, Moseley Associates, Inc., has pioneered many advances in aural studio-transmitter link (STL) and transmitter remote control equipment. Some of these innovations are —

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- ✓ All Solid-State Aural STL and Remote Pickup Systems
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- ✓ Digital Transmitter Remote Control and Logging

## AND FOR '76 - MOSELEY PRESENTS

- ✓ First 950 MHz STL Transmitter with ON-FREQUENCY ALL SOLID-STATE RF POWER AMPLIFIER
- ✓ Full COLOR CRT Display of Transmitter Remote Telemetry Information

See these and other Moseley innovations in Booth 505 during 1976 NAB Convention... or contact us directly for full details of a Moseley innovation to meet your requirement.



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## SBE

(Continued from page 14)

equipment specifications that will go into effect this April.

### Chapter 11: Boston, Mass.

Members of Chapter 11 met January 27 at the American Telephone facility in Boston for an informative tour of A. T. & T.'s radio and TV division. A business meeting was held in one of the conference rooms that evening.

### Chapter 16: Seattle, Wash.

On January 14, Chapter 16 met to hear Barry Lloyd from RCA give a report on circular polarization of TV antennas. The presentation included slides which were taken at the WLS-TV site in Chicago.

### Chapter 20: Pittsburgh, Penn.

Chapter 20 welcomed Mr. Bill Bannow, director of commercial marketing for the Duquesne Light Company, at their regular noon meeting on January 15. Mr. Bannow included a twenty-minute film on "The Critical Choices Ahead" in his speech on the uses and production of energy. A question-and-answer period followed.

### Chapter 26: Chicago, Illinois

The Chicago Chapter invited local SBE members Fred Rodey and Ken Steininger to present the program on January 20. Mr. Rodey, manager of TV technical operations, discussed video signal standards. These represent a tightening of the allowable parameters within the FCC specifications so that there will be less chance of a station receiving a citation for violating the technical standards. The inherent problems in this procedure were discussed, and copies of the specifications as published by NBC were passed out to the group. (NOTE: NBC has published the tightened specs for its own internal use and, in the interest of maintaining better

(Continued on page 102)

## SBE Chapters

CHAPTER 35—LOUISVILLE, KENTUCKY. Robert J. Kline, Chairman, WKLE(TV), 600 Cooper Drive, Lexington, Kentucky 40502, (606) 233-0666.

CHAPTER 36—SAN DIEGO, CALIFORNIA. Bill Montgomery, Secretary/Treasurer, SBE, 6841 Convoy Court, San Diego, California 92111, (714) 556-8080.

CHAPTER 37—WASHINGTON, D.C./NORTHERN VIRGINIA. Charles F. Riley, Chairman, Tele-Color Productions, 708 N. West Street, Alexandria, Virginia 22314, (703) 683-3203.

(List continues on page 102)

# TRI-LOC<sup>®</sup> CONNECTORS

**A complete series  
of quick disconnect  
triaxial connectors  
specifically  
designed for  
the telecast  
industry!**

KINGS' TRI-LOC connectors have been designed to the interconnect requirements of digital color cameras. Their unique design offers a matched impedance that insures low loss transmission between cameras and control units.

Camera crews, with the use of triaxial cable and TRI-LOC connectors, can now work at distances 20 to 30 times further from the van than had previously been possible.

These connectors are extremely rugged, and are completely weatherproof when mated. This, combined with Kings' durable TR-5<sup>®</sup> weather resistant finish make them ideally suited for outdoor use. TRI-LOC connectors quickly and accurately terminate  $\frac{3}{8}$ " (9.5mm) and  $\frac{1}{2}$ " (12.7mm) cables.

For further information and literature on these and other connectors for the telecast industry, write, wire or phone today.

**KINGS**  
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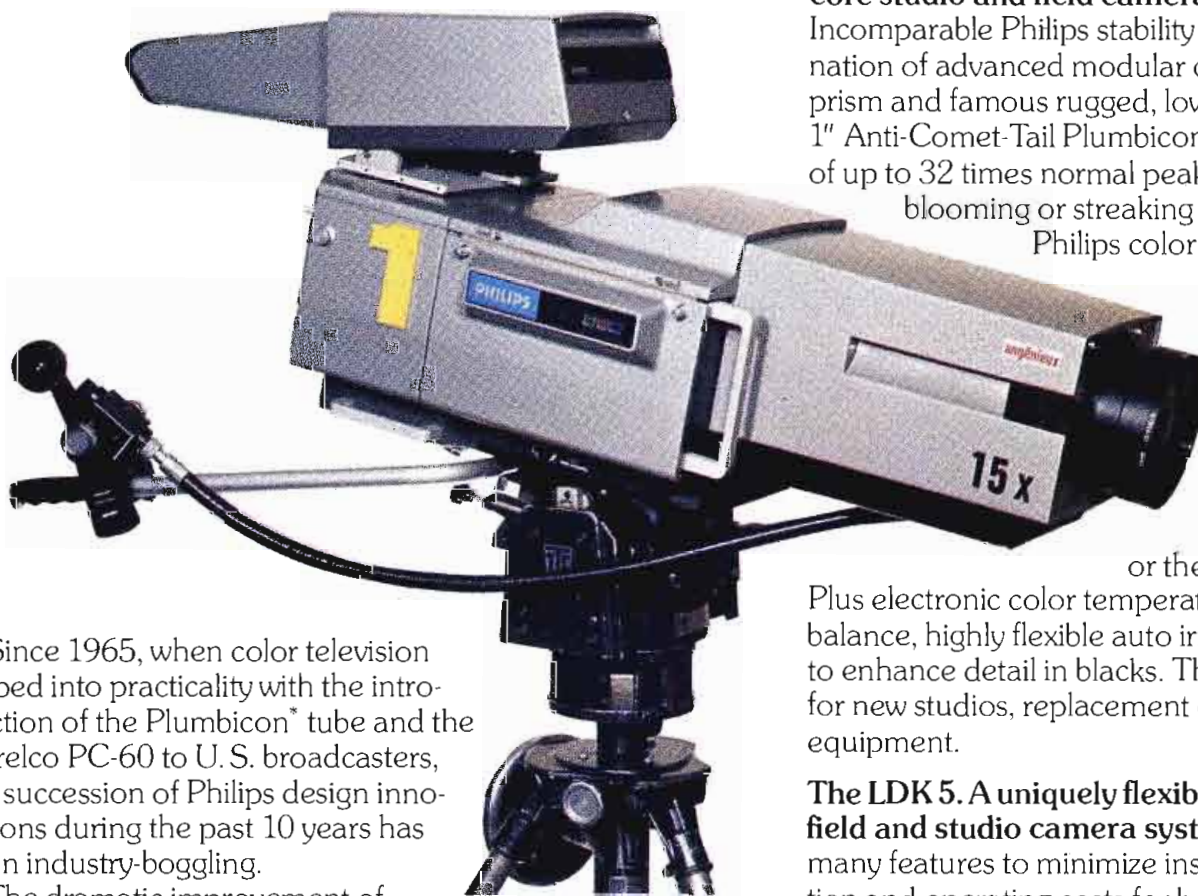
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NAB SHOW  
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# IT'S DECADE

**...and another giant step forward in camera technology from the makers of the most wanted, most used and most imitated cameras in the world.**



Since 1965, when color television leaped into practicality with the introduction of the Plumbicon\* tube and the Norelco PC-60 to U.S. broadcasters, the succession of Philips design innovations during the past 10 years has been industry-boggling.

The dramatic improvement of home screen pictures and the equally dramatic simplification and reliability of color production techniques brought on by such exclusive Philips advancements as its 3-Plumbicon tube design and beam-splitter prism, had all 3 networks and most groups and independents using PC-60's and 70's. In a few years, over 1,000 cameras were in use. And over the past 10 years, as one important technical advancement followed another, Philips cameras have become the accepted leader in the U.S. and throughout the world.

Building on these major breakthroughs, Philips now has taken the industry into DECADE TWO—with the LDK and LDH series—the finest, most advanced and

most complete family of cameras available today. Cameras designed to meet every requirement and budget. Plus an expanded national sales and service organization ready to serve you.

**The LDK 25. Unquestionably, the state of the art multi-core studio and field camera system on the market.**

Incomparable Philips stability through its exclusive combination of advanced modular circuitry, beam-splitting prism and famous rugged, low profile head casting. Uses 1" Anti-Comet-Tail Plumbicon tubes that allow highlights of up to 32 times normal peak white level without blooming or streaking... and still providing famous Philips color rendition and resolution.

Has unique CLUE (Color Line Up Equipment) at viewfinder and CCU for very rapid and highly accurate color balance under any lighting condition using only a monochrome monitor or the camera viewfinder itself.

Plus electronic color temperature control, auto white balance, highly flexible auto iris and contrast compression to enhance detail in blacks. The LDK 25... *the* camera for new studios, replacement or adding to existing equipment.

**The LDK 5. A uniquely flexible, digitally controlled Triax field and studio camera system** with

many features to minimize installation and operating costs for both studio and field operation... plus the advantages of Triax to make it ideal for remote situations. Has a built-in memory system that maintains settings for up to a week and automatic cable compensation that eliminates timing and power supply problems even beyond a mile. And much, much more.





# TWO



**The LDK 11.** At last... a camera *totally* designed for full broadcast quality ENG and production applications. All without compromise of quality or operational features. This remarkable battery or AC powered 15 lb. camera has full production control either remotely or at the backpack and all the key Philips engineering features. Famed 3 Plumbicon tube picture with bias light, beam-split prism, linear matrix for superb colorimetry, H and V contours, auto iris, auto white balance, genlock sync generator, switchable gain and gamma, built-in color bars. Also, remote VTR and zoom controls and 2 microphone channels. All this and more provide the utmost flexibility and economy for ENG, remote and studio production... and, we repeat, *without* compromise.

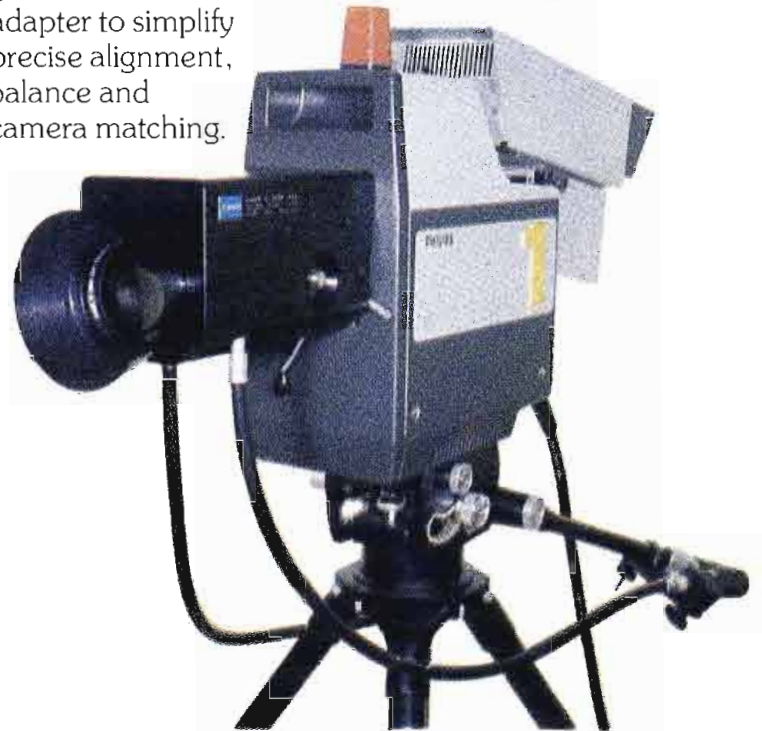
**The LDK 15.** The ultimate portable production camera.

Actually an LDK 5 in a portable package. Use it inside, outside, wherever. Operates in a self con-



tained mode or interfaces with either the LDK 5 or the LDK 25 CCU in system configurations with absolutely no compromise in performance. Triax, wireless and standard cable modes of operation.

**The LDH 20S.** The recognized leader in 3-tube economy cameras. Now with increased sensitivity and a greater selection of performance-oriented field interchangeable zoom lenses. The Philips patented prism beam-split optics and contours-out-of-green enhancement are included. Plus a new CLUE adapter to simplify precise alignment, balance and camera matching.



For more information or to arrange a demonstration, call your local Philips representative or contact: Broadcast Products, Philips Audio Video Systems Corp., 91 McKee Drive, Mahwah, N.J. 07430. (201) 529-3800.

# PHILIPS®

\*T.M. - N. V. PHILIPS

*The attendance at this year's NAB convention will probably be the largest ever. Exhibitors won't like the union's way of doing business, but the aisles will be crowded.*

# NAB

## Docks In Muddy Waters For '76 Convention

*It's back to the Windy City, and the portents are for a stormy convention. The question is whether or not the Association will broaden its battle lines.*



---

BY RON MERRELL

---

### **You Can't Please 'em All**

Some years ago a group of prominent engineers decided that it might be beneficial for their kind if a professional society could be formed that would focus on the needs of the professional broadcast engineer. Through their efforts, they formed what became known as the Society of Broadcast Engineers (SBE). And it has grown into just about what the charter members wanted.

Who did they pull away from? The IEEE, NAEB, or NAB? While it might be true that they pulled away from some association, it is more true to say that no association

has or is paying more attention to their everyday problems than the SBE.

But the hills and valleys of broadcasting have many special interest groups, and more crop up all the time. It follows that no one association could blanket the countryside and give equal time.

What about the FM segment. Once the weak sisters of radio, they've come into their own. So much so that today they represent the greatest growth area in over-the-air broadcasting. So they started the National Association of FM Broadcasters (NAFMB). Annually, they met immediately before, during, or after the NAB convention....and, in the same city. In the past year, that organization has become totally independent. They recently changed their name

to the National Radio Broadcasters Association (NRBA).

Now this caused more than a ripple among the NAB ranks. They got the spotlight when they planned a national convention at great distance in time and space from the NAB. Attendance was good and exhibitors cooperated.

But if the people who set up the NAEB, the NRBA, the SBE and other special interest groups were pulling away, wouldn't this weaken the NAB? And if the NAB were but a mere shadow of its former self, wouldn't that cause the industry to lose its bargaining and lobbying strength? The answers might seem to be, Yes, Yes!

Fortunately, that's not really what we're seeing. If these special interest groups threw out their memberships to NAB, it would be a



problem. But if you notice what's been happening, you see that the NAEB, SBE, and NRBA people still have memberships in the NAB, accept the Code, and attend conventions. And speaking of conventions, they attend in greater numbers now than they ever did before! What has happened is that these associations have gotten more people into the act, and as a result, they start attending one convention, then two. Ironic, isn't it.

Now the worst thing that could happen would be for the NAB to deny that special interest associations are needed and that their existence threatens the major umbrella association, the NAB. That, in itself, would open a chasm that might never be closed, with the greatest crunch falling on the NAB itself.

#### **More Services For Radio Members**

In late January, president Vincent T. Wasilewski outlined to the Radio Board of Directors of the National Association of Broadcasters a multifaceted program designed to provide additional services for its radio members.

He told the Board the new measures are part of an ongoing program that already has resulted in NAB "doing more for radio than any other organization by a margin of about 1,000 per cent."

Wasilewski announced the promotion of Charles T. Jones, Jr., NAB vice president and director of its Radio Information Office, to the newly-created post of vice president for radio affairs. He said Jones will act as NAB's radio ombudsman—the staffer who will serve as the

contact point for all radio members and who will devote full time and attention to all radio issues.

The president said the Radio Information Office also will be expanded and the Legal and Government Relations Departments will each designate a staff member as, respectively, radio legal affairs and radio government relations specialists. Valerie Waddelove was promoted to administrative assistant for RIO.

Wasilewski said NAB cooperation with the Radio Advertising Bureau during last year's Fall meetings proved very successful and plans now are well underway for broader participation by RAB and the Television Bureau of Advertising at the forthcoming NAB Convention in Chicago.

He also reported that feedback



**NAB president Vincent Wasilewski...** "doing more for radio than any other organization by a margin of about 1,000 percent."

from radio members shows they are "extremely pleased" with **RADIO-active**, NAB's new monthly publication for radio members.

Measures also are underway, he said, to improve communications and "work more closely" with state broadcaster associations. Among other things, state presidents and executive directors will be invited to fall meetings and conventions as NAB guests.

#### **All-Radio Legislation**

At the meeting, the Radio Board adopted a resolution reaffirming its support on legislation requiring that all radio sets costing more than \$15 be equipped to receive both AM and FM signals.

The resolution said that "the Radio Board of Directors reaffirms its endorsement of all-channel radio legislation and urges that strong efforts continue to effect the passage of such legislation. In addition, the Board recognizes and commends the free-enterprise programs in response to the urging of NAB made by such companies as the Chrysler Corp., Hertz, and others in providing all-channel receivers."

The Radio Board also urged NAB's Engineering Department to look into the possibility of establishing standards for radio receivers and urged the Federal Communications Commission to broaden its inquiry into television receivers to include radio sets as well.

In other actions, the Radio Board:

- Authorized establishment of a Radio Hall of Fame honoring individuals who have made outstanding contributions to the sound media. A four-member committee was appointed to carry the project forward. Members are Robert Hilker, Suburban Radio Group, Belmont, N.C.; Donald Jones, PSB Radio Group, Fond du Lac, Wis.; Len Hensel, WSM, Nashville, Tenn., and Sherril Taylor, CBS Radio, New York, N.Y.

- Authorized a \$30,000 study of the Future of Radio under the supervision of a committee to be named later.

- Returned to the Radio Code Board for further study a Code Board recommendation for a ban on advertising of fireworks for sale to the public.

- Heard a report by Bill Sims, Wycon Corp., Laramie, Wyo., chairman of NAB's new cable radio committee, on degradation and elimination of radio signals on cable systems, possible non-duplication protection, and the need for BMI and ASCAP fees on programs cable originates.

- Heard Taylor emphasize the importance of radio members supporting NAB's drive to prevent cable siphoning of free TV's programs.

The Joint Radio-Television Board, at an earlier meeting, adopted two new categories for

associate members—attorneys and consulting engineers. The dues structure provided calls for annual dues of \$250 for firms with from one to five persons; \$500 for those with six to 10, and \$750 for those with more than 10.

The Board also provided graduated increases for associate member equipment manufacturers with gross receipts of more than \$1 million annually. Those grossing between one and five million would pay \$1,250 a year; those grossing between five and 10 million would pay \$1,500, and those grossing over \$10 million would pay \$2,000.

#### **Headliners**

Richard E. Wiley, chairman of the Federal Communications Commission, and noted commentator Paul Harvey, will address the annual convention.

Wiley will address the joint radio-television luncheon Tuesday, March 23, and Harvey will speak at the radio luncheon on Monday, March 22.

#### **Pay TV Panel**

The NAB has announced the participants for the panel discussion "Pay TV: Will it Supplement or Supplant?" during a television session at its annual convention.

The panel at the Monday (March 22) afternoon session will be moderated by CBS newsman Mike Wallace.

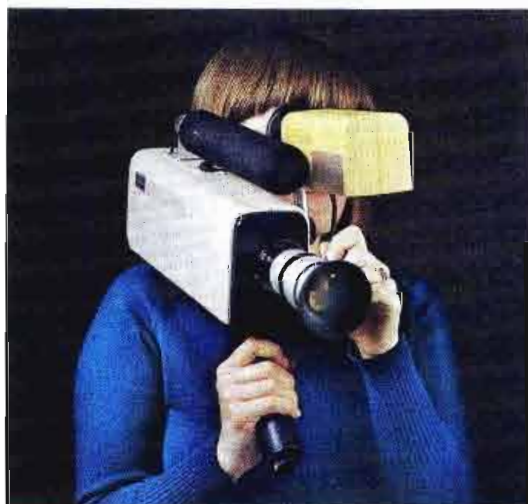
Panelists will be Everett H. Erlick, senior vice president and general counsel, ABC, New York; William Carlisle, NAB vice president for government relations, and former chairman of the Federal Communications Commission Frederick W. Ford. Ford is with the Washington, D.C. law firm of Pittman, Lovett, Ford and Hennessey. A fourth panelist will be announced later.

#### **Congress, Too**

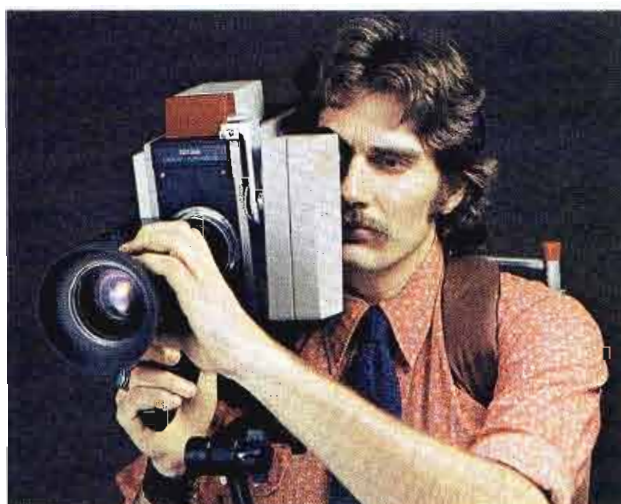
A member of the Senate Commerce Committee and two members of the House Committee on Interstate and Foreign Commerce, also will participate in the convention.

Speaking at Monday's (March

# Two Of Our Cameras Are Covering The News.



Hitachi FP3030



Hitachi SK-70

## The Third One Is News.

You're invited to the unveiling of our new Hitachi SK-80 portable ENG color camera at the NAB Show. The SK-80 is a totally self-contained camera whose exceptional design and features are sure to be appreciated by broadcasters.

While you're at our booth, also check out our existing SK-70 and FP3030 portable color cameras. The SK-70 is a modular system which can be converted easily from studio to field use, with superior performance in either mode. And the FP3030 is a light weight and low cost completely self-contained camera which is ideal for mobile video capability in ENG, as well as a variety of educational and industrial applications.



Hitachi SK-80

Come get the scoop on ENG cameras at the Hitachi booth.




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# CANON ANNOUNCES THE ULTIMATE STUDIO LENS



	<b>PV18x12B2</b> (for 1 1/4"/25mm Plumbicon*)	<b>P18x16B2</b> (for 1 1/4"/30mm Plumbicon)
Focal length with 1.5x range extender	12-216mm	16-288mm
with 2x range extender	18-324mm	24-432mm
Maximum relative aperture	1:1.6 (f=12-172mm) 1:2.0 (f=216mm)	1:2.1 (f=16-230mm) 1:2.7 (f=288mm)
Zoom ratio	18x	18x
Image format covered	12.8 x 9.6mm; 16.0mm dia.	17.1 x 12.8mm; 21.4mm dia.
Minimum object distance from front vertex	0.7m (27.6")	0.7m (27.6")
Object dimension at minimum object distance: Wide:	103.2 x 77.4cm; 129.0cm diameter	
Tele:	5.3 x 4.0cm; 6.7cm diameter	
Back focal distance	62.65mm (in air)	78.08mm (in air)
Glass compensation	69.2mm (BK7)	70.2mm (BK7)
Wavelength range for color correction	400-700nm	400-700nm
Weight	17kg (approx. 37 lbs.)	17kg (approx. 37 lbs.)
Dimensions	466.5mm length x 284mm width x 260.5mm height	
Focus and Zoom control	Manual, with plug-in interchangeable servos	
Range extender control	Plug-in servo / manual.	

\*TM N.V. Philips of Holland

The new Canon 18x series for major broadcast cameras. With the best relative aperture, superior wide angle and shorter M.O.D. Choice of manual or servo focus and zoom. Built-in servo/manual operated 1.5x and 2x extenders. And interchangeable, plug-in servo modules, for easier service. All at a competitive price.

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Canon Amsterdam N.V., Industrial Products Division De Boelelaan 8, Amsterdam, Netherlands



*NAB '76 should see the largest number of exhibitors ever scheduled for the annual convention. Hot items will be the EBS equipment and ENG key and support equipment.*

22) afternoon television session will be Senator Vance Hartke (D-Ind.), who also is on the Communications Subcommittee.

Scheduled for Tuesday morning's radio session is Torbert H. Macdonald (D-Mass.), chairman of the House Communications Subcommittee. Broadcasters attending that morning's television session will hear Lionel Van Deerlin (D-Calif.).

### **The Union of '76**

The convention site is Chicago, and what's going to happen to exhibitors there may well go down in history as the great American ripoff. I mean, can you believe that the exhibitor will have to pay for a carpenter to uncrate his exhibit equipment? That he must have an electrician to hook up all connections (even though he won't have the

foggiest notion of what he's doing)? Or that it may take someone from the upholsterer's union and the carpenter's union to get a curtain stapled back or a sign put up?

Now while the NAB is running, Chicago will be flooded by attendees of the Chicago Flower and Garden Show. And their numbers will make the NAB look mighty small. Chances are mighty small that the manufacturers will stand for a repeat of NAB-Chicago!

Despite the predictions of even more innovative and exciting new products coming from the horn of plenty at NAB convention time, the star in the spotlight will be the latest version of two-tone Emergency Broadcast System (EBS) equipment.

As everyone admits, there has been some confusion about who

must have what. More importantly, when. Well, the deadline stands at April 15. If it's fair game to second-guess the FCC, you'll have to admit that it's hard to imagine the **entire** industry having bought and installed the new equipment in time to meet the deadline. With this in mind, the FCC may allow—in some districts—an extra week or so.

Admittedly, second-guessing the FCC is risky, at best. Inspection interpretations are not always consistent. They never have been and they probably never will be. So while some RI's may turn their backs today, they'll be back tomorrow. If you haven't already made the purchase, it's time to get moving. And the NAB convention will be a great place to shop and compare. (Continued on page 32)

# Ampex, the first word in VTRs, announces the last word in cameras.

## Overnight, BCC-1 made your camera obsolete.

BCC-1 is a new state-of-the-art in color cameras.

We predict it will become the new standard of the world, because it was designed from the floor up to be the **now** camera. To fill the **now** needs of working broadcasters.

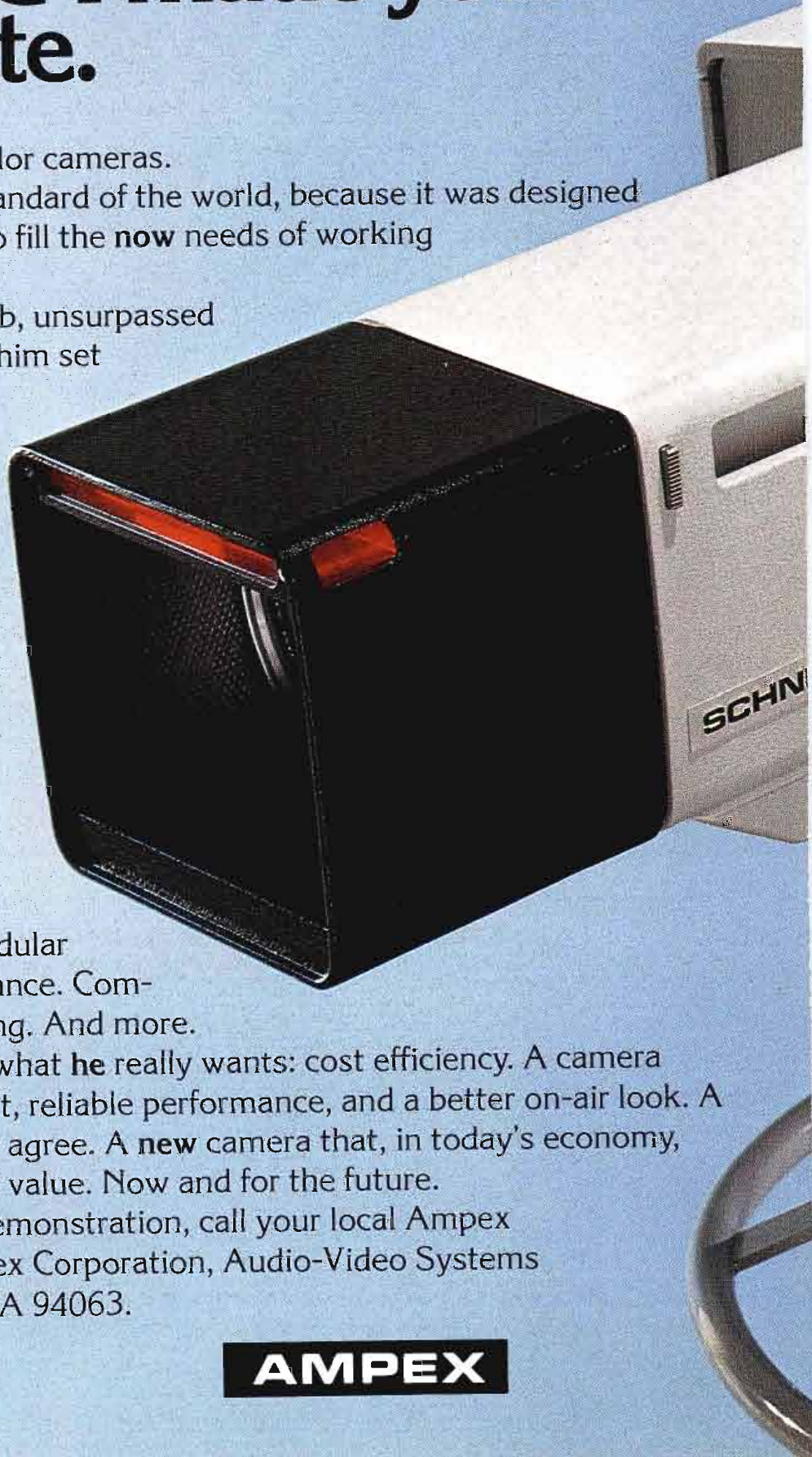
Now the director can count on superb, unsurpassed picture quality. Operational flexibility lets him set up and shoot, in the studio or in the field, in minutes. New convenience features give him better creative control of his cameraman and his picture.

Now the cameraman can claim a camera for his own—"the cameraman's camera." Because the BCC-1's maneuverability makes his work faster, easier, more efficient. Like a tiltable, rotatable viewfinder. A return viewfinder feed. New digitized intercom.

And now the engineer can smile again. About picture quality from 1" Plumbicon\* tubes. 1000 hour reliability. Ruggedized construction throughout. Modular design for accessibility and easy maintenance. Computer-matched yokes. Automatic centering. And more.

And now, finally, the manager gets what **he** really wants: cost efficiency. A camera unprecedented for rugged, stable, efficient, reliable performance, and a better on-air look. A camera on which all of his key people can agree. A **new** camera that, in today's economy, adds up to the **only** choice for investment value. Now and for the future.

See why. See it for yourself. For a demonstration, call your local Ampex Broadcast Sales Engineer, or write: Ampex Corporation, Audio-Video Systems Division, 401 Broadway, Redwood City, CA 94063.



\*Trademark N.V. Philips

**AMPEX**







**FCC Chairman Wiley** will be on hand, along with other Commission members. As usual, there will be fire and counter fire.

### **A Plea From NAB**

The NAB did ask the Commission to delay their deadline date by at least six months. Meanwhile, of course, a goodly number of stations already had purchased the new EBS equipment.

From the manufacturer's point of view, they had pushed to design and build the new EBS equipment to meet the deadlines. And one of their major objections to delaying the deadline (after all they would sell their units anyway) was that if the deadline weren't firm, the industry would maybe be only half ready to handle an EBS problem should it occur on April 15 or any other day shortly thereafter. Then too, from their point of view, it would have been a lot easier to promote their equipment over time, as well as to run it down the line, wring it out, and deliver.

In its filing, NAB said that since the system was adopted on December 5, 1974, stations have been asking what the cost of new equipment would be. Answers ranged from \$100-\$700, and also that the government would issue a schematic

which would enable station engineering personnel to build the required units for as little as \$50.

"As a result," NAB said, "most stations chose to ignore the initial commercial units which were placed on the market in the \$300-\$700 range."

Finally, in August of this year, the Commission decided to require type acceptance of encoders and the idea of do-it-yourself units was no longer a practical consideration.

Questions were raised as to why all stations should be required to install the transmitting equipment, rather than just a few. Commission personnel conceded the merit in such questions and suggested the real possibility of a further extension of the effective date.

NAB also said "it is an industry composed of hundreds and possibly thousands of radio stations whose role as transmitters of the two-tone signal would be redundant to the point of absurdity. These latter stations should not be required to purchase equipment only to find later that their role as transmitters is superfluous."

### **Plan Your Time And Interest**

You'll notice that on page 33 we included a four-section map of the convention exhibit area. Also, on page 48 we have included a list of manufacturers, their booth numbers, new products, and their hotel.

The key to using your convention time wisely is to mark the maps to indicate (from these special sections) those manufacturers you'll want to be sure to visit.

### **The FCC's View**

Meanwhile, the Commission said NAB failed to provide supporting data for its claim that stations, on notice for more than eight years of impending changes, would be affected adversely by the new system. In addition it said the EBS two-tone system's primary purpose is for inter-station signalling between broadcast stations rather than as home warnings, all references to which were deleted in 1972 when any use of inter-station signalling by the general public was put on a secondary basis.

The FCC said that while it did not wish to discourage public monitoring, it was imperative that the two-tone system become operational to improve inter-station signalling.

### **More On Home Brew**

The Commission pointed out that a station licensee who constructed not more than five encoders or decoders for his use at one station location and did not offer them for sale need not submit the fees required with certification and type acceptance applications but still must obtain formal type acceptance and certification from the FCC.

Since a conscientious licensee would assure that the station-built equipment was thoroughly tested before installation and use, the Commission said the only additional requirement was that they submit test results to the FCC.

The Commission said the requirement that all broadcast stations, with the exception of noncommercial educational FM's with 10 watts or less power, be equipped with the two-tone system was intended to ensure adequate inter-station signalling under the most adverse national, regional or local

*(Continued on page 38)*

# BROADCAST ENGINEERING

## McCormick Place Locator Guide

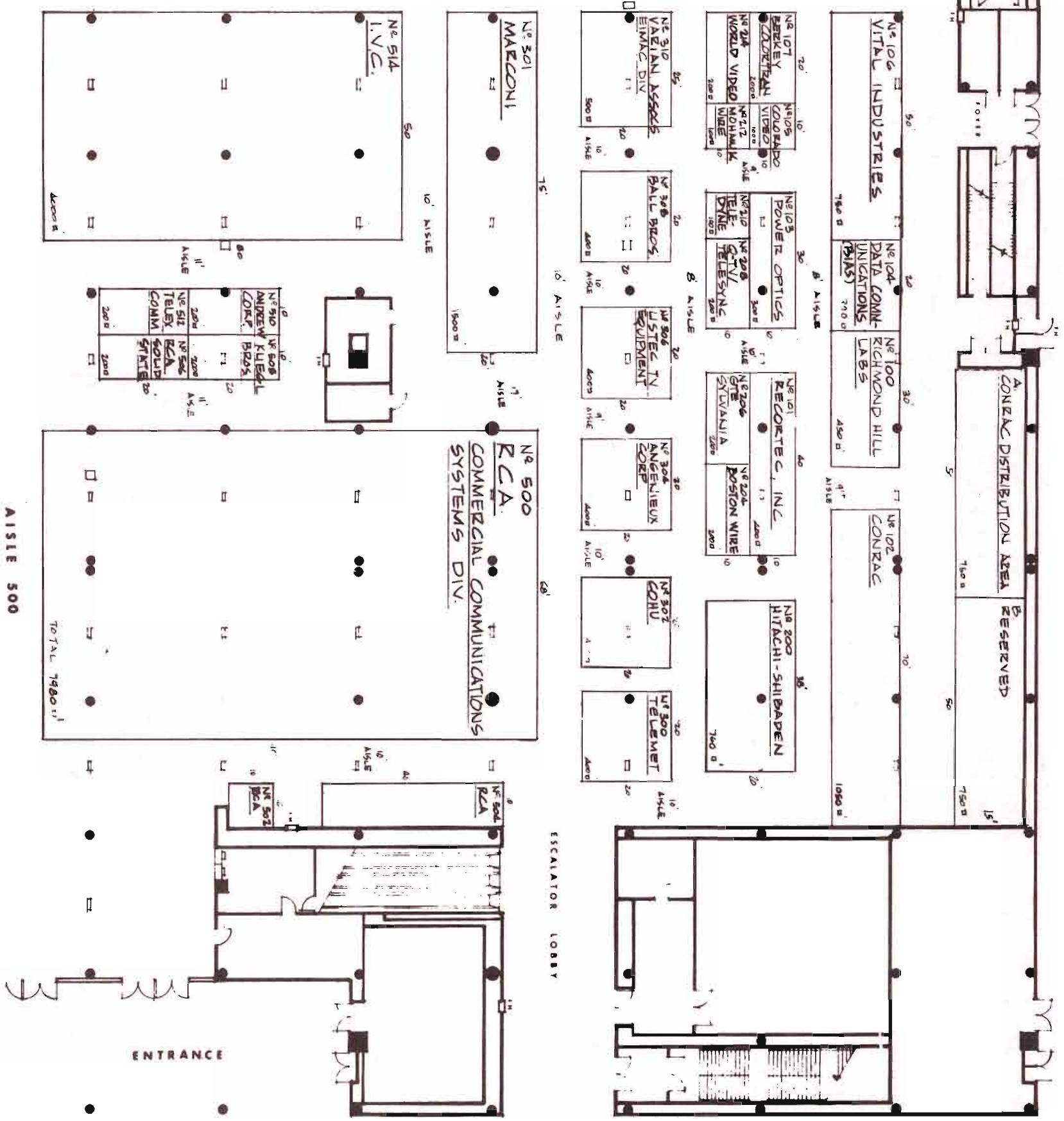
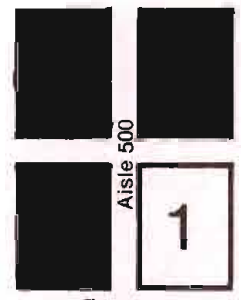
**Section 1 Exhibitors**  
 Andrew Corp.-510  
 Angenieux Corp.-304  
 Ball Bros.-308  
 Berkey Colortran-107  
 Boston Wire-204  
 Coahu-302  
 Colorado Video Inc.-105  
 Conrac-102  
 Data Communications (BIAS)-104  
 GTE Sylvania-206

Hitachi-Shibaden-200  
 International Video Corp. (IVC)-514  
 Kliegl Bros.-508  
 Listec TV Equipment-306  
 Marconi-301  
 Mohawk Wire-212  
 Power Optics-103  
 Q-TV/Telesync-208  
 RCA-502 & 504  
 RCA/Commercial Communications Systems Div.-500

RCA Solid State-506  
 Recortec, Inc.-101  
 Richmond Hill Labs-100  
 Teledyne-210  
 Telemet-300  
 Telex Communications-512  
 Varian Assoc., Eimac Div.-310  
 Vital Industries-106  
 World Video-214

**Section 2 Exhibitors**  
 AEL-601

Alford Mfg.-503  
 Ampex-513  
 Ampro Corp.-812  
 Audio Designs-511  
 Barco US Div., Kallman Assoc.-600  
 Belar Electronics Lab.-509  
 Bird Electronics-705A  
 Broadcast Electronics Inc.-507  
 Broadcast Programming Intl.-803  
 CCA-602



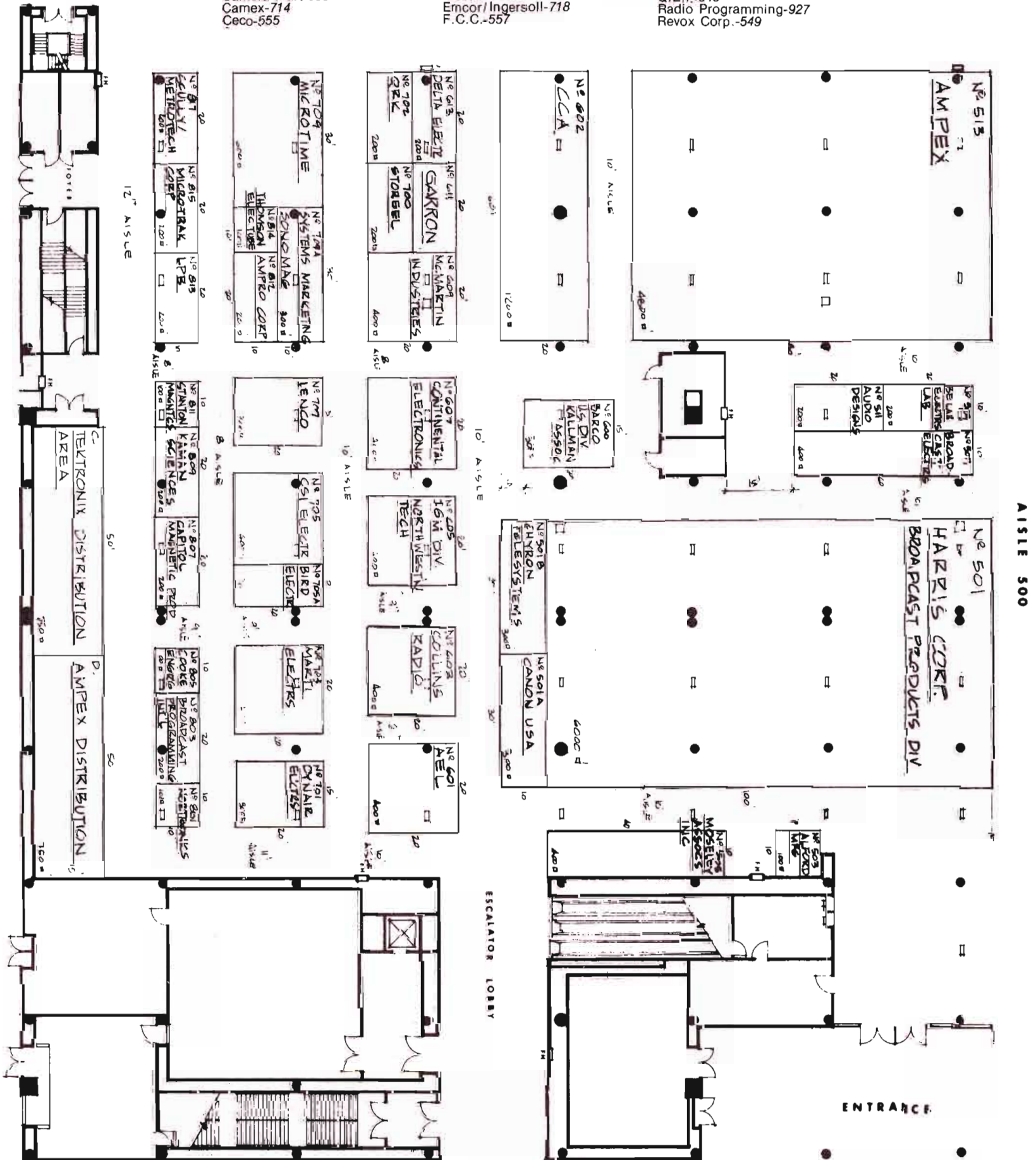
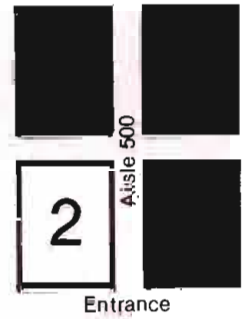
Canon USA-501A  
 Capitol Magnetics-807  
 Chyron Telesystems-501B  
 Collins Radio (Rockwell Int'l.)-603  
 Continental Electronics Mfg.-607  
 Cooke Engineering-805  
 CSI Electronics-705B  
 Delta Electronics-613  
 Dynair Electronics-701  
 Garron Electronics-611  
 Harris Corp., Broadcast Products Div.-501  
 IGM-605  
 Kaman Sciences-809  
 Lenco-707  
 LPB-813  
 Marti Electronics-703  
 McMartin Industries-609  
 Microtime Inc.-709

Micro-Trak Corp.-815  
 Moseley Assoc. Inc.-505  
 Nortronics-801  
 ORK-702  
 Scully/Metrotech-817  
 Stanton Magnetics-811  
 Storeel-700  
 Systems Marketing Corp. (Sonomag)-709A  
 Thomson Elec. Tube-814

**Section 3 Exhibitors**  
 Akai America-545  
 Alan Gordon Enterprises-925  
 Amco Engineering-827  
 Army Recruiting-721  
 Asaca-614  
 Audi-Cord-922  
 Audio Services Inc.-821  
 Auditronics Inc.-804  
 Automated Processes-711  
 Beston Electronics-616  
 Beta Technology-629  
 Cablewave Systems Inc.-710  
 Camera Mart-935  
 Camex-714  
 Ceco-555

Cetec Corp. (Sparta Corp., Jampco Antenna, Cetec Audio, Vega, Schafer Electronics)-615  
 Cetec Audio (Cetec)-615  
 CMX Systems (Orrox Corp.)-606  
 Commercial Electronics Inc. (CEI)-519  
 Computer Image-627  
 Computer Magnetics Corp.-543  
 Comrex Corp.-831  
 Consolidated Video Systems (CVS)-547  
 Control Design Corp.-706  
 Cox Data-604  
 Dielectric Communications-808  
 Dipol-835  
 Drake-Chenault-806  
 Eastman Kodak Co.-521  
 Edutron-928-30  
 Electron Divers-816  
 Electro-Voice Inc.-802  
 Emcor/Ingersoll-718  
 F.C.C.-557

Fernseh Group, Robert Bosch-610  
 Film Treat-924  
 Fujinon Optical-541  
 Grass Valley Group-517  
 Industrial Sciences Inc.-539  
 Jampco Antenna (Cetec)-615  
 McCurdy Radio-704  
 Memorex-537  
 Charles Michelson-923  
 Micmix-829  
 Micro-Consultants-926  
 Micro-Probe-918  
 Mincom Div., 3-M-529  
 Minneapolis Magnetics-825  
 Nagra Magnetics-708  
 National Guard-819  
 O'Connor Engineering-916  
 Orrox Corp. (Videomax and CMX Systems)-606  
 Pacific Recorders-717  
 Pentagon Industries-621  
 Phelps Dodge-625  
 Potomac Instruments Inc.-523  
 Q.E.I.-943  
 Radio Programming-927  
 Revex Corp.-549



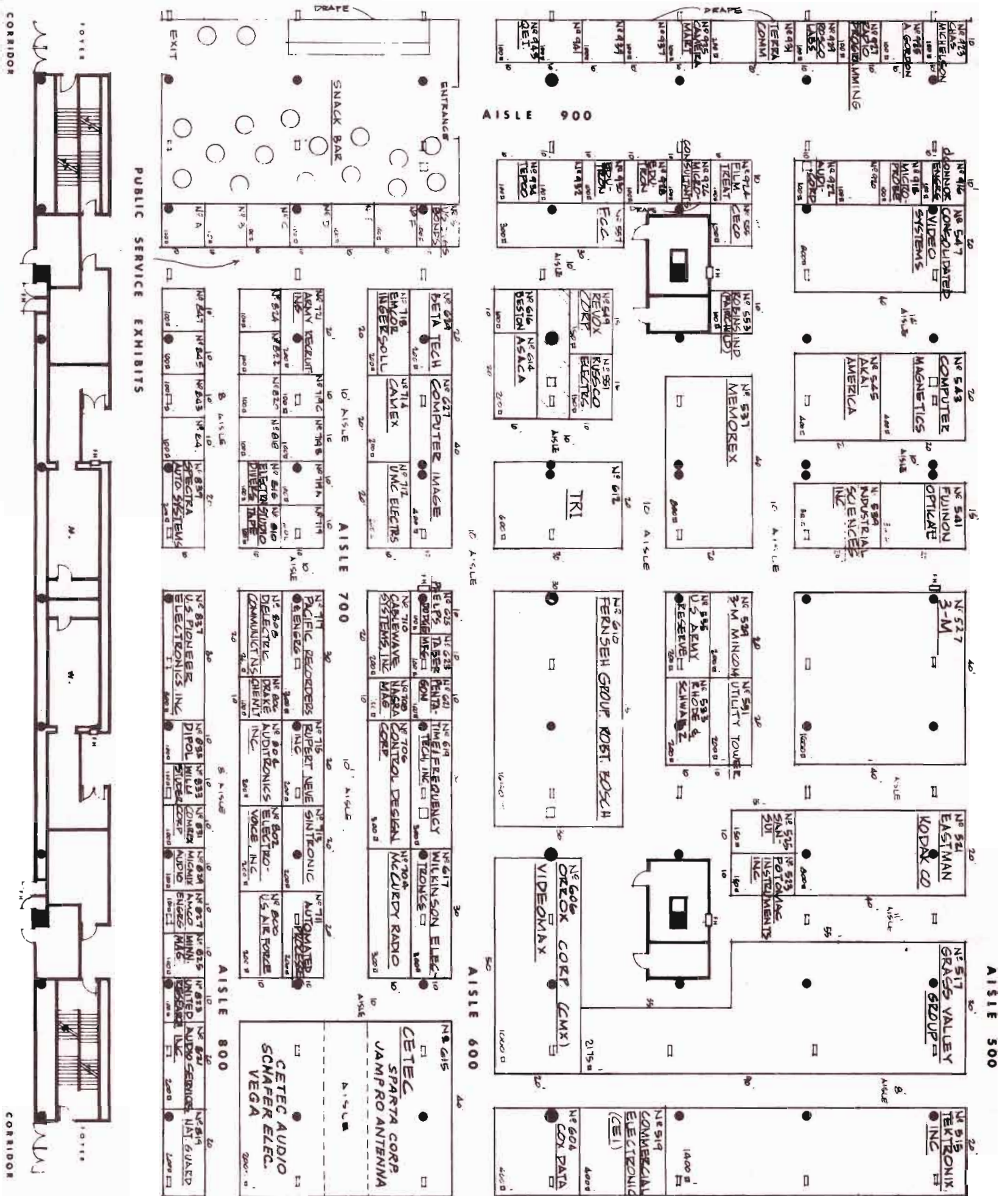
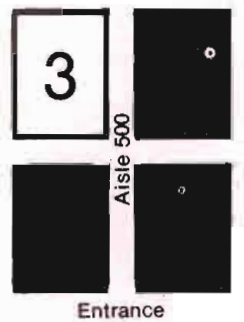
Rhode & Schwarz-533  
 Robins-Fairchild-553  
 Rosco Labs-929  
 Rupert Neve-715  
 Russco Electronics-551  
 Sansui-525  
 Schafer Electronics  
 (Cetec)-615  
 Sintronic-713  
 Sparta (Cetec)-615  
 Spectra Automation  
 Systems-839  
 Studio Tape Exchange-810  
 Taber Mfg.-623  
 Tektronix Inc.-515

Television Research Int'l.  
 (TRI)-612  
 Tepeco-934  
 Terracomm-931  
 3-M-527  
 Time & Frequency  
 Technology-619  
 UMC Electronics-712  
 US Air Force-800  
 US Army Reserve-535  
 U.S. Pioneer Electronics-837  
 United Research-823  
 Utility Tower-531  
 Vega (Cetec)-615  
 Videomax (Orrox Corp.)-606

Wilkinson Electronics-617  
 Willi Studer-833

**Section 4 Exhibitors**  
 Acrodyne Industries-109  
 American Data Corp.-403  
 Anixter Mark-130  
 Arvin Echo-316A  
 Atwood Richards-915  
 Central Dynamics Corp.-518  
 Cine Co.-913  
 Cinema Products-406  
 Communications  
 Technology-232  
 Comquip-226

Convergence Corp.-317  
 Corning Glass-116  
 Data Disc-112  
 Datatek Corp.-313  
 Datatron-409  
 Digital Video Labs-305  
 Dynasciences-400  
 E & O-315  
 Eigen Video-906  
 Electrohome Ltd.-311  
 Electronics, Missiles &  
 Comm.-314  
 ESE-122  
 Farinon Electric-110  
 Fidelipac/Telepro-405

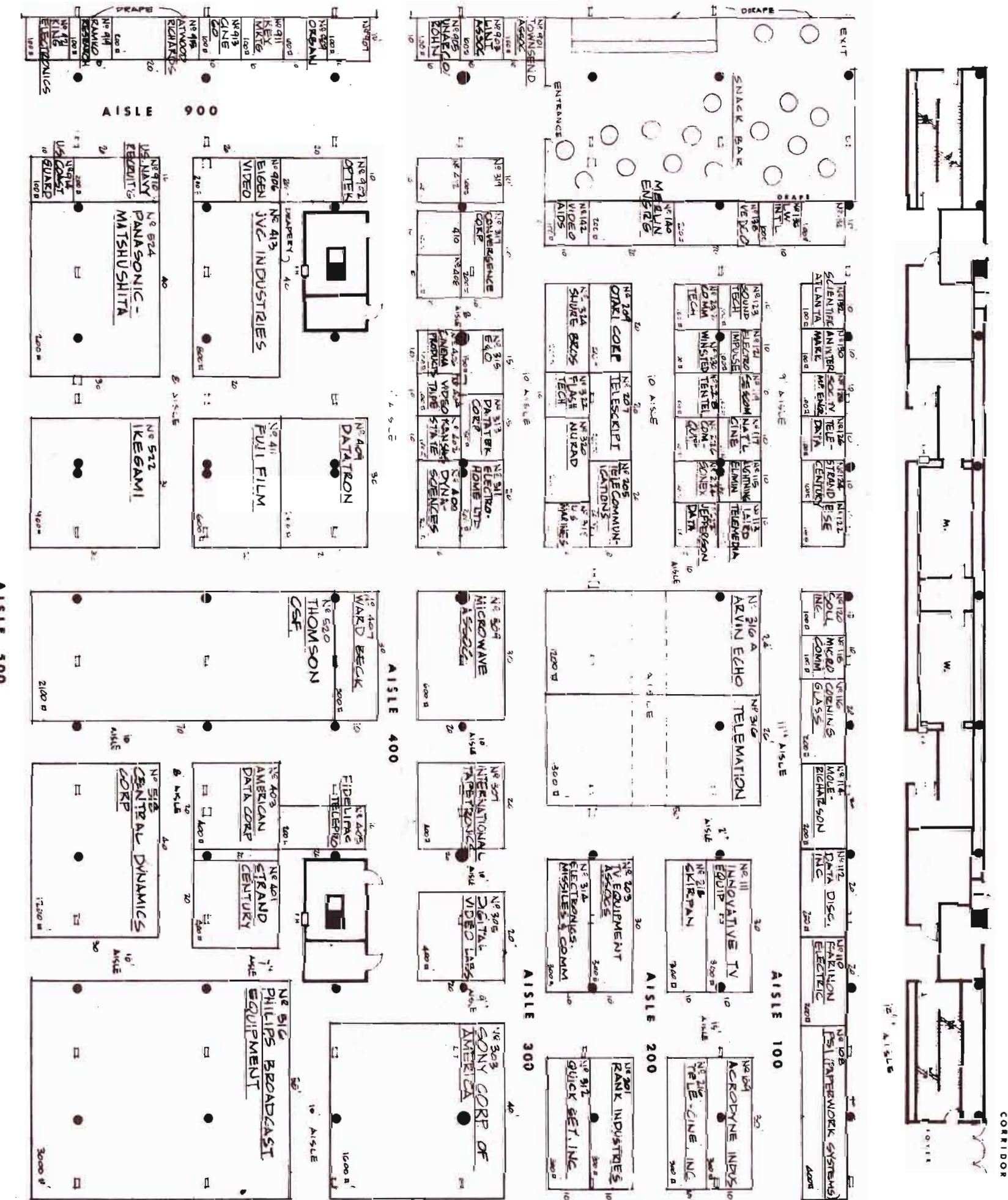
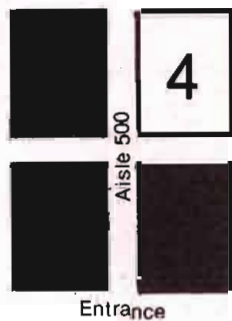


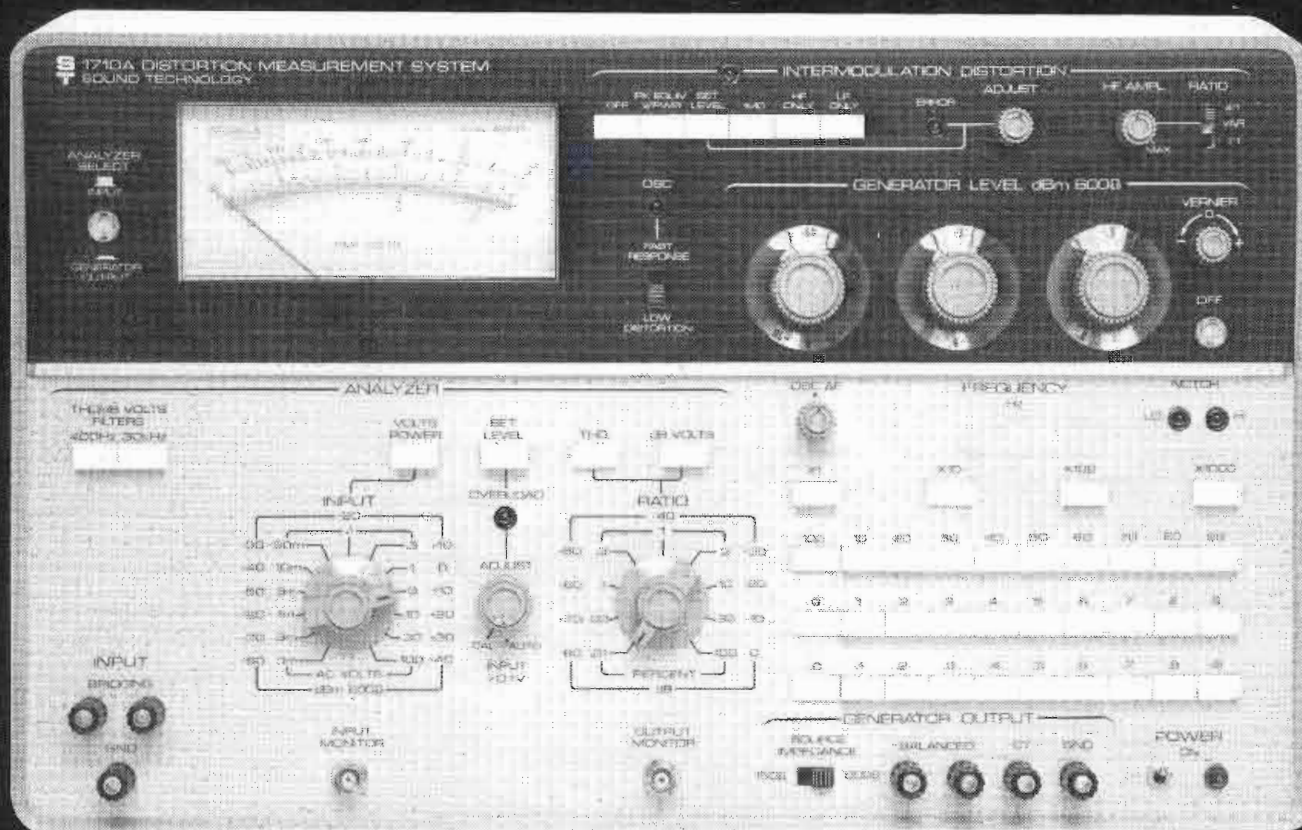
Flash Technology-322  
 Fuji Film-411  
 Ikegami-522  
 Innovative TV Equip.-111  
 International Tapetronics-307  
 Jefferson Data-222  
 JVC Industries-413  
 Kansas State Network (KSN)-402  
 Key Mktg.-911  
 Kings Electronics-921  
 Laird Telemidia-113  
 Lightning Elim.-115  
 Lint Assoc.-903  
 L-W Int'l-136

Merlin Engineering-140  
 Micro Communications-118  
 Microwave Assoc.-309  
 Mole-Richardson-114  
 Nat'l. Cine-117  
 Nurad-320  
 Optek-902  
 Orban-909  
 Otari Corp.-209  
 Panasonic-Matshushita-524  
 Philips Broadcast Equipment-516  
 PSI-708  
 Quick-Set, Inc.-312  
 Ramko Research-919

Rank Industries-201  
 Scientific Atlanta-132  
 Sescam-119  
 Shure Bros.-324  
 SMPTE-128  
 Soil Inc.-120  
 Sonex-224  
 Sony Corp. of America-303  
 Sound Tech-123  
 Strand Century-401  
 Tele-Cine, Inc.-216  
 Telecommunications Int. Ltd.-205  
 Teledata-126  
 Telemation/NEC America-316

Telescript-207  
 TV Equipment Assoc.-203  
 Tentel-228  
 Thomson CSF-520  
 Townsend Assoc.-901  
 Unarco/Rohn-905  
 US Coast Guard-914  
 US Marines-318  
 US Navy Recruiting-910  
 Vedco-138  
 Video Aids Corp. of Colorado-142  
 Video Tape Co.-404  
 Ward Beck-407  
 Winsted-230





# Your new automatic distortion measuring system for balanced measurements

## REDUCED OPERATOR ERROR

Here's something you'll like — Sound Tech's new distortion measuring instrument for use in balanced work.

The new 1710A is much more than just a distortion analyzer. It's a system.

It contains its own ultra-low-distortion generator tracked with the analyzer. It's a system that greatly simplifies measuring — gives you fast measuring with simple operation that reduces operator error.

For example, push the frequency buttons and you set both generator and analyzer. Push "Distortion" and you have your reading. Automatically. No slow, tedious manual null-searching.

Features in the new 1710A include:

- a balanced, floating output (600/150 ohms)
- a balanced (bridging) input
- a high-level +26 dBm signal

- +26 to -90 dBm attenuator
- distortion measurements to .002%
- fast 5-second measuring speed
- automatic nulling, optional automatic set level.
- both harmonic and optional intermodulation distortion measurements.

## SPECIAL OUTPUT CIRCUIT

In the 1710A you get a transformerless audio generator output that's balanced and floating. No transformer means no transformer distortion. Floating *and* balanced means you can connect to virtually any audio circuit regardless of configuration. And you can set the output from +26 to -90 dBm in 0.1 dB steps.

## FAST, SIMPLE MEASURING

Automatic nulling and the automatic set level option (ASL) give you ex-

remely fast measuring and little chance for operator error. You can measure in 5 or 6 seconds. *With ASL you can measure distortion vs. frequency, and distortion vs. voltage or power without resetting level.*

## IM OPTION

An additional optional bonus is that the 1710A also measures intermodulation distortion. After you've made a harmonic measurement, just push the "IMD" button. In 3 seconds you'll have the IM reading. With this option you'll be ready for future IM requirements.

## CALL/SEND NOW FOR LITERATURE

It's worth while getting the information on this major new distortion measuring system. Call Larry Maguire or Bob Andersen now and get our new product brochure. It's ready and waiting.

**S** SOUND TECHNOLOGY  
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CAMPBELL, CALIFORNIA 95008  
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(Continued from page 32)

emergency conditions. It said to restrict the two-tone transmission capability, as suggested by the NAB, would leave the EBS vulnerable and diminish its flexibility and diversity.

In November 1974, the Commission amended its rules to substitute a two-tone signalling system (a transmission with two audio tones) for the carrier-break (two five-second breaks followed by a 1000 Hz tone for 15 seconds) attention system then in use.

In an order released August 11, 1975, the rules were amended to provide type acceptance and certification parameters that the new EBS attention signal equipment must satisfy before it could be used at broadcast stations. The same order extended the original starting date of January 15, 1976, through April 15, and exempted noncommercial educational FM stations with power of 10 watts or less from installing the encoder.

(Type acceptance and certification are two of three equipment approval procedures used by the FCC. Type acceptance is granted

after a review of data submitted to the FCC by an applicant. Certification means that the manufacturer or user has filed a report of measurements to show that the equipment complies with FCC technical rules.)

In seeking a delay of at least one year, the Louisiana Broadcasters said the required equipment was in short supply, the cost of purchase would be burdensome to many small market stations, and insufficient time had been spent in studying the actual need and effectiveness of the new devices.

The FCC replied that 14 equipment suppliers had received equipment type acceptance or certification for EBS attention signal encoders and decoders. It said these suppliers had a combined capability to manufacture and deliver an adequate supply of encoders or decoders by April 15 and, therefore, it could not foresee any problems regarding availability of equipment by that date.

The Commission said one factor that delayed earlier implementation of the two-tone signal was the high

costs of the then-available equipment. However, it said, advances in solid state technology had made it possible to produce acceptable equipment at lower costs.

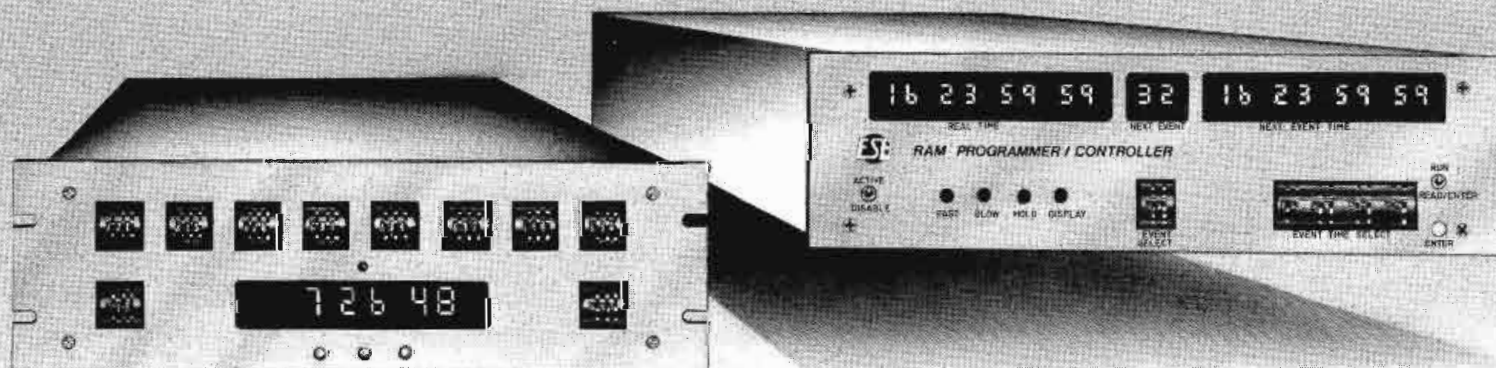
The FCC said manufacturers now indicated prices ranging as low as \$195 for a combination encoder/decoder and therefore, the cost now was neither exorbitant nor prohibitive.

The Commission noted that in 1967 it issued two public notices that emergency broadcast receivers then in operation might become obsolete when a new, improved alerting signal went into operation.

It said equipment then being supplied to public institutions such as schools and hospitals was designed to respond to the carrier-break attention signal which then, as now, was used primarily for inter-station signalling purposes, and such equipment carried no official approval.

The Commission noted that the notices stressed that a two-toned signal technique was being developed and was expected to prove superior to the two-tone signal. □

# PERFECT TIMING



## Programmer/Comparators and Controllers

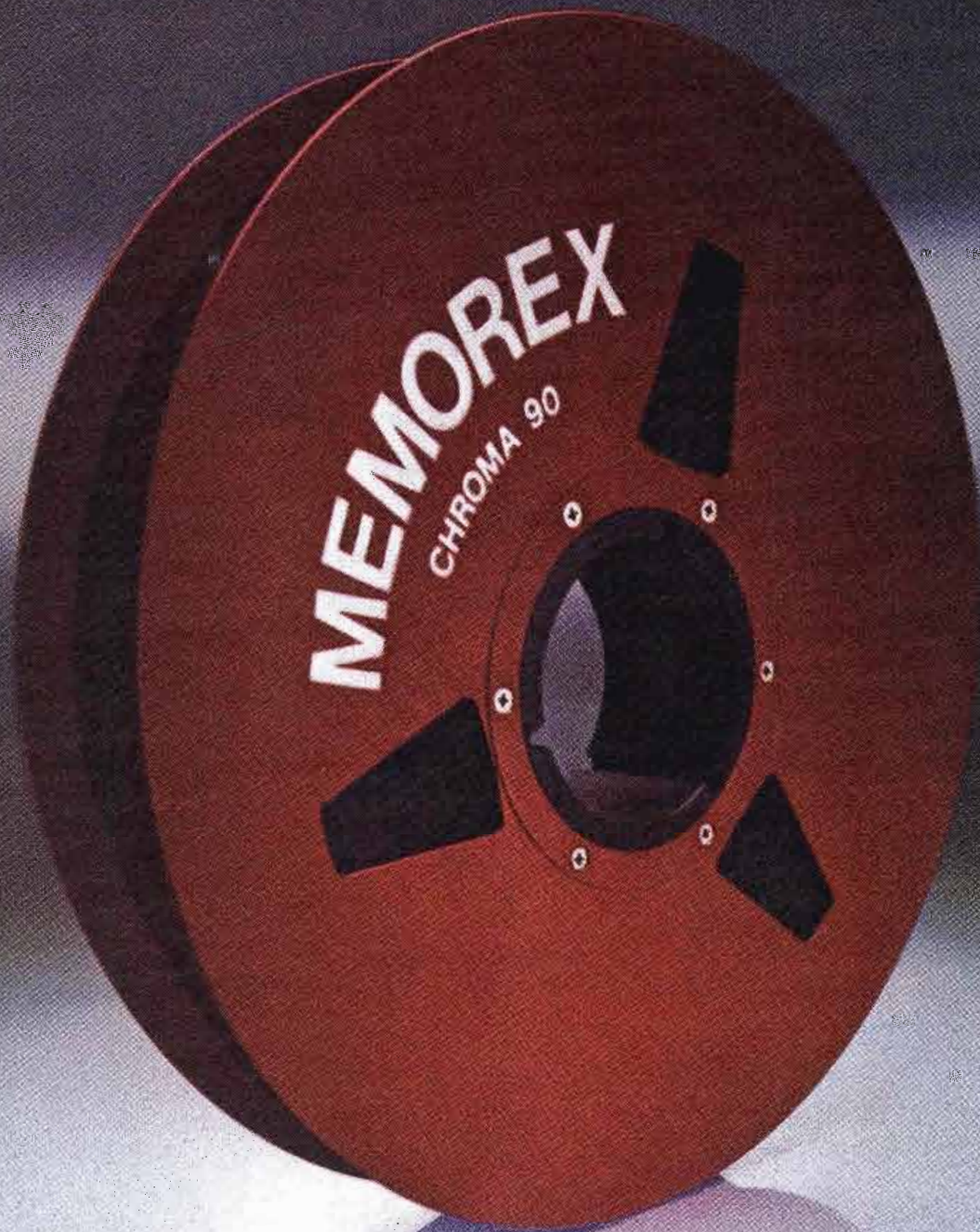
Whether your station is based in New York, Honolulu or anywhere in between, perfect timing of programs, station breaks and commercials is essential. To meet your exacting timing requirements ESE now offers two precision timing systems. For flexibility and economy with up to ten events, ESE has designed the 750 Series of Programmer/Comparators. Rugged thumbwheel programmers coupled with an ESE clock or timer to provide a single pole contact closure (1 Amp contact rating) for the length of time program matches display. Low on cost, the reliable Programmer/Comparators start at \$305. Write, Wire or Call Today: 505½ Centinela Avenue



When you want to program more than ten events, consider the ES 780 Series of Programmer/Controllers: A Solid State Random Access Memory united with an ESE clock or timer to provide 32 user-programmed outputs. Ten minutes is all you need to program all 32 events. Manual override and ten second re-programming provide maximum flexibility. All this in 5¼ inches of rack space! Internal crystal time-base and battery pack are standard features. Four digit, 32 event units are \$1,200. and Eight digit, 32 event units are \$1,500. Custom options and special orders are available. Inglewood, California 90302 • (213) 674-3021



**After you've spent thousands on the production, the tape better be good.**



And if it's Memorex Chroma 90, it is.

In fact, Memorex Chroma 90 Broadcast Video Tape has an image quality so crisp and clear, we dared test it against a live picture on a closed circuit TV monitor. Even the Broadcast Engineer we challenged couldn't tell if the picture he was watching was live or on Memorex Chroma 90.

That's the kind of consistency you need in a tape today. And every day.



**MEMOREX CHROMA 90.**

Reproduction so true, we can ask, "Is it live, or is it Memorex?"

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# NAB product review

Since the flood of new products often is the biggest story coming out of the NAB convention, we're kicking off our products section up front. You'll see here a sampling of products that will be on display in the exhibit area, mostly for the first time.

And, you'll note that we are including a circle number with each item. In this way, you can circle the appropriate number on our Reader Service Card and get further information. So even if you don't make it to the convention, you can have about all the information you will need for your own product files.

As expected, the halls will be crowded with two hot items: emergency broadcast equipment and ENG packages. And speaking of EBS, Broadcast Engineering Techniques now has type approval by the FCC. Since the April 15 deadline for installation of the EBS equipment still stands, buying should be brisk.

But it's the ENG and LIVE areas that will show most of the new equipment. There will be new

cameras, maybe even a few new recorders. The approach will be to make the equipment lighter, easier to operate, and editing equipment even more practical. There should be a lot of new support equipment.

Even if your interest doesn't lie in EBS or ENG equipment, there will be plenty new to see. Antennas continue to change, as well as transmitters. Even automation will have some new, interesting wrinkles.

## Hand-held Color Camera

A versatile "take-it-anywhere" hand-held camera for professional quality video productions is now available from the Broadcast Equipment Division of **Philips Audio Video Systems Corp.** Known as the Philips LDK-11, the camera has many features which make it ideal for a wide variety of on-site television assignments, such as electronic news gathering, local station commercial productions, documentaries and special events.

For maximum flexibility, the LDK-11 may be either battery or

AC powered. The system design permits operation of the camera either as a fully self-contained portable unit, or as a cable-connected, remote-controlled camera when integrated with additional cameras in a multi-unit studio or field pickup.

Compactly constructed, the LDK-11 camera head with lens weighs only 15 pounds. It contains three  $\frac{2}{3}$ -inch Plumbicon pickup tubes and integral bias light to minimize lag at low light levels. Augmenting pickup quality is a patented beam splitting prism which Philips claims provides high quality pictures compatible in colorimetry with studio cameras. For added operating efficiency, it is equipped with automatic white balance and automatic iris.

Equally lightweight, the 19-pound backpack not only has been designed for wearer comfort, but also to give the cameraman immediate and easy access to all necessary operational controls. The pack produces a fully processed encoded signal, including contour enhancement. It contains provisions for connection of two commentator microphones and a composite interface connector to connect all necessary signals to the remote control unit or an associated VTR.

In all modes of operation, the camera system can be genlocked to an external signal either at the backpack or the remote control unit.

To provide the cameraman with maximum accessibility to key controls, the LDK-11 camera contains fingertip controls for VTR stop/start, motorized zoom and servo iris, auto/manual exposure, auto/manual white balance, external viewfinder video monitoring, and a four-position filter wheel.

For More Details Circle (151) on Reply Card

## Pro Recorders

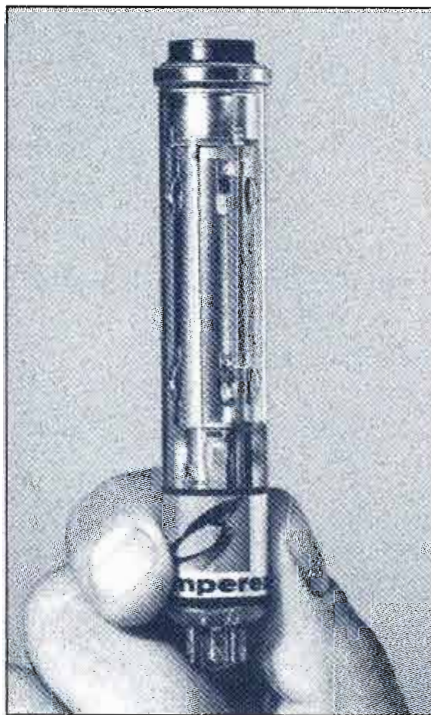
**OTARI Corporation** will introduce several improved models of its professional recorder line. These



***Regardless  
of who made your  
2/3-inch Plumbicon\* TV camera,  
or where it was made—  
Amperex has the exact replacement  
for the tube  
that came with the camera.***

We know this tube as only its originator *can* know it. You can take our word for it...*there is only one Plumbicon*. And no matter where your Plumbicon camera comes from, whether it's a full-sized studio camera or one of the new hand-held portables... Amperex has the replacements for your equipment that will give you equal or better performance compared to any tube that came with the camera.

There *is* this difference. Amperex replacement tubes are immediately available, off-the-shelf,

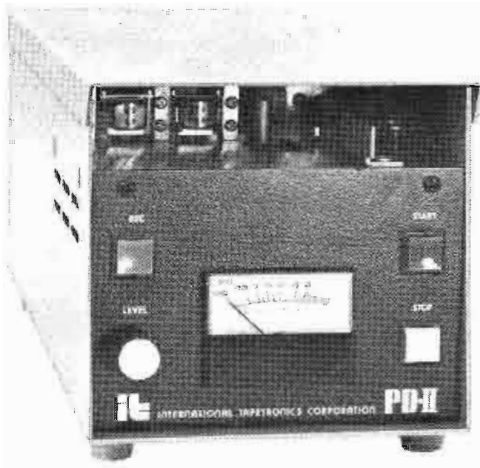


for delivery within 24 hours through local distributors and Amperex factory sales representatives. And Amperex tube distributors (your own local businessmen), are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and on-the-spot customer service.

For more information on Plumbicon TV camera tubes, write or phone: Electro-Optical Devices Division, Amperex Electronic Corporation, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.



\*Trademark of N.V. Philips of the Netherlands



**Recorder/Reproducer \$775**  
**(Reproducer \$550)**

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A machine that records and plays mono tapes in the "A" size cartridge, stops automatically on the 1 kHz cue tone and offers you longer life, less maintenance and better performance than any other cartridge machine at an economy price.

### Compare For Yourself

- Quiet air-damped solenoid
- Flat, stable 1/2 inch solid aluminum deck
- Micro-adjustable head assembly
- Direct-drive capstan motor
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For More Details Circle (18) on Reply Card

## NAB Products *(Continued from page 40)*

include the production version of the ARS-1000 automated radio station reproducer, the eight channel MX-5050 with variable speed ( $\pm 10\%$  DC capstan servo as standard, plus the two and four channel versions with and without optional DC capstan servo, and the MX-7308 one-inch eight channel recorder.

**ARS-1000 Automated Radio Station Reproducer:** The production version of this machine, already in wide use in automation systems, will be demonstrated for the first time at NAB 76. The ARS-1000 is a ruggedly built rack mounted reproduce machine designed to meet the special needs of the automated radio broadcaster for long term reliability under continuous operation.

Its features include two speeds— $7\frac{1}{2}$  and  $3\frac{3}{4}$  ips, two channel stereo (half track) head stacks (full track heads optionally available), recessed front adjustable output level and head azimuth, plug in professional

For More Details Circle (150) on Reply Card

### **EBS-100 Encoder-Decoder**

**Broadcast Engineering Techniques** has received FCC Type Acceptance and Certification for its Model EBS-100 Emergency Broadcast System Encoder-Decoder.

The EBS-100 employs digital techniques in frequency generating, decoding, and timing functions. Two temperature-compensated precision audio oscillators generate the attention signal frequencies; the Decoder uses CMOS digital comparators which match incoming material against the generator section's accurate reference for identification of the EBS signal. The digital approach provides the reliability and accuracy of integrated circuitry.

In addition to its state-of-the-art design, the EBS-100 features three transformer-isolated Encoder outputs (two switched for stereo stations, one always on for test); a built-in speaker amplifier and speaker; both normally open and normally closed contacts for external decode alarms; and the convenience of a single  $3\frac{1}{2}$ -inch rack chassis. The optional fixed-tuned AM Receiver comes mounted in the

grade PC boards and relays, IC preamp in head assembly for improved S/N, simple operation plus remotable Play and Stop, ready light to indicate proper tape threading, special long-life polypropylene pinch roller and ball bearings.

**MX-5050 Compact Recorder:** A full capability professional recorder, with  $10\frac{1}{2}$  inch reels, three motors, and two or four channels in  $\frac{1}{4}$  inch tape. New at NAB will be the first showing of the variable speed DC capstan servo, a new dual case for the four channel, and portable cases for all models. MX-5050 professional features include front panel edit and cue controls, motion sensing, precision mounted splicing block on head cover, synchronous reproduce, professional XLR connectors for line in and 600 ohm line output, variable or fixed outputs (at +4 dBm or -10 dBm), front adjustable bias and equalization, built-in test and cue oscillator.

same enclosure.

The equipment is now in production, and orders are still being assigned shipping dates before the April re-regulation deadline. Production includes a two-day burn-in for component testing. The unit is covered by a five year parts, one year labor warranty.

For More Details Circle (149) on Reply Card

### **In-line Linear Chroma Keyer**

A new in-line linear chroma keyer will be introduced at the National Association of Broadcasters convention, March 21, by **DYNAIR Electronics, Inc.** Incorporating proportional keying techniques, the new SE-362A Chroma-tech makes possible soft combining of two NTSC encoded color video sources into a single composite picture.

One and two tube color cameras, which do not usually provide RGB outputs, can now be utilized as a video source in post production applications with or without the use of a production switcher.

According to Bob Vendeland, VP

*(Continued on page 45)*

# In Seattle it's Mark VIII. Automatically.

KCTS-TV, Seattle, recently purchased six Marconi Mark VIII-B cameras, after careful evaluation of every known top quality camera. We welcome Public Broadcasting Station KCTS-TV to the ranks of commercial, educational, and specialist users of the Mark VIII-B camera in the U.S. and around the world.



## Mark VIII-B. A well-proven, reliable production tool.

- World's first fully automatic color camera
- Super-sensitive. Saving studio energy by operating at f/4.0 in 75 f.c. Or operating on remotes when others quit.
- Small and lightweight, using 1/2-inch cable.
- Always making "Big-Picture" pictures  
AUTOMATICALLY.

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Our consoles are manufactured with the finest components for long life and trouble-free operation. Hopefully you will never need service, but if you do, we will provide assistance promptly and without question. Our five-year warranty is the most liberal in the industry. Before you buy any console—standard or custom—let us give you some more reasons why an ADM Console is your best buy. Call or write us soon.



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See us at the show—Booth 511

For More Details Circle (20) on Reply Card

## NAB Products

(Continued from page 42)

Marketing of the San Diego based DYN AIR, who claims delivery of the keyer is from stock, "the introduction of the SE-362A Chroma-tech as well as a completely new line of broadcast video, pulse, pulse delay, and subcarrier distribution equipment to DYN AIR's broadcast distribution switchers will allow our specialized dealers to provide an integrated package backed by one of the most experienced switching and distribution manufacturers in the field."

For More Details Circle (142) on Reply Card

### Video Line Isolator

Video Aids Corporation of Colorado will be in booth 142 with their new video line isolator called the VL-1. This self-contained electro-optical unit passes 1 Hz to 8 MHz yet it will reject hum levels up to 70 V rms at 60 Hz.

When using the VL-1, video signals can be routed from building to building or between complexes where equipment is connected to different AC line sources. Listed at \$250, the VL-1 is available on two weeks delivery.

For More Details Circle (143) on Reply Card

### FM Transmitting Antenna

CCA Electronics will introduce a new FM transmitting antenna at NAB. This new antenna comes in a low power and a high power version.

The low power version will handle up to 10 kW, while the high power model will take up to 50kW (single bay). These antennas feature a 700 kHz bandwidth with the SWR under 1.1:1. All elements are 50 ohm to assure lowest Q. Large gap form factor of the antenna eliminates feed point straps and insulators.

Its integral radome is designed to offer no increase in wind load.

For More Details Circle (144) on Reply Card

### High Speed Color And B/W Video Duplicator

Panasonic has introduced the world's first cartridge VTP system for EIAJ standard color and black-

## Practical Tests & Measurements

Tektronix will do something new and interesting in their booth at NAB. The company will feature a tests and measurements theater that will give practical "how to" demonstrations for making measurements in AM, FM and TV

operations.

The basic elements of these sessions will be proof of performance, monitoring requirements, and day-to-day maintenance. The AM and FM sessions will focus on audio systems tests and measurements.

and-white video cartridges. This mass printing system makes possible duplication of a 30-minute video cartridge in less than three minutes.

In introducing this new product, Mr. Irwin Tarr, General Manager of Panasonic's Video Systems Division, noted that this cartridge VTP will make it possible to print video tapes almost as easily as one makes duplicates of documents on an office copying machine.

The Panasonic cartridge VTP system, VTP-1000, consists of two compact machines: master cartridge recorder NV-5180 with controller NV-5181, and tape printer NV-5182.

The master cartridge recorder records the video signal from a camera monitor, VTR or VCR in a pattern that is a mirror-image of the EIAJ standard color or #1 black-and-white signal. This master can be used to make 1,000 precise duplicates. The master tape is recorded on a video cartridge—all tape threading, duplicating, and rewind functions are thus performed automatically.

For More Details Circle (145) on Reply Card

### Triaxial Connectors

Kings Electronics Co., Inc., Tuckahoe, New York has developed Tri-Loc®, a new connector series for the television broadcast industry. This series is designed for triaxial cable.

The Tri-Loc® connector is designed to fulfill the interconnect requirements of triaxial color cameras for the telecast industry. This unique quick disconnect RF connector terminates 3/8" and 1/2" diameter triaxial cables.

When mated, the connectors are completely weatherproof. This rugged mechanical construction, with Kings' durable TR-5 weather-resistant finish, makes the connectors ideally suited for outdoor use.

The connectors have an interface retention greater than 100 pounds and cable retention greater than 200 pounds.

The contacts can be either crimped or soldered. The inner braid is crimped and the outer braid is of the conventional comb-out type, thus assuring quick, reliable termination.

The use of triaxial cable with its inherent low capacitance enables the camera crew to use the triax camera at distances 20 to 30 times further from the van than had been possible with the old multicable multiconductor system.

For More Details Circle (146) on Reply Card

### EBS Decoder

Bryant Electronics has introduced an EBS decoder that they've dubbed the Model EBSD-1. Bryant is specializing in decoders only.

The EBSD-1 is an all solid state design, with TTL and PPL circuitry in a broadcast equipment configuration. The power supply is IC regulated.

This decoder can be driven by any receiver capable of 100 mw output into an 8 ohm load. The unit includes 8 and 600 ohm inputs.

The front panel includes two control switches that are tied to color coded status lights to show switch position. Also, a digital timer is used with the alarm.

For More Details Circle (147) on Reply Card

### Live Color TV Camera

The 1976 Harris NAB exhibit will feature the new top-of-the-line TC-80 live color television camera with optional Triax, which will be introduced at the convention.

The TC-80 uses three normal lead oxide or anti-comet tail tubes, interchangeable by the customer as desired, and employs a full range of automatic features. The camera

stresses extremely stable operation, matchless color integrity and fast, easy setup and control.

Harris will also introduce its new circularly polarized television antenna at the NAB. The CP antenna has excellent specs for axial ratio, horizontal circularity, and maximum antenna bandwidth. The horizontal circularity may be custom tailored to fit the user's requirements. A model antenna will be on display at the show.

For More Details Circle (148) on Reply Card

### Microwave Transmitters

The new all solid state TEM-7 and TEM-13 microwave transmitters for television broadcast have been announced by **Tepeco Corporation**, Rapid City, South Dakota. The TEM-7 is 7 GHz and the TEM-13 is 13 GHz.

Both have digital frequency control, continuously variable frequency adjustment and micrometer frequency dials. Companion receivers have automatic frequency control.

Applications are STL, inter-city relay for fixed installations, portable for electronic news gathering and remote pickup for temporary installations.

A company spokesman said the new designs are based on manufacturing and field experience the company has gained since it was founded in 1961.

For More Details Circle (152) on Reply Card

### Field Strength Meter

The FIM-71 Field Strength Meter by **Potomac Instruments** is a truly portable test instrument of laboratory quality, covering the frequency spectrum between 47 MHz and 225MHz.

This unit contains an accurate internal calibration oscillator and may be used as a tuned voltmeter or, when used with the associated antenna assembly, a highly accurate field strength meter. Intended primarily for measurement of commercial TV and FM broadcast signals and harmonics, the FIM-71 has

switchable IF bandwidth and switchable AM/FM demodulators which make it suitable for practically all types of radio frequency emission measurements within its frequency range. Either average or peak values of TV sync signals may be read.

The receiver operates as a linear voltmeter having a 120 dB range in 20 dB steps. The 5-inch taut band meter has a logarithmic (approximate) scale calibrated between 1 and 10. A dB scale is also provided for signal ratio measurements. A dynamic range of 60 dB, without attenuator switching, is provided in the LOG mode of operation.

For More Details Circle (153) on Reply Card

### Video Spot Assembler

The **Recortec** Video Spot Assembler (VSA) is a microprocessor based system designed to provide the convenience and versatility of a cartridge system at a fraction of its cost. The VSA uses the same two VTRs used for A-B rolls for  
*(Continued on page 145)*

# FULL PROFESSIONAL PERFORMANCE AND FEATURES IN A COMPACT PACKAGE

## OTARI MX-5050

What does a professional recording or broadcast engineer demand in a tape recorder? Above all, he wants consistently high performance, production and editing features, ease of operation and set up, and a reliable mechanism that won't let him down when the schedule gets tight.

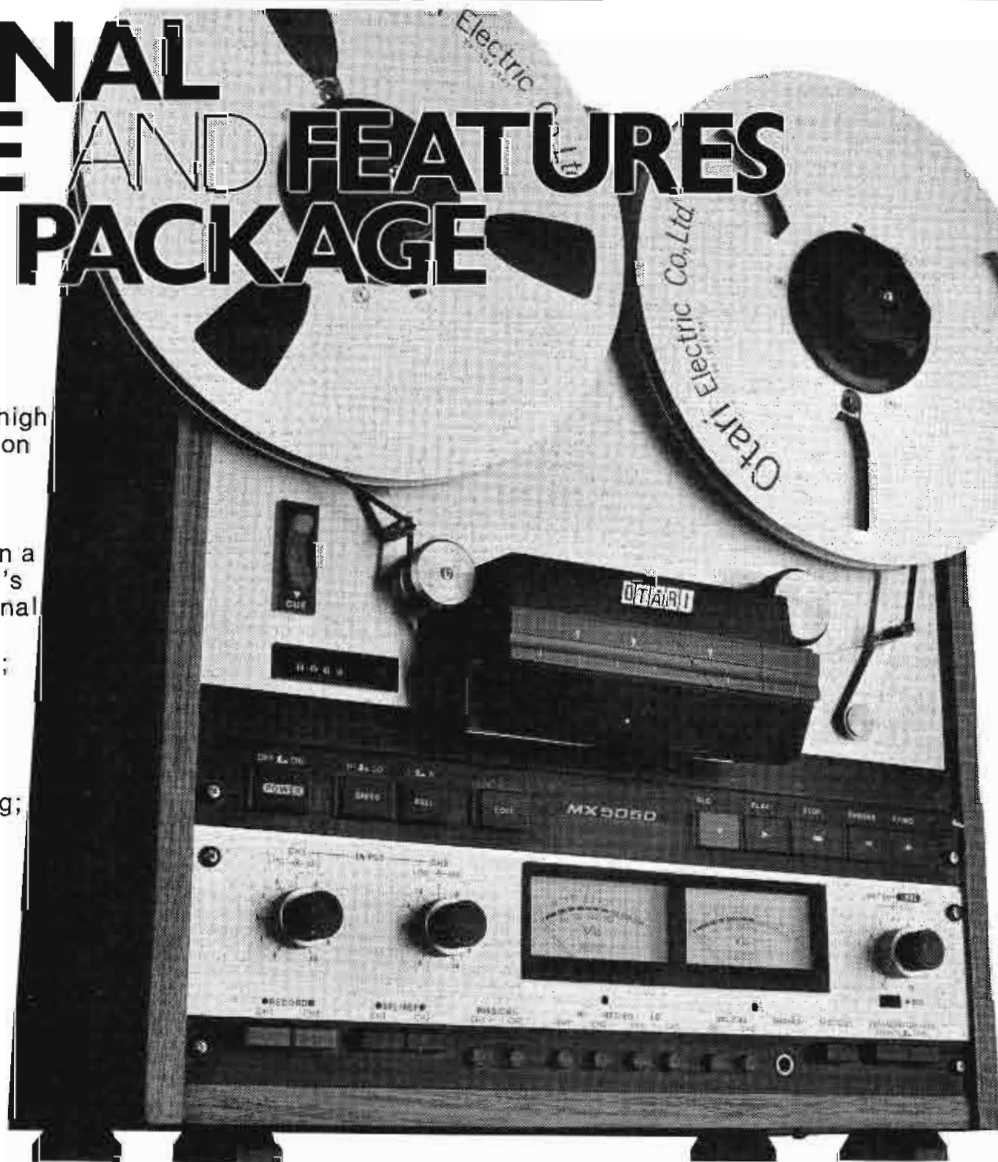
If that's what you want too, then take a close look at the Otari MX-5050. It's a full capability professional machine in a compact package. This new recorder is the end result of Otari's ten years of leadership in producing Japan's finest professional recorders and high speed duplicators.

Check these features: gentle, positive tape handling; front panel edit and cue; built-in precision-aligned splicing block; front adjustable bias and equalization; synchronous reproduce for overdubbing; professional connectors, levels, and impedances; 68 dB S/N, 19 dB headroom, 60 dB crosstalk; optional variable speed dc capstan servo; motion sensing; plus many others. And if you need more than two channels, the MX-5050 is also available in four channel (1/4 inch) and eight channel (1/2 inch), the eight channel with dc capstan servo as standard.

See Otari at NAB Booth 209.

# OTARI

Otari Corporation  
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(415) 593-1648 TWX: 910-376-4890  
In Canada: Noresco Mfg., Toronto (416) 249-7316



For More Details Circle (132) on Reply Card



# This is all you need to get moving with Dolby FM



Remember the first time you came across Dolbyized cassettes? And how surprised you were that music could sound so good in such a convenient form?

Well, now the same principles are being used to improve FM broadcasting. The audible effect of the Dolby system as used in FM is a bit more subtle than with

cassettes. But the overall results are just as important. Dolby FM is cleaner, with sparkling high frequencies free of limiting. And, of course, noise is reduced, which often increases the area of good reception.

As of August 1975, over 100 US stations have purchased the Dolby Model 324 or

334 FM Broadcast Unit. The unit accurately compresses the signal in accordance with the Dolby B-Type characteristics and changes the effective transmission time-constant to 25 microseconds. This allows the station to reduce or eliminate any high frequency limiting required previously.

Akron OH	WAEZ 97.5	Cincinnati OH	WGUC 90.9	Edmond OK	KWHP 97.7	Los Angeles CA	KGBS 97.1	New York NY	WOXR 96.3	Seattle WA	KIXI 95.7
Albany NY	WHSB 106.5	Collegeville MN	KSJR 90.1	Fairmont NC	WFMO 100.9	Los Angeles CA	KIOO 100.3	New York NY	WRFM 105.1	Skokie IL	WCLR 101.9
Allentown PA	WFMZ 100.7	Columbus GA	WEIZ 100.1	Flint MI	WGMZ 107.9	Los Angeles CA	KPFK 90.7	Normal IL	WGLT 91.7	St. George SC	WPWR 95.9
Alta Vista VA	WKDE 105.5	Columbus OH	WCOL 92.3	Fort Wayne IN	WMEF 97.3	Lancaster PA	WDAC 94.5	Opportunity WA	KZUN 96.1	St. Louis MO	KCFM 93.7
Arlington TX	KAMC 94.9	Columbus OH	WOSU 98.7	Fort Worth TX	KWXI 97.1	Lexington VA	WLUR 91.5	Paterson NJ	WPAT 93.1	Stevens Point WI	WSPT 97.9
Baltimore MD	KAMR 106.5	Dayton OH	WTUE 104.7	Fresno CA	KPHD 95.5	Louisville KY	WCSN 99.7	Philadelphia PA	WMMR 93.3	Sylvania OH	WXEZ 105.5
Birmingham MI	WHNE 94.7	Dallas TX	KCHU 90.9	Gainesville GA	WDUN 106.7	Louisville KY	WLRS 102.3	Portland ME	WDCS 97.9	Topeka KS	KTPK 106.9
Boston MA	WROR 98.5	Dallas TX	KTLC 100.3	Grand Rapids MI	WZZM 95.7	Louisville KY	WYXE 92.1	Richmond VA	WEZS 103.7	Tuscaloosa AL	WUOA 95.7
Boston MA	WVBF 105.7	Dallas TX	KVIL 103.7	Hanover NH	WDCR 99.3	Maine FL	WAIA 97.3	Rochester NY	WCMF 96.5	Utica NY	WOUR 96.9
Buffalo NY	WDCX 99.5	Dallas TX	KZEW 97.9	Hartford CT	WTIC 96.5	Manassas VA	WEZR 106.7	Rochester NY	WEZO 101.3	Washington DC	WAMU 88.5
Buffalo NY	WBEN 102.5	Denver CO	KBPI 105.9	Henrietta NY	WITR 89.7	Memphis TN	WKNO 91.1	Saline MI	WIOB 102.9	Washington DC	WASH 97.1
Carbondale IL	WSIU 91.9	Denver CO	KLZ 106.7	Houston TX	KILT 100.3	Miami FL	WAIA 97.3	Salt Lake City UT	KDAB 101.1	Washington DC	WGMS 107.3
Charlotte NC	WEZC 104.7	Detroit MI	WABX 99.5	Houston TX	KRLY 93.7	Minneapolis MN	KSJN 91.1	Salt Lake City UT	KSL 100.3	Washington DC	WHUR 96.3
Charlotte NC	WROO 95.1	Detroit MI	WOMC 104.3	Indianapolis IN	WNAF 93.1	Morganlown WV	WAJR 101.9	San Antonio TX	KEXL 104.5	Washington DC	WMAL 107.3
Chicago IL	WFMT 98.7	Detroit MI	WJZZ 105.9	Jackson MS	WSLI 96.3	New Orleans LA	WEZB 97.1	San Diego CA	KGB 101.5	Wilkes-Barre PA	WYZZ 92.9
Chicago IL	WLOO 100.3	Detroit MI	WMUZ 103.5	Kettering OH	WVUD 99.9	New Orleans LA	WNOW 101.1	San Francisco CA	KABL 98.1	Youngstown OH	WYSU 88.5
Cincinnati OH	WEBN 102.7	Detroit MI	WQRS 105.1	Los Angeles CA	KBIG 104.3	New York NY	WNEW 102.7	Seattle WA	-KIRO 100.7		

## JANUARY 1976: 30 more stations

As listeners to these stations can hear for themselves, a Dolby FM signal is compatible. In fact, most people find it a better signal even when received on their normal equipment without Dolby decoding.

However, some listeners like to take advantage of every opportunity for improvement. If they use Dolby circuitry\* during reception, they can bring the signal even closer to the quality of the original source material used at the station.

Naturally, the noise is reduced. But that's not all. Dolby compression is standardized, recoverable compression. By using Dolby encoding instead of the conventional high frequency limiting normally required during transmission, the station gives the listener at home the opportunity of recovering the full frequency range and dynamics of the signal. Furthermore, depending on the amount of limiting previously used, many stations find that Dolby encoding permits them to increase their level - which is good for both the listeners and the station.

If these prospects excite you, we think you will soon be wanting to check out the new Dolby Model 334 FM Broadcast Unit. \$1,350 and 1½ inches of rack space are all you need to get moving with Dolby FM - an improvement we think both you and your listeners will appreciate.

**Distributors**  
 FTC Brewer Co, Pensacola, FL  
 Broadcast Communication Devices, Anaheim, CA  
 Broadcast Consultants Corp, Leesburg, VA  
 Collins Radio Group, Dallas, TX  
 Control Technology Inc, Fort Lauderdale, FL  
 HM Dyer Electronics, Farmington Hills, MI

La Salle Audio, Chicago, IL  
 Lebow Labs Inc, Brighton, MA  
 Pacific Recorders and Engineering Corp, San Diego, CA  
 Schafer Electronics Corp, Goleta, CA  
 Sparta Electronics Corp, Sacramento, CA  
 Whalin's Pro Audio Sales, Arlington, TX

Technical literature and reprints of papers describing these developments are available from our offices or distributors

\*Some of the 50 Dolby licensees are already producing their new receiver models, and others have new designs in the pipeline.



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# NAB Exhibitor List

The following is a list of NAB convention exhibitors who responded to our pre-convention survey. Of special interest, of course, is the equipment they list as **NEW**. This equipment will be on display at the NAB for the first time.

In another section of our pre-

convention section, you'll find maps of the exhibit area. It will help you plan your stops if you'll note the name and booth number of a company you want to visit, turn to the maps, and mark the booth there so you can easily find it when you get to the convention.

## **Acrodyne Industries Inc.** Booth 109

Broadcast television translators, transmitters and accessory equipment.

**NEW:** T-210 100% solid state UHF translator, 500-Watt television transmitter.

Suite: Conrad Hilton

## **American Data Division, Airpax Electronics, Inc.** Booth 403

Featured, will be the all new ADC 558 production system. Also on display will be the latest version of the 900 series distribution switchers and the full line-up of related terminal equipment.

**NEW:** The 558 "Dual Key" production switcher and the 553 production switcher designed for remote ENG and small studio operations.

Suite: NA

## **American Electronic Laboratories, Inc.** Booth 601

AM-5KE, AM-10KD, FM-10KE, FM-25KE, antennas, dummy loads & assorted "post transmitter" equipments.

**NEW:** AM-5KE and FM-10KE transmitters

Suite: NA

## **Ampex Corporation** Booth 513

Studio and portable videotape

recorders for broadcasting, business and industry, education, and government; video disc recorders; color broadcast cameras; editing systems; broadcast automation products; digital time base correctors; professional audio recorders and accessories; time code synchronization systems; video tape in all widths and formats; audio mastering and recording tape.

**NEW:** To be announced.

Suite: NA

## **AMPRO Corporation** Booth 812

Cartridge tape recorders and reproducers broadcast audio consoles; 4 to 12 channel, studio furniture & accessories, cartridge tape transport controllers.

**NEW:** Modular studio furniture and accessories, cartridge tape transport controller, "B" version cartridge tape equipment.

Suite: NA

## **Angenieux Corporation of America** Booth 304

10x14E11, f/1.6, 10x14.5E11, f/2.2, 15x14E61, f/1.6, 18x20.5E61, f/1.5. Zoom and fixed focal length lenses as well as prisms, dichroics and splitting systems for the broadcast industry.

**NEW:** Cover all lens - 42x16E11, f/2; for ENG - 15x9.5, f/1.9, 15x12.5, f/2.5.

Suite: NA

## **Anixter-Mark** Booth 130

Microwave antennas for electronic journalism, STL and intercity systems.

**NEW:** Circular polarized 2.0GHZ antennas.

Suite: NA

## **Audio Designs & Mfg., Inc.** Booth 511

Audio consoles, accessory components.

**NEW:** ADM DA 16/CH 20 audio distribution system, ADM 660 1/3 octave audio real time analyzer.

Suite: NA

## **Auditronics, Inc.** Booth 804

Audio consoles.

Suite: NA

## **Belar Electronics Laboratory, Inc.** Booth 509

Comprehensive line of AM, FM, TV modulation and frequency monitors with their respective auxiliary equipment. This includes the two new AM modulation only monitors recently introduced. Also AM stereo techniques via an active display. Silence alarms for both modulation and carrier off.

**NEW:** A number of different units directed to alerting the broadcaster to the moment-by-moment performance of his broadcasted signal.

Suite: None.

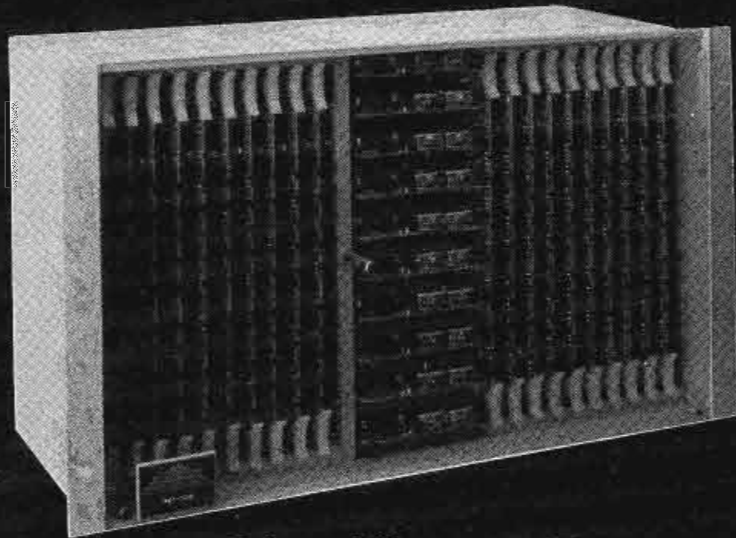
## **Bird Electronic Corporation** Booth 705A

Quality instruments and components for RF power measurement; RF directional Thruline® wattmeters; RF absorption wattmeters; 2W to 50kW

(Continued on page 50)

# THE ADC 900 IS

# QUALITY!



**RELIABILITY** is the watchdog of quality management. With many 900 systems now approaching 20,000 hours of continuous operation with no significant downtime or maintenance required, we offer proven reliability.

## Significant Features

- Exclusive use of high reliability standard and multi-sourced proprietary components.
- Only 10 crosspoints per crosspoint module allows in-service maintenance with minimum disruption.
- Input oriented crosspoint modules which allow the superior shielding required to maintain extremely low crosstalk specifications between either synchronous or non-synchronous inputs.
- Individual, horizontally oriented output amplifiers enable superior shielding between outputs and in-service maintenance with no disruption to other output channels.
- Externally accessible control latching and decoding which allows in-service maintenance, no interaction between matrix frames and uses no unique codes or non-compatible addressing schemes. All active control components are plug-in devices.
- External control interface to allow use of multiple control panels of different types on a single system.
- Standard LED grid matrix status display on all systems gives visual display of crosspoint status at all times.
- Control hold system available to return matrix to a last state condition in event of power failure or dip. Hold times of 20 minutes to 12 hours available.
- Fully redundant power systems with visual, aural and remote alarms available.
- Vertical interval switching standard on all systems.
- Use of an external combining matrix on systems with more than 20 inputs allows complete isolation to the smallest matrix unit (10 x 10) for superb specifications. External matricing simplifies system timing, any input to any output, on large systems.

## Customers

Alabama ETV  
Bell Labs  
City of Los Angeles  
Editel  
HCG Geneva  
Jefferson Productions  
KATU  
KCTS  
KGGM  
KLAS  
KOLR  
Michigan State University  
NASA  
NBC - Burbank  
N. J. Bell

ORTQ  
RCA Camden  
RCA, Ltd.  
RTV Belgrade  
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University of Louisville  
University of Michigan  
USIA  
U. S. Navy  
Venevision  
WCAU  
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WPBT  
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## AMERICAN DATA DIVISION

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ROCKVILLE, MD. 20853  
301-460-1454

3250 WILSHIRE BL. STE900  
LOS ANGELES, CA. 90010  
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2908 MULBERRY  
PASADENA, TX. 77502  
713-941-7272

233 W. HILL AVE.  
GLENN ELLYN, IL. 60137  
312-469-6200

For More Details Circle (133) on Reply Card

## Exhibitors

(Continued from page 48)

air cooled, water cooled and self-contained-heat-exchanger loads. New series of line terminations. RF power and VSWR monitors; coaxial filters, couplers and filter-couplers.

**NEW:** SENTRILINE® filter/couplers for FM transmitters. The Bicentennial 76,000th THRULINE® Model 43 RF wattmeter.

Suite: NA

### Capitol Magnetic Products Booth 807

Audiopak A-2 broadcast cartridge, Audio tape Q19 high output, low noise, back coated mastering tape, Audiotape Q15 low noise tape, Audiofilm perforated audio film.

**NEW:** NA

Suite: NA

### CEI (Commercial Electronics Inc.) Booth 519

CEI-290 portable production color television camera system. CEI Camera Control and Operating Control Units.

**NEW:** CEI-287 professional color television camera system. CEI Medical television camera.

Suite: Blackstone

### Cinema Products Corporation Booth 406

16mm TV-newsfilm/documentary cameras, Aero-Kit and Cat-Kit quartz location lighting kits; the CINEVID-16 video-assist camera system; Crystalink wireless system; Sturdy-Lite focusing spot, the CPT-24 fluid head tripod, PLC-4 16mm 400 ft. magazine, J-5 zoom lens control.

**NEW:** CINEVID-16 video-assist camera system.

suite: NA

### CMX Systems Booth 606

In addition to the 340X, the 34X video tape time code editing system. The 340X works with quad or helical or both and is compatible with all other CMX editing systems.

**NEW:** 34X

### Collins Radio Group, Rockwell International Corp. Booth 603

Model 820D-2 1-kw AM transmitter, Model 831D-2 2.5-kw FM transmitter, Model 831G-2 20-kw FM transmitter, Model IC-6 and Model IC-10 control consoles, and Collins' new A7600 program automation system.

**NEW:** The A7600 program automation system.

Suite: NA

### Colorado Video, Inc. Booth 105

Equipment for the transmission of compressed video signals over FM subcarrier channels.

**NEW:** See above.

Suite: NA

### Communications Technology, Inc. Booth 232

Complete line of video/audio routing switchers.

**NEW:** Small production switcher, audio switcher.

Suite: NA

### Computer Image Corp. Booth 627

Video switcher equipment, R&D and manufacturing products, software production materials.

**NEW:** Video switcher equipment, CAESAR Electronic character/graphic animation software, large 7243-B production switcher, master control, and two computer controlled editing switchers, software products generated by the CAESAR electronic animation system.

Suite: NA

### Computer Magnetics Corp. Booth 543

Auto equalizer, refurbishing Mark X, Mark XV, and Mark XX video head assemblies, refurbishing audio heads for VTR's, video discs & heads for slow-motion applications.

**NEW:** Auto equalizer.

Suite: NA

### COMQUIP, Inc. Booth 226

Fixed lens adapter for color TV cameras.

Suite: NA

### Comrex Corporation Booth 831

Introducing: The Comrex radio ENG system; studio diversity system; floor-man's wireless intercom system; 450 MHz 1-Watt hand-held wireless microphone. Also showing: Full line of receivers for ENG cueing/command/control, 450 RA/TA wireless microphone system, cue systems.

**NEW:** Comrex radio ENG system; studio diversity system; floor-man's wireless intercom system; 450 MHz 1-Watt hand-held wireless microphone.

Suite: NA

### Conrac Division, Conrac Corp. Booth 102

Conrac will introduce four new products. The 6000, a 19-inch professional broadcast color monitor with full front access. The 5300, a 19-inch broadcast color monitor, budget priced for general purpose broadcast applications. The 5700, a 13-inch high-resolution broadcast color monitor for 10½-inch tape bridge mounting. The DZB, a 14-inch updated version of the DZA monochrome broadcast monitor for 10½-inch tape bridge mounting.

**NEW:** See above.

Suite: NA

### Consolidated Video Systems Booth 547

Digital time base correctors and digital video synchronizer with electronic video compression.

**NEW:** "Low cost" digital time base corrector.

Suite: NA

### Continental Electronics Mfg. Co. Booth 607

5 kW, 10 kW, and 50 kW transmitters. Also related equipment and services such as design and manufacture of antenna phasing and coupling

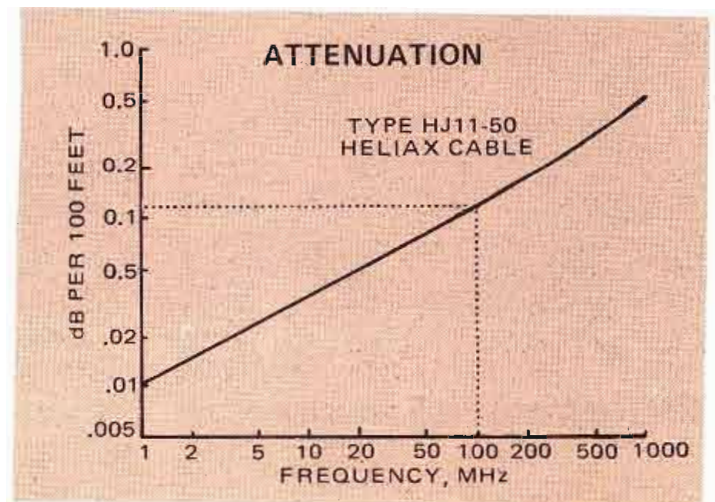
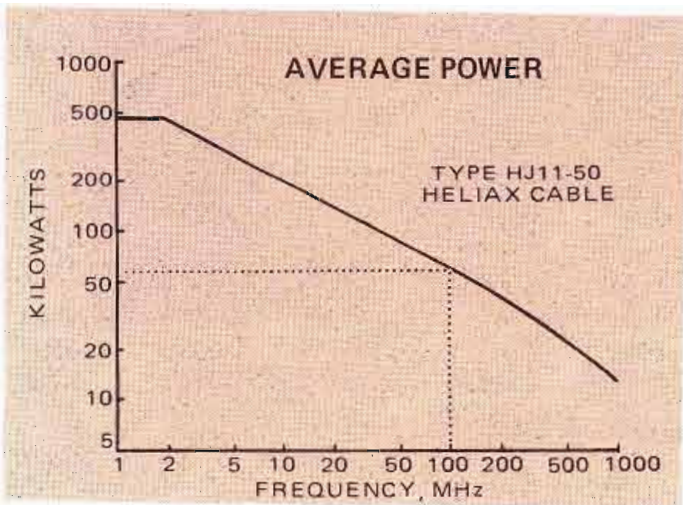
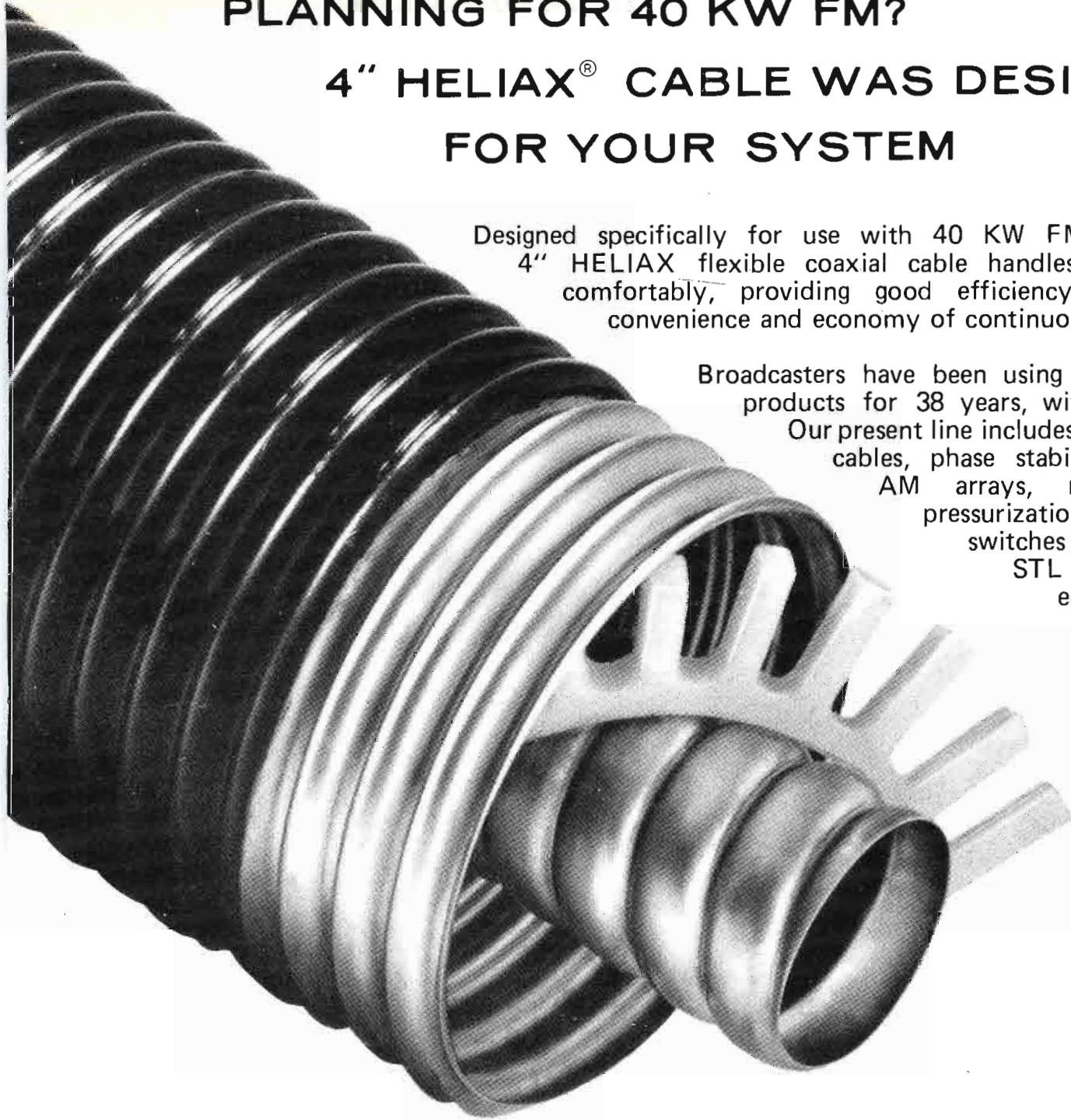
(Continued on page 54)

# PLANNING FOR 40 KW FM?

## 4" HELIAX® CABLE WAS DESIGNED FOR YOUR SYSTEM

Designed specifically for use with 40 KW FM transmitters, our new 4" HELIAX flexible coaxial cable handles this power level very comfortably, providing good efficiency, low VSWR and the convenience and economy of continuous lengths.

Broadcasters have been using Andrew antenna system products for 38 years, with complete satisfaction. Our present line includes HELIAX flexible coaxial cables, phase stabilized sampling lines for AM arrays, rigid line component pressurization equipment, coaxial switches and a complete line of STL microwave antenna equipment. Most items are available off-the-shelf. Ask for Bulletin 1123



ANDREW CORPORATION 10500 W. 153rd St., Orland Park, IL., U.S.A. 60462 Telephone: (312) 349-3300

ANDREW ANTENNA COMPANY LTD. 606 Beech St., Whitby, Ontario, Canada L1N 5S2 Tel: (416) 668-3348

ANDREW ANTENNA SYSTEMS Lochgelly, Fife, Great Britain KY5 9HG Telephone: (0592) 780561

ANDREW ANTENNAS 171 Henty St., Reservoir, Victoria, Australia 3073 Telephone: (03) 460.1544

ANDREW ANTENAS LIMITADA Av. Brigadeiro Faria Lima, 830s/64 Caixa Postal 22.252, 01452 São Paulo, Brasil Tels: 210-2808, 211-5132

March, 1976

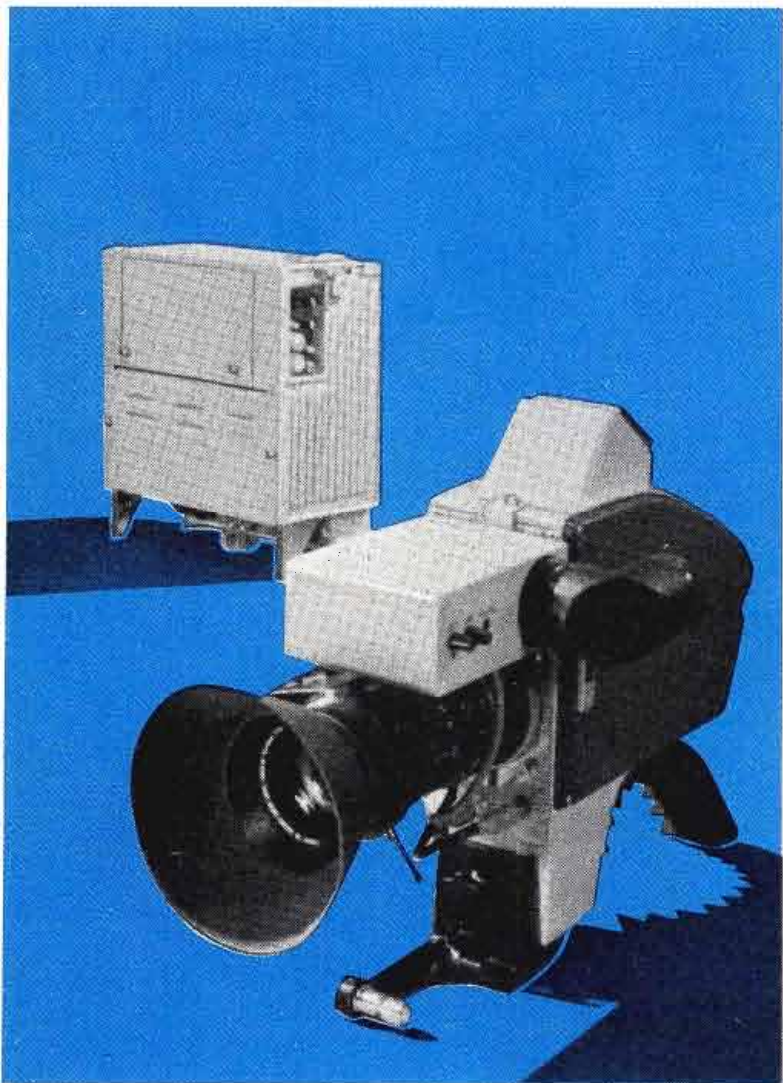
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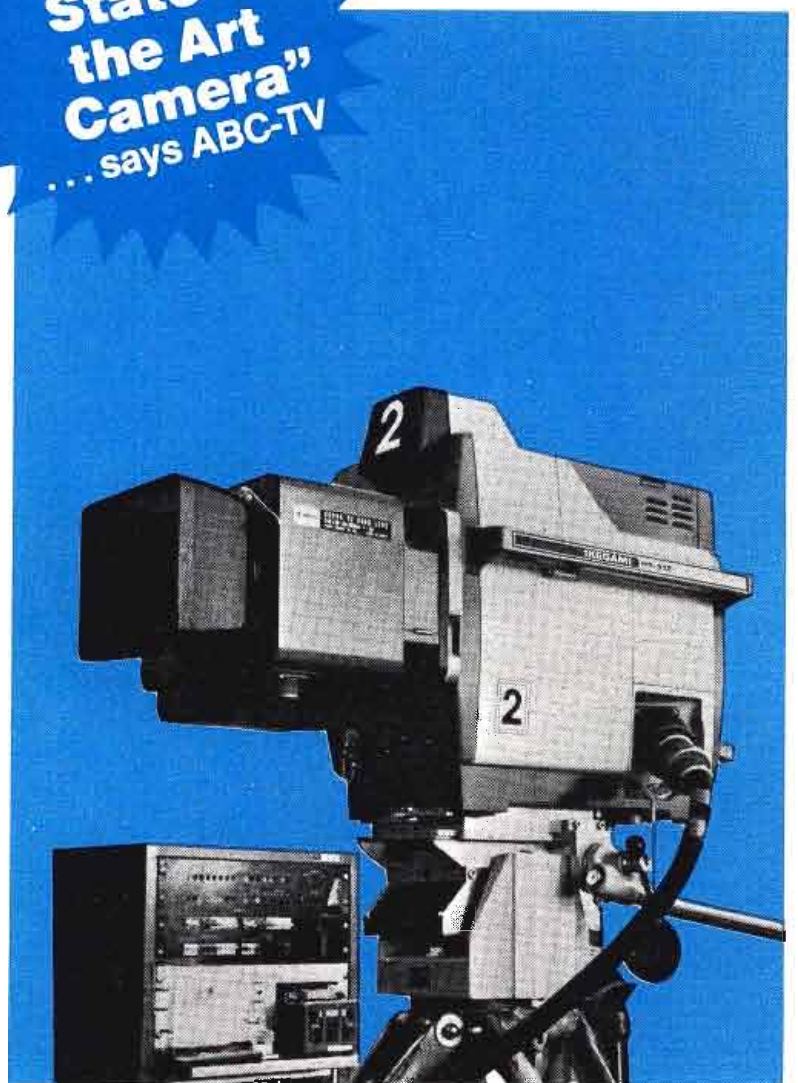
# IKEGAMI. The Depe

"Latest  
State of  
the Art  
Camera"  
... says ABC-TV



## **IKEGAMI ENG Systems...over 300 cameras in service**

More broadcast-quality ENG Systems by Ikegami are in the field than all other makes combined. Reason: one user tells another they're the "Dependables". They're super-rugged, light, and deliver superb colorimetry. You can get great low-light pictures . . . right down to 15 ft.-candles.

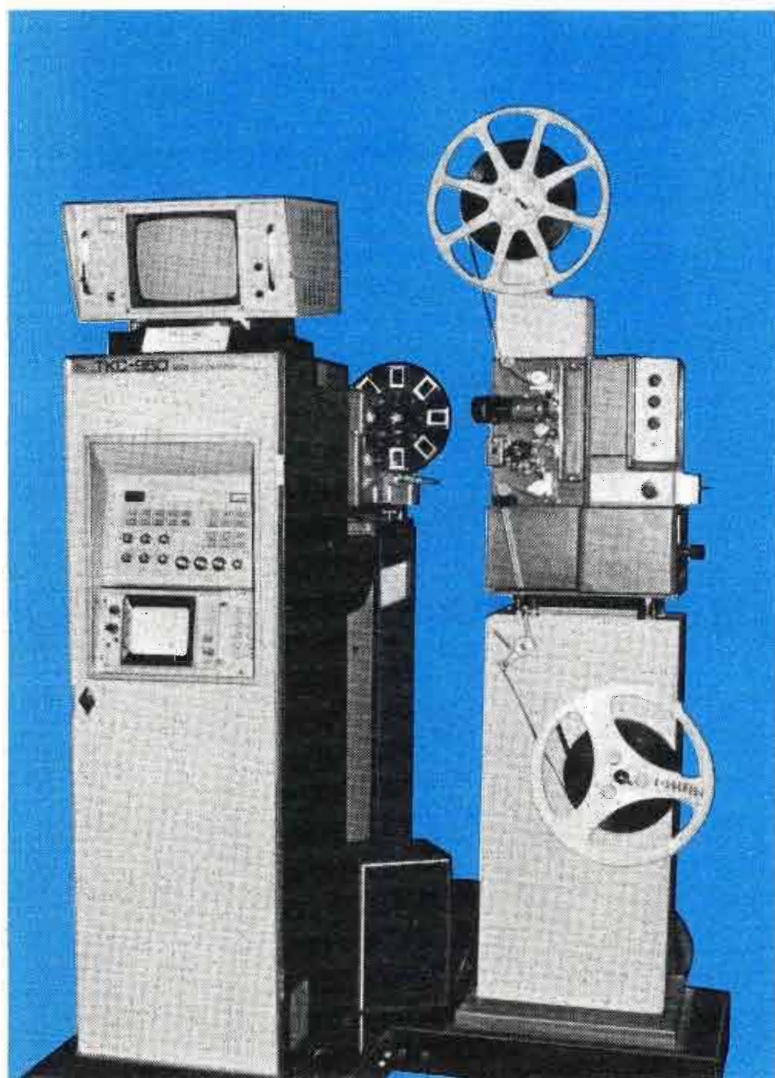


## **IKEGAMI HK-312 ... ultra-high performance camera**

After putting the cameras of top makers through the wringer, ABC chose the Ikegami HK-312. Besides outstanding colorimetry, stability, and engineering, it offers many more functions than competing cameras. "It's the latest state-of-the-art camera," says Julius Barnathan, V.P. in Charge of Broadcast and Engineering at ABC. An exclusive feature is its push-button minicomputer. In 15 seconds per camera, it will cycle many remote cameras through all adjustment parameters . . . white balance, black balance, flare correction, gamma correction, and 9 registration functions.

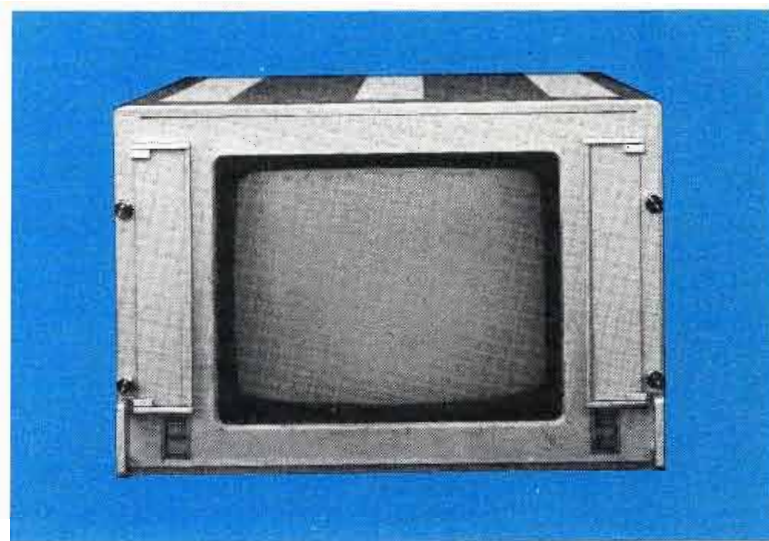
■ ■

# Indables.



## IKEGAMI TKC-950 ... the ultimate film chain

High quality film chain that automatically achieves highest fidelity color reproduction. Built-in test pattern slide. Built-in ALC with ND disk to instantly compensate for all light variations. Unique optical system cuts lens dust out of the picture.



## IKEGAMI TM14-1RHP... 600-line resolution NTSC color monitor

This compact 14" color monitor offers the most precise picture reproduction in broadcasting. All key sections have IC circuitry for stable operation, minimum size, long life. Solid state throughout. Adjustment controls are up front for convenience. Exceptionally rugged, rigid construction.

Convenient distributors offer full stocks of parts and quick service nationwide.

**LANDY ASSOCIATES**  
12 Buston Road  
Cherry Hill, New Jersey 08003  
609-424-4660

**TRI TRONICS, INC. (TTI)**  
4019 Tujunga Avenue  
North Hollywood, California 91604  
213-985-6616

**TECHNICAL VIDEO SYSTEMS**  
1148 Burke Street  
Winston-Salem, North Carolina 27101  
919-722-6181

**BENNETT ASSOCIATES, INC.**  
P.O. Box 23  
Mercer Island, Washington 98040  
206-232-3550

**CAMERA MART**  
456 West 55 Street  
New York, New York 10019  
212-757-6977

**ELECTRONICS PRODUCTS CORP.**  
16006 Waterloo Road  
Cleveland, Ohio 44110  
216-692-3050

**ROSCOR, INC.**  
6160 W. Oakton Street  
Morton Grove, Illinois 60053  
312-539-7700

**GRAY COMMUNICATIONS**  
1709 Stuart Avenue  
Albany, Georgia 31707  
912-439-7610

**MARTIN, ZIENKOSKY & BROWNE**  
13731 Omega Road  
Dallas, Texas 75240  
214-233-5535

Call or write for a demonstration.

**IKEGAMI**  
Depend on it

Ikegami Electronics (USA) Inc., 29-19 39th Avenue  
Long Island City, New York 11101 (212) 932-2577

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## Exhibitors

(Continued from page 50)

equipment, diplexers, filters, combiners, and all special requirements related to AM transmitting systems.

NEW: NA

Suite: NA

**Data Communications Corp. (BIAS)**  
Booth 104

BIAS (Broadcast Industry Automation System), a real time sales, traffic, accounting and engineering automation system.

**NEW:** The BIAS standard interface for linking-up with technical automation systems.

Suite: Continental Plaza

**Datatek Corp.**  
Booth 313

TV transmitter color phase equalizer

and waveform corrector, video-audio routing switchers, video sweep generators, differential phase & gain measuring sets, video, audio and pulse D.A.'s.

**NEW:** Video sweep generators.

Suite: NA

**DYN AIR Electronics, Inc.**  
Booth 701

Featuring new line of linear chroma-keyers and color distribution amplifiers. Also on display: audio switching, video switching, digital control modulators, demodulators.

**NEW:** linear chroma-keyers and color distribution amplifiers.

Suite: NA

**Dynasciences Video Products**  
Booth 400

Image enhancers, video processing system, distribution amplifiers, routing & production switchers.

**NEW:** Model 7200 downstream chroma keyer vibra stop low-cost motion-stabilized lens.

Suite: NA

**Electro Home (USA) Limited**  
Booth 311

Monitors.

**NEW:** 17V, 25V professional color monitors.

Suite: NA

**EIMAC Division of Varian**  
Booth 310

X-2159, X-2170 plus tubes for AM-FM-TV service.

NEW: NA

Suite: NA

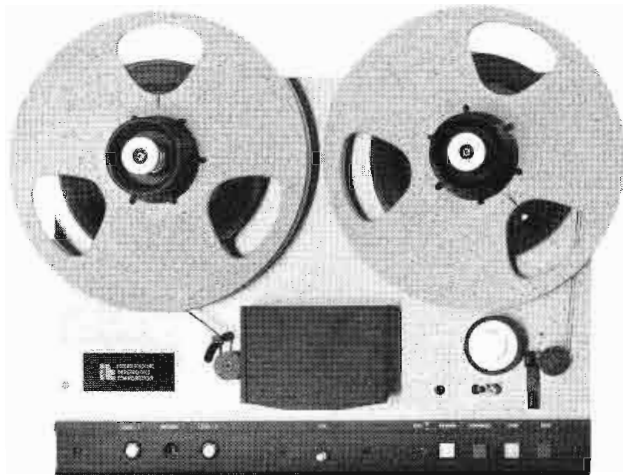
**Electro Impulse**  
Booth 121

AM/FM/TV loads, attenuators, baluns, power meters.

**NEW:** 40kw self-cooled load.

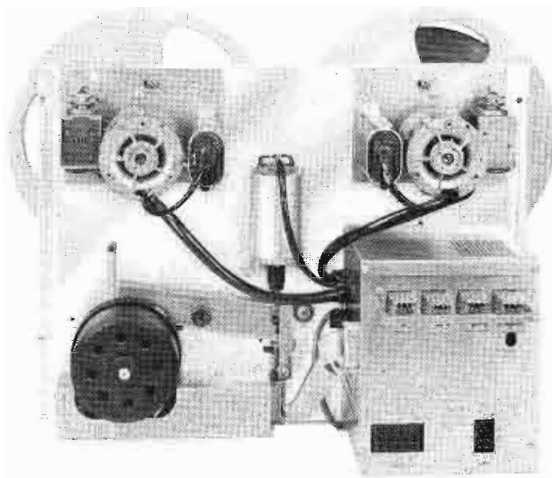
Suite: NA

# Built for Professionals



## ITC's 750 Series Reproducer

1/2 Track Stereo \$1150



Check with any leading automation company for more information or call ITC collect (309-828-1381).

**ITC** INTERNATIONAL TAPETRONICS CORPORATION  
2425 SOUTH MAIN STREET • BLOOMINGTON, ILLINOIS 61701

Marketed in Canada exclusively by McCurdy Radio Industries Ltd • Toronto

© 1975 by ITC

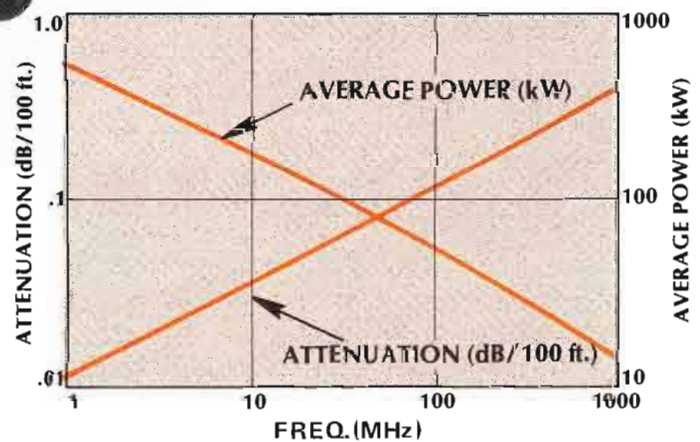
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(Continued on page 56)



# NEW coaxial cable

## 3 1/2" - 50 kW - 100 MHz



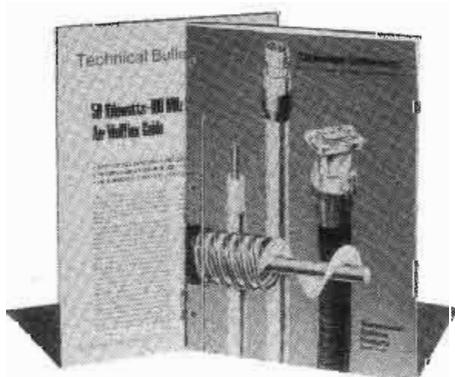
### Copper Corrugated, Air Dielectric for High Power – Low Loss Applications, Specifically – FM Broadcasting and AM, VHF/UHF TV Antenna Feeders

This 3 1/2" air dielectric Wellflex consists of a corrugated tubular copper center conductor, unique polyethylene locked vertebrae helix dielectric, copper corrugated outer conductor and black polyethylene jacket. It is remarkably flexible, has excellent mechanical stability and extremely low attenuation.

#### SPECIFICATIONS:

Velocity of Propagation .....	96%
Attenuation at 100 MHz .....	0.110 dB/100 ft.
Average Power at 100 MHz .....	50.06 kW
Peak Power .....	940 kW

Send for our new 3 1/2" Coax Data Sheet and our complete catalog.



**Cablewave Systems**

### Cablewave Systems Inc.

60 Dodge Avenue, North Haven, Connecticut 06473  
203-239-3311 • TWX: 710-465-0244

## Exhibitors

(Continued from page 54)

### Farinon Electric Booth 110

ENG version of FV(2)P portable microwave for video and subcarrier point-to-point relay at 2 GHz, with optional 6-watt or 20-watt RF output; information on other fixed and portable microwave equipment for video and subcarrier transmission.

**NEW:** The above-mentioned ENG version of FV(2)P microwave.

Suite: NA

### Fidelipac Booth 405

Master Cart and its stereo phase performance will be featured. Over 400 Master Carts will be available for at random selection. Also the Models 300, 350, 600, & 1200 cartridges, studio on-air light, alignment tools, labels, racks and other accessories.

**NEW:** Cartridges for use with delay machines, with delays of 8 and 10 seconds.

Suite: NA

### Flash Technology Corp. of America Booth 322

High intensity obstruction warning lighting system.

**NEW:** FTB 205 electroflash beacon system.

Suite: Pick Congress

### Fuji Photo Film USA, Inc. Video Tape Booth 411

H-701 broadcast video tape Beridox 3/4" u-matic cassettes.

**NEW:** NA

Suite: Conrad Hilton

### Garron Electronics Booth 611

RAPID-Q cartridge tape equipment, STE-100 stereo phase enhancer.

### Harris Corporation - Broadcast Products Division Booth 501

TV cameras, TV transmitters, AM and FM transmitters, consoles, and broadcast antennas.

**NEW:** TC-80 live color TV camera with optional triax; circularly polarized TV antenna; TF-100 color film camera; TE-301 live color TV camera; BT-25L1, 25-kW VHF low band color TV transmitter.

Suite: Conrad Hilton, North Imperial

### Hitachi Shibaden Corp. of America Booth 200

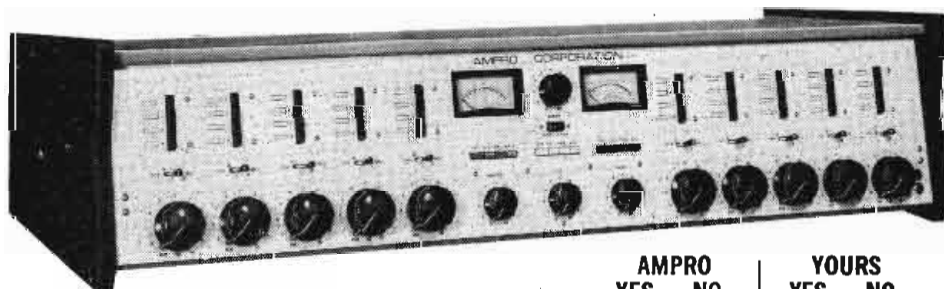
ISK-70 w/22:1 zoom lens, digital control unit; SK-70 (portable version); FP-3030: 1 tube (tri-electrode tube) fully self-contained color portable camera; FP-1212 3 1" Plumbicon camera; FP-1010: 3 tube self-contained color camera.

**NEW:** SK-80

(Continued on page 60)

## CHECK... COMPARE... CONSIDER...

does your audio console, or the one you're talking about purchasing, have all these standard features:



	AMPRO		YOURS	
	YES	NO	YES	NO
Every input channel equipped with preamp	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 transformer coupled inputs per channel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote start contacts on all high level inputs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Modular plug-in amplifiers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 location cue/intercom system with remote talkback	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 selectable monitor inputs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 programmable speaker muting outputs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Step type faders with cue on all channels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 watt rms protected monitor amp	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 selectable headphone inputs plus stereo cue	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
+ 18dBm transformer coupled outputs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone grade lever keys	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shielded PC board mixing bus for extra RF immunity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engraved panel markings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Extra cost hidden options	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High purchase price	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ampro audio consoles are available in 6, 8, 10 and 12 channel rotary or slide fader versions in mono, dual mono, stereo or dual stereo/simulcast configurations. Priced from \$1,995.00 to \$5,275.00.

Ampro also produces a comprehensive line of *broadcast tape cartridge equipment*. For complete details, call collect today or write.

Rep inquiries invited. See us at the Show.

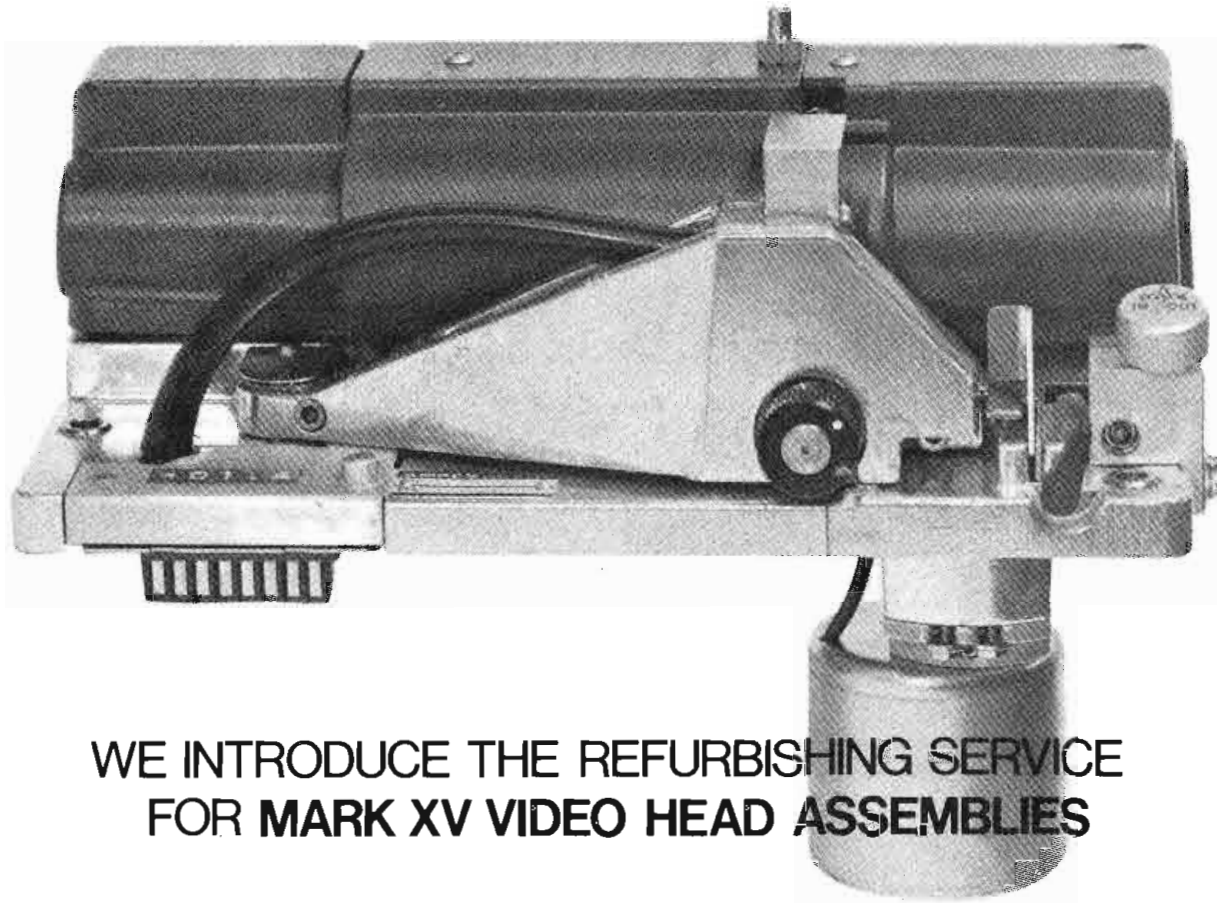
## AMPRO CORPORATION

850 PENNSYLVANIA BLVD., FEASTERVILLE, PA 19047 • (215) 322-5100  
Professional Equipment for Broadcasting Professionals



See us at Booth #812, NAB

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WE INTRODUCE THE REFURBISHING SERVICE  
FOR MARK XV VIDEO HEAD ASSEMBLIES

# Send Your Heads to CMC FOR FAST TURNAROUND

- MARK III VIDEO HEAD ASSEMBLIES
  - MARK X VIDEO HEAD ASSEMBLIES
  - MARK XV VIDEO HEAD ASSEMBLIES
  - MARK XX VIDEO HEAD ASSEMBLIES
- } ONE week turn-around.
- AUDIO STACKS (FOR VTR's) . . . . . ONE week turn-around.
  - VIDEO DISCS & HEADS for SLO-MO . . . IMMEDIATE shipment.

We are proud to claim that in addition to our superior workmanship, our pricing and service are still unmatched in the TV industry.

*For more information, please write:*

**COMPUTER MAGNETICS CORP.**

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Burbank, Calif. 91502  
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(213) 843-6674

**AIR PROGRAMS INTERNATIONAL**

60 Bathurst Street  
Sydney, N.S.W. 2000  
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TEL: 26-1498

**GLETRONIX, LTD.**

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Don Mills, Ontario M3B 1Z5  
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(416) 444-8497

**TRANS-ELECTRONIC SYSTEMS LTD.**

105-614 6th Ave., S.W.  
Calgary, Alberta T2P 0S4  
CANADA  
(403) 264-3863

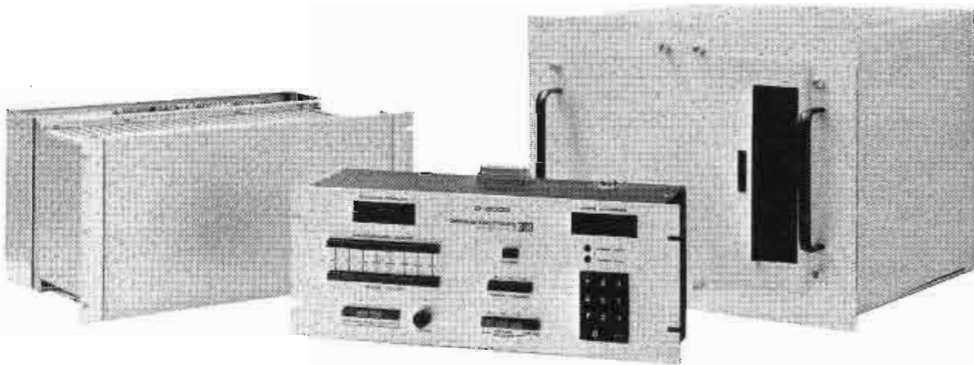
For any inquiries other than Canada and Australia, please contact CMC in Burbank, California.

SEE US AT NAB BOOTH 543

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# **BULLETIN: The Do It Again at Booth**

**DON'T MISS THESE 7 GREAT NEW PRODUCTS  
FROM 3M . . . SEE THEM DEMONSTRATED.**



## **1. NEW AT NAB! D-8000 Video Art Memory System.**

Now you'll be able to present artwork in seconds on a random-select basis. The D-8000 converts any high-contrast original art into digital format for storage on low-cost diskettes. It changes fixed-

image video inputs from a standard monochrome TV camera into black-and-white or colored video art. Cursor Re-entry Mode allows use of up to 6 different colors. Stores and displays one "full frame" presentation. Use the D-8000 now for high-impact '76 Election Coverage . . . and throughout the year for colorful station logos, repetitive titles, product art, and special graphics.

## **5. NEW AT NAB! D-3000/ D-4000 Animation.**

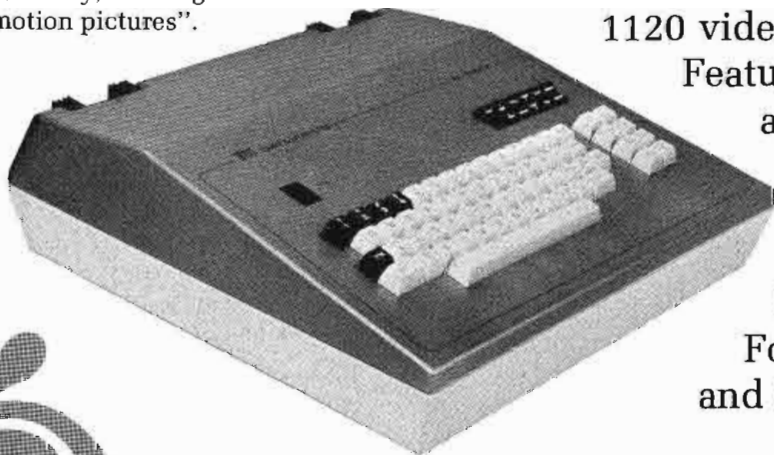


We've added new dimension to the D-3000 Character Generator and companion D-4000 Disc Memory. Now, you have a greater selection of video-type fonts . . . including Upper and Lower Case. Also, selected math symbols, and accented foreign language characters. PLUS, you can animate your display for action. New Animation Mode allows you to play out full frames at a rate of 6 or 12 per second from the D-4000 Memory, creating "video motion pictures".

## **3. NEW AT NAB! D-2000 Character Generator.**

Our new D-2000 Titler provides high-resolution characters at the lowest price ever. Up to 1120 video element resolution per character.

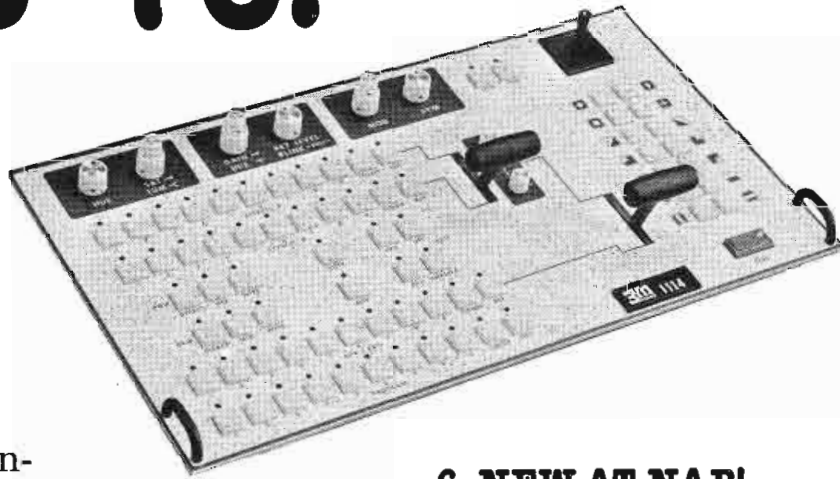
Features internal video mixing and audio interface. Internal four-page memory. Page format has 24 characters per row, 10 rows per page. Both 28sl and 20sl Upper Case Fonts. Lower Case Fonts optional. Automatic Centering and Character Edging optional.



# "Good News" People 529, NAB '76!

## 2. NEW AT NAB! 1114 Production Switcher.

We are pleased to announce a broadcast Production Switcher with big unit functions . . . at a small unit price. Provides the most wanted and used features in a convenient single-unit package. Model 1114 is loaded with features. The Preview Channel allows accurate set-up of effects before actual use, including preset wipes and pattern modulation. And, the Key-Over-Effects function gives added dimension to special effects capabilities. Has 100% vertical interval switching . . . 11 inputs . . . 4 bus system . . . 14 special effects . . . many, many more features.



## 6. NEW AT NAB! Video Outliner.



Now there's a Video Outliner from 3M. Add sharp, clear outlines to camera or video generated titles and artwork. Built-in video keyer. Features: Full edging; 4-position drop shadow selection; black and white outlining capability; more.



## 4. NEW AT NAB! RGB Image Enhancer.

Introducing a new, professional quality RGB Image Enhancer from 3M, featuring green-derived enhancement, 3.58 combing, and adjustable noise reduction circuitry. Also features . . . Horizontal/Vertical Enhancement Balance . . . Level Dependent Aperture Equalizer and Coring controls . . . three sets of independent outputs to drive encoder, effects generator, and monitor . . . much, much more.

## 7. NEW AT NAB! Keyer/Colorizer.

New. Companion to our Video Outliner, or can be used as a stand-alone unit. Full Remote Control Panel provided. Features: 5 insert modes; Cut or selectable rate Dissolve control; accepts 3 "push-button selectable" video inputs; unique circuit minimizes "edge crawl" effect.

*For complete data visit our booth, write to 15932 Shady Grove Road, Gaithersburg, MD 20760, or Phone: (301) 948-0460.*

**Mincom Division** **3M**  
COMPANY

COMTEC

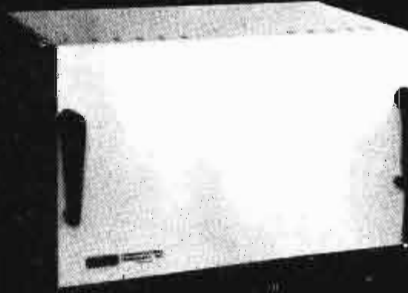
# COMMUNICATIONS TECHNOLOGY, INC.

## ROUTING SWITCHERS FOR EVERY REQUIREMENT

**20X**

### THE ULTIMATE

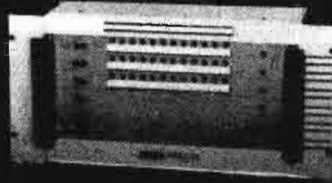
- ★ 20x10 Matrix W/P.S.
- ★ 5 Level Switching  
1—Video, 2—Audio &  
2—bi-directional auxiliary
- ★ Breakaway Audio
- ★ Memory — CMOS Logic
- ★ Any Type Control



**15X**

### REPLACES PATCH PANELS VIDEO/AUDIO

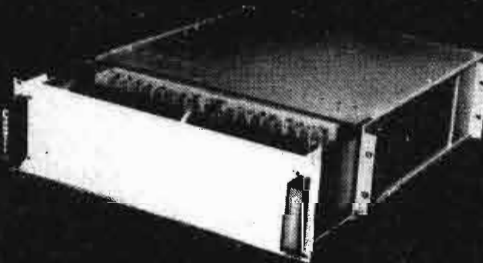
- ★ Plug-in Construction
- ★ Local or Remote
- ★ 12 or 15 Inputs
- ★ LED Status Indicators



**RX**

### REMOTE CONTROL FOR BROADCASTERS VIDEO/AUDIO

- ★ Plug-in Modular Const.
- ★ Momentary Pushbuttons
- ★ LED Indicators
- ★ Input-Output Amps
- ★ Optional Vert. Int.



**15X-2**

### TWO CHANNEL SWITCHER

- ★ Same features as 15X with one or two outputs



**20X-3**

### THREE CHANNEL SWITCHER

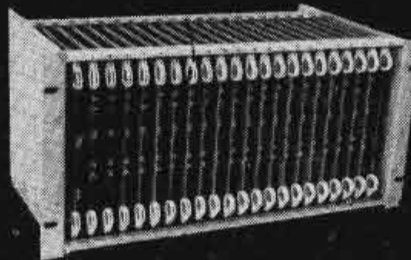
- ★ Same features as 20X with one to three outputs



**AX**

### AUDIO SWITCHER

- ★ Two 24x10 Matrices per frame
- ★ All Solid State
- ★ Card frame construction
- ★ Plug-in control logic



**QUALITY AT A PRICE EVERYONE CAN AFFORD!**

*Send For Brochures & Price List*

**COMMUNICATIONS TECHNOLOGY, INC.**

3070 LEEMAN FERRY ROAD, S.W. • HUNTSVILLE, ALABAMA 35801

205-883-7370

See us at NAB Booth #232

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## Exhibitors

(Continued from page 56)

### **IGM/Northwestern Technology, Inc.** Booth 605

New live operator assist control system (MARC VII), Instacart & Go-Cart random access cartridge handling systems, automation systems, printed logging equipment, memory units, expansion equipment for existing systems, Series 700 computer automation systems.

**NEW:** Go-Cart cart handler, MARC VII manual assist controller, Series 700 systems.

Suite: NA

### **Industrial Sciences (ISI)** Booth 539

Special effects generators 32 patterns routing switcher.

**NEW:** Custom audio console.

Suite: NA

### **Innovative Television Equipment** Booth 111

Television camera support dollies, tripods, pedestals, pan/tilt heads, microwave support products and accessories.

**NEW:** Model ITE-H1 torsion head and ITE-H5 hydro head. Pan and tilt heads designed for ENG cameras for both remote and studio camera control.

Suite: NA

### **International Tapetronics Corp.** Booth 307

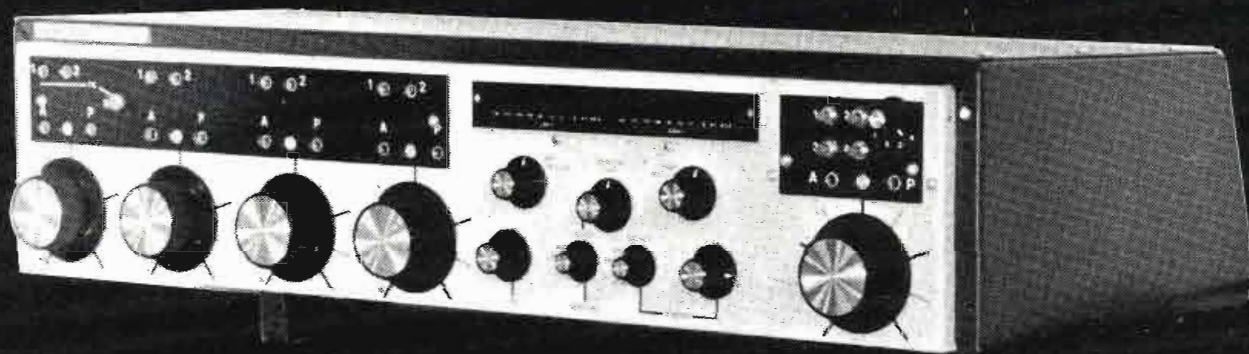
ITC will display its complete line of audio tape equipment including single and multi-deck premium cartridge equipment and the PD-II Series of economy cartridge machines. Also at the NAB you will see ITC's professional audio reel-to-reel equipment—both the premium 850 Series and the new economy 750 Series.

**NEW:** The 750 Series of professional, economy open reel audio equipment, showing both the reproducer and the recorder/reproducer. Also new this year is a totally automatic cartridge splice locator/eraser.

Suite: NA

(Continued on page 62)

# Tomorrows audio consoles . . . . . . here today!



NAB Booth  
#919

## THE BIGGEST ADVANCE OF AUDIO CONTROL IN THE LAST 15 YEARS . . .

Noiseless input select switches. Noiseless audition / off / program select switches. Noiseless audio mixers. Noiseless cue switching. Do these things make any sound at all? You bet! Probably the cleanest sweetest low distortion sound you've heard from any audio console regardless of price. Not only that but these babies are loaded with features that: (1) you will only find in consoles selling for 5 to 10 times more; (2) you'll only find in these consoles . . . period.

From our exclusive illuminated Touch Pad audio select switching, thru our, "better

than a VU meter", solid state light emitting meters, to the highly reliable & noiseless method of audio control. That's not all. Prices that are almost unbelievably low (compared to what you're used to) and performance that takes second place to **none**.

Want more? OK, how about RAMKO's exclusive SIMUL-Q or our full range gain select on each input, or the cue and monitor mute select patch boards on each channel (except the last one). The plug in amplifier cards or the RF suppression.

For More Details Circle (164) on Reply Card

Call collect or write today. You'll find it both an exciting and profitable adventure!

### MODELS & PRICES

SC-5M Single Channel, mono . . .	\$ 605
DC-5M Dual Channel, mono . . .	\$ 742
DC-5MS Dual Channel, stereo . . .	\$ 979
DC-8M Dual Channel, mono . . .	\$1,199
DC-8MS Dual Channel, stereo . . .	\$1,760

## RAMKO RESEARCH

3516 C LaGRANDE BLVD.  
SACRAMENTO, CA 95823  
Telephone (916) 392-2100

## Exhibitors

(Continued from page 60)

### **International Video Corp.** Booth 514

IVC-9000 broadcast videotape recorders; IVC-7000 broadcast color television cameras (studio and portable).

**NEW:** Expanded line of 2-inch and 1-inch broadcast recorders and color cameras. New all-purpose digital timebase correctors.

**Suite:** Executive House, #3812

### **Jampro Antenna Company** Booth 615

Circularly polarized FM antennas, circularly polarized TV antennas.

**NEW:** Top mounted circularly polarized television antenna.

**Suite:** NA

### **Kaman Sciences Corp./BCS** Booth 809

BCS will display its complete family of computerized traffic and accounting systems for radio and television. In addition, computerized interfaces from BCS traffic systems to automated control room switchers.

**NEW:** BCS 1100 system which handles AM/FM/TV and automated switching simultaneously.

**Suite:** McCormick Inn

### **Kliegl Bros.** Booth 508

Lighting equipment (theater, television, film)

**NEW:** Q-level 2000, Kliegpac 9 (6000W), lighting fixtures.

**Suite:** NA

### **KSN, Inc.** Suite 402

Time base corrector and character generators.

**NEW:** Low cost production character generator. Model CG-410.

### **LENCO, INC., Electronics Division** Booth 707

Video terminal and test equipment, digital genlock sync generators, NTSC color encoders, color stabilizing amplifiers, video presence detectors, video, pulse and subcarrier amplifiers, and the modular 300 system, including sync generation, video test signals, pulse and video distribution modules.

**NEW:** 300 System modular video test signal generators, e.g. multiburst/sweeper, stairstep/ramp generators, etc.

**Suite:** McCormick Inn, #601

### **Listec Television Equipment Corporation** Booth 306

Television camera mounting equipment.

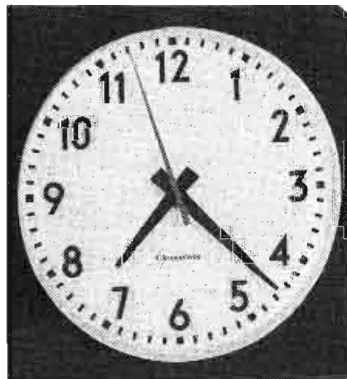
**NEW:** Kestrel powered camera crane.

**Suite:** NA

(Continued on page 64)

## CLOCK SYSTEM AUTOMATICALLY SYNCHRONIZED TO NBS

Featuring  
The New  
Illuminated Impulse Clock!



- Designed for darkened TV Studio
- Extremely silent operation, no oil bath required.
- Easy time setting from rear.
- Low voltage and current requirements:  
12V at 12ma, 24V at 6ma.
- Easy to follow impulse action.
- Wall, rack and console mounted units.
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Available in 5", 8", 12" and 16" models  
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**CHRONOTRON SYSTEMS INCORPORATED**  
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Phone: 516-248-4858

See us at NAB Booth No. 629

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## CASSETTE TIMER



**NEW!**

Another  
**FIRST** from the  
leader in tape timing  
devices. Complete, ready  
to plug into your **2850** Cassette machine.  
Timer with re-cue function standard.  
Presets optional for editing ease.



### **VAMCO ENGINEERING**

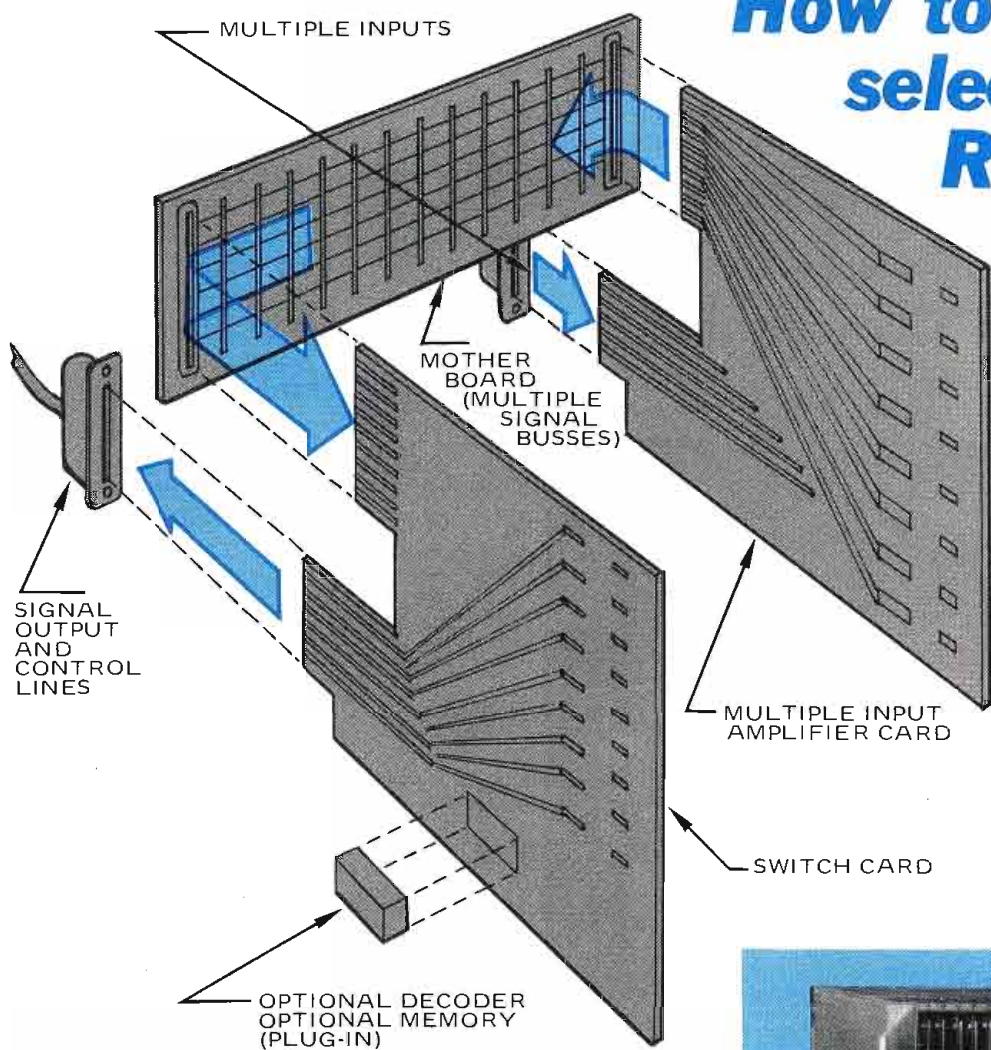
Box 7512  
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Call Collect (918) 252-4142, 747-7812  
*leadership through creativity in design*

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BROADCAST ENGINEERING



# How to select a ROUTING SWITCHER!...



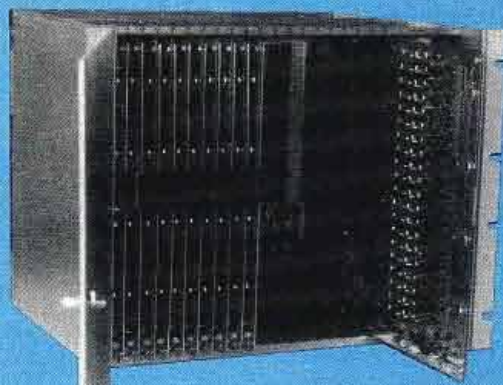
- Select for PERFORMANCE
- Select for COST EFFECTIVENESS
- Select for RELIABILITY
- Select for EXPANDABILITY
- Select for RELIABLE SOURCE

**Select DYNAIR**



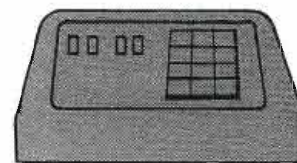
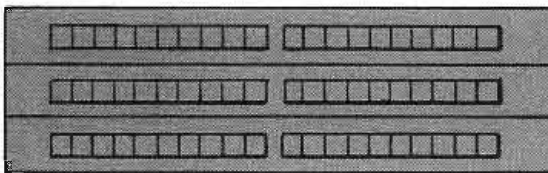
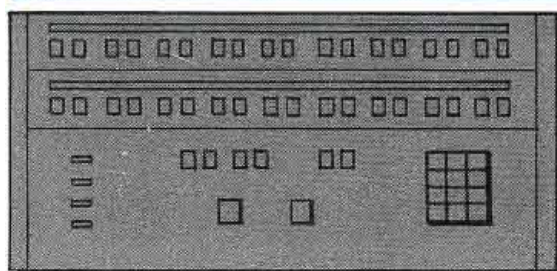
**SERIES 8100 AUDIO SWITCHER**

Frequency Response  $\pm 0.15$  dB (20 Hz to 20 kHz) – Harmonic Distortion less than 0.15% – Hum and Noise 85 dB below maximum output – Crosstalk better than 70 dB



**SERIES 1400 VIDEO SWITCHER**

Frequency Response 8 MHz  $\pm 0.1$  dB, 12 MHz  $\pm 0.5$  dB – Differential Phase  $0.1^\circ$  – Differential Gain 0.1% – Crosstalk better than 60 dB



Pushbuttons to computers control our switches. Specify from an inventory of standard controls, describe your desired control, or invent your own. Our crosspoints are addressed discretely or with BCD so flexibility comes naturally. **DO IT YOUR WAY!**

**DYNAIR ELECTRONICS, INC.**

6360 FEDERAL BLVD., SAN DIEGO, CA. 92114  
PHONE: (714) 582-9211; TWX: (910) 335-2040

DYNAIR

## Exhibitors

(Continued from page 62)

### **LPB Inc.** Booth 813

Complete line of studio broadcast equipment including six consoles. One of which will be an operating unit on our DJ8 furniture system.

**NEW:** A 10 channel audio dual stereo console.

Suite: NA

### **Marconi Electronics, Inc.** Booth 301

Marconi Mark VIII-B automatic studio and portable color television cameras, featuring new HOP pick-up tube; Marc VIII telecine, type B3404; D.I.C.E. all-digital NTSC/PAL/SECAM standards conversion equipment; EEV camera tubes; test equipment.

**NEW:** Mark VIII-B camera to be shown with new highlight overload protection (HOP) camera tubes; D.I.C.E.—Digital Inter-Continental Conversion Equipment.

### **Marconi Instruments** Booth 301

Automatic TV quality monitor system, TV non-linear distortion analyzer, test line generator and inserter, video sweep analyzer.

**NEW:** All systems now compatible with NTC #7 recommendations. New data selector Model 2917 for remote interrogation and reporting of TV picture quality.

Suite: NA

### **McCurdy Radio Industries, Inc.** Booth 704

Audio consoles, turntables, intercoms, audio distribution and speaker systems.

**NEW:** Modular consoles for Mono, Stereo or Quadraphonic applications, tape input switcher (SA141).

Suite: NA

### **MICMIX Audio Products, Inc.** Booth 829

Master-Room series reverberation chambers, LED panel meter with switchable rms/peak indication and switchable dBm/top-of-equipment indication.

**NEW:** An improved model of the STUDIO B series Master-Room reverb and a brand new 'C' series.

Suite: NA

### **Micro-Trak Corp.**

**NEW:** Audio control centers—line of four channel stereo & monaural consoles.

Suite: NA

### **3M Brand Video Products Datavision Video Products Mincom Division, 3M Company** Booth 529

Electronic video titling system, video processing equipment, video signal & distribution equipment, video art memory system, Quad DOC, production switcher.

**NEW:** Model 5110 colorizer/keyer, Model 5120 outliner, D-2000 title generator, Model 1114 production switcher.

Suite: NA

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Many people think of Stainless as only tall tower specialists, but we are also experts in AM/FM. We supply as many radio towers as anyone else—and have for a long time.

Whether you require a single 200 foot AM tower like WMMM in Westport, Connecticut, an 8 tower array like KULF in Houston, or even a 2000 foot tower, our standards of excellence in engineering, workmanship and materials are always consistent and our prices are always competitive.

So if AM or FM is your field, think of Stainless for your tower—and call us.

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TWX 510-661-8097

For More Details Circle (157) on Reply Card

(Continued on page 66)

# RCA power tubes of the future have a remarkable past: actual lifespans up to 30,000 hours.

Tube Operating Hours Reported by 20 TV Stations*		
<b>Up to 5 kW</b> Types 8890 & 8806 Aural service	24,142 hrs.	21,329 hrs.
	12,263 hrs.	19,200 hrs.
	16,200 hrs.	14,000 hrs.
<b>Up to 12.5 kW</b> Type 8891 Visual service	10,096 hrs.	10,525 hrs.
	9,402 hrs.	
<b>Up to 17.5 kW</b> Type 8807 Visual service	16,600 hrs.	18,300 hrs.
	29,800 hrs.	21,200 hrs.
	30,100 hrs.	20,400 hrs.
<b>Up to 27.5 kW</b> Type 8916 Visual service	9,778 hrs.	9,776 hrs.
	7,875 hrs.	13,183 hrs.
	10,799 hrs.	

\*Serial numbers and tube type data available on request

RCA power tubes are at work now in new-generation color transmitters. Proving their value with an excellent combination of high gain, high linearity, plus long operating life.

*Documented* long life. In the table, you can see actual operat-

ing hours reported by 20 TV stations. That reliability comes from RCA's sturdy, coaxial CERMALOX® construction and thoriated-tungsten mesh filament, which minimize inductances and feed-thru capacitances. So you can use simple, economical broadband circuitry.

In fact, RCA can supply you with the right circuit and cavity to go with the tube you select.

For high performance and proven long life in a wide range of power tubes, there's one thing to do. Contact your RCA Representative. Or, RCA Power Tube Marketing, Lancaster, PA 17604. Telephone 717/397-7661.



# RCA

For More Details Circle (158) on Reply Card

## Exhibitors

(Continued from page 64)

### **3M Company, Magnetic Audio/ Video Products Division** Booth 527

Complete line of quadruplex and helical videotape, videocassettes and video cartridges. Full line of video accessory items.

Suite: McCormick Inn

### **3M Company, Mincom Division** Booth 529

Broadcast video products including: character generators; production switchers; video animation systems; video processing and amplifying equipment.

**NEW:** D-2000 high resolution; low cost character generator; Model 1114 small, full function production switcher; D-8000 video synthesized animation system; keyer/colorizer; image enhancer; video outliner and others.

Suite: NA

### **Microwave Associates** Booth 309

STL intercity links at 2 GHz, 7 GHz, and 13 GHz. Long band intercity microwave systems. ENG microwave systems, including MA-13CP miniature camera. Bantam weight TV pickup links, 2 GHz van links and down links.

**NEW:** Solid State "window" microwave relay system for ENG.

### **Mohawk Wire & Cable Corp.** Booth 212

Television color camera cables, connectors and cable assemblies for most American and European manufactured color cameras.

Suite: NA

### **Mole-Richardson Co.** Booth 114

Studio lighting equipment.

**NEW:** Type 40310 Teenie-Weenie-Mole Kit.

### **Moseley Associates, Inc.** Booth 505

Newly-revised PCL-505 series STL utilizing all solid-state on-frequency RF amplifier in transmitter; Models SCG-9 stereo generator; Series "8" subcarrier system; TRC-15A remote control system; RPL-3 and RPL-4 remote pickup links; DRS-1 digital remote system; DCS-2 digital control system with computer option.

### **Nagra Magnetic Recorders, Inc.** Booth 708

Nagra portable audio tape recorders and accessories.

**NEW:** Kudelski QGB 10½ inch reel attachment and QTIM tape timer for use with nagra series IV & 4.2 tape recorders.

### **NEC America, Inc.** Booth 316

FS-10B Frame Synchronizer with video compression; FS-12 Frame Synchronizer with video compression; and FS-12 Frame Synchronizer with time base corrector.

**NEW:** MNC-61 Micropower hand held color camera for ENG system; TT-3000 Helical Scan video tape recorder; NTC-4000 Time Base Corrector for U-Matic VTR.

Suite: NA

### **Orban/Panasound** Booth 909

Spring reverb, dynamic sibilance controller, stereo synthesizer, parametric equalizer.

Suite: NA

### **Pacific Recorders And Engineering** Booth 717

Multilimiter; Multisync.

**NEW:** Digiclock, Digital stopwatch in the form of a clock. Tape Velocity Indicator, variable speed for MCI recorder.

Suite: NA

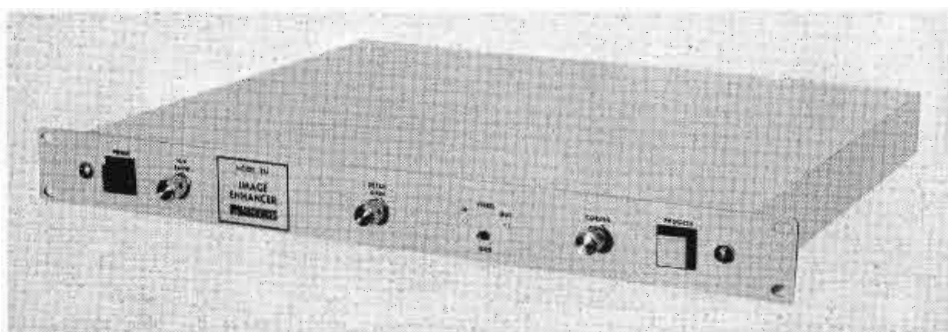
### **Phelps Dodge Communications Company** Booth 625

FM antennas, rigid coaxial transmission line, transmission line accessories.

(Continued on page 68)

# image enhancer

- Up to 175% enhancement with adjustable H/V balance
- Better than 60 dB signal/noise ratio
- Comb filter provides optimum enhancement without chroma distortion or noise addition
- Models available for automatic or manual enhancement, encoded or RGB inputs, NTSC, PAL or SECAM



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# Our antennas make waves.

## 350 MHz to 13.25 GHz

At Anixter-Mark, we make a startling array of microwave antennas spanning the frequency spectrum from 350 MHz to 13.25 GHz.

All our microwave antennas are backed by over 20 years experience and innovation. Look at the two antennas featured here. You'll see what we mean.

## Rugged center-fed feed antenna

5.9-13.25 GHz. High efficiency, low side lobes. Unique backframe enables this antenna to withstand 125 mph wind (200 KM per hour) with 1 inch (25mm) of radial ice. Maintains deflection to less than 0.1° in 70 mph (110 KM per hour).

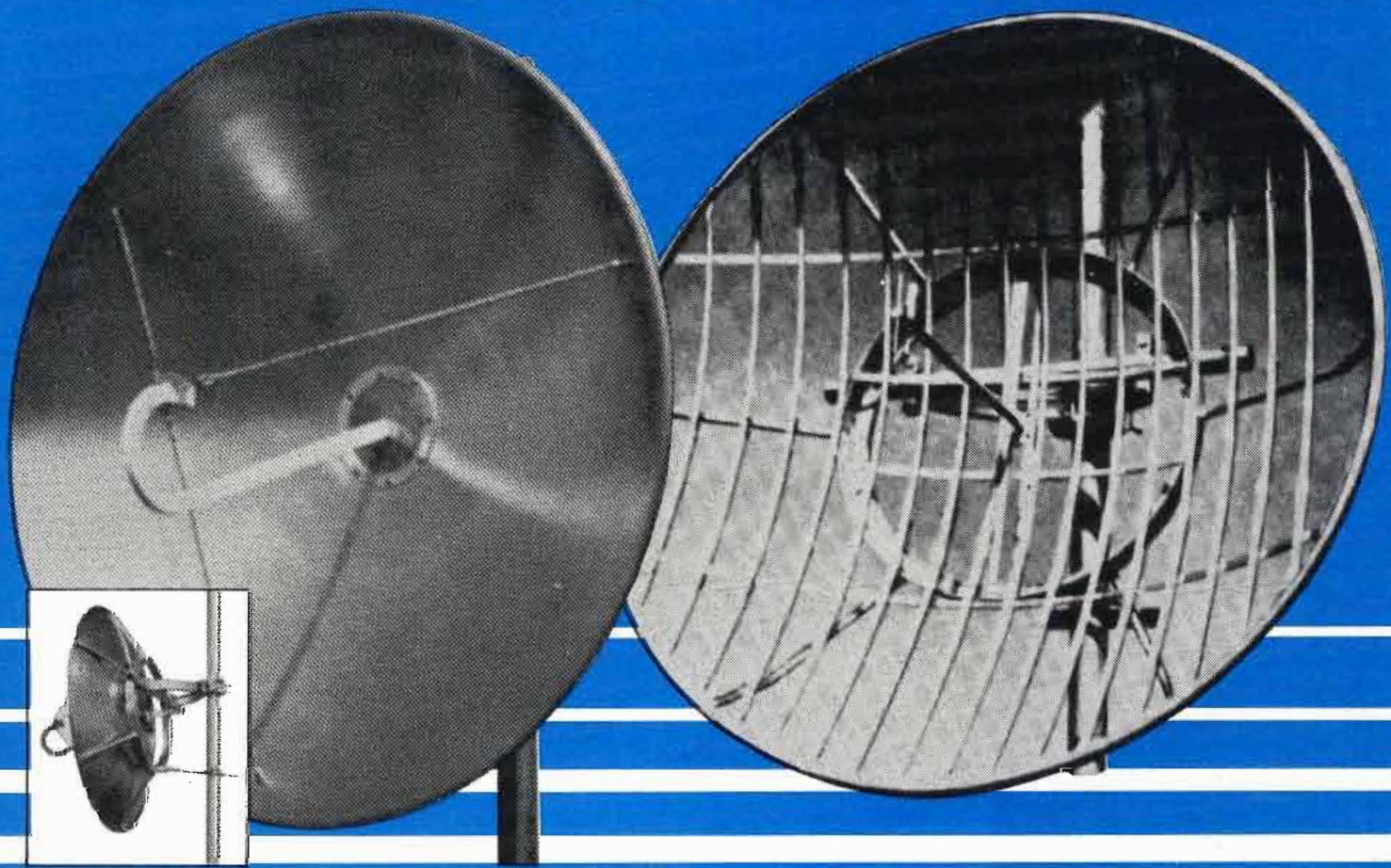
This antenna meets or exceeds EIA Standard

RS-222B and RS-195A. It features a low profile for bulk crating, continuous polarization adjustment and is pressurable to 10 PSI. Feed guy wires included on all models 4 feet and larger. High performance "Shroudome" and ultra-high performance antennas also available.

## Low windload antenna

Low profile grid design cuts tower construction cost with no sacrifice in electrical performance. Three-point mounting greatly reduces path alignment and installation time.

Ringbacks further improve already extremely low wind loading characteristics of Anixter-Mark grid antennas compared to solid dish type parabolics. Frequency range: 350-2700 MHz. Others available on special application. Nest 4 to a crate.



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# ANIXTER-MARK

Manufacturers of a Full Line of Point-To-Point Antennas

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DON'T MIX THE GOOD  
SOUND WITH ANYTHING  
BUT THE BEST .....



THE  
MODEL 6444 STEREO AUDIO  
CONTROL CONSOLE

Micro-Trak's new 6444 Professional Audio Console; The console to pick for your small studio, remote, portable or production four channel, stereo board. With its two turntable, two microphone, and three auxiliary inputs coupled to four high quality mixing channels, it makes the ideal choice for that, use everywhere, broadcast console.

Totally professional from design...to application of the highest quality components...to its heritage from a company that's been providing broadcasters with the finest audio equipment for over thirty years, the 6444 has it all.....

Smooth pots...FET audio switching Panel laid out for the Pro...Metered plus four dBm output, balanced to drive 600 ohms...Monitor output... Inbuilt cue amp and speaker...noise so low its virtually not there... Built to take all you can give it and still come up swinging .....

And best of all the 6444-BT is only \$895.00 and our mono version, the 6454-BT is only \$745.00 .....

See your Micro-Trak dealer for specifications, or write directly to our marketing department, or

SEE US AT NAB BOOTH 815

**MICRO-TRAK**



620 RACE STREET  
HOLYOKE, MA. 01040

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## Exhibitors

(Continued from page 66)

### Philips Audio Video Systems Corp.

Booth 516

Broad line of video equipment.

**NEW:** ENG Camera.

Suite: Conrad Hilton, 1600.

### Potomac Instruments Inc.

Booth 523

AM, FM, TV field strength meters, antenna monitors, RF frequency synthesizer/detector.

**NEW:** FIM-71 VHF field strength meter.

Suite: NA

### Quick-Set, Inc.

Booth 312

Complete line of television support equipment. Products for all studio, remote, ENG and special effects requirements. Featuring newly acquired Houston Fearless product line and new line of fluid heads for all cameras 5-150 lbs.

**NEW:** Houston Fearless support line and ENG equipment.

Suite: NA

### Ramko Research

Booth 919

Audio consoles, turntable preamps, mic line amps, distribution amps, power controllers (remote), studio monitor amps, automatic tape winders, mic/limiters.

**NEW:** Audio consoles, mic/limiters/ super power amplifiers

Suite: NA

### Rank Precision Industries, Inc.

Booth 201

Rank Cintel 16 and 33 mm. Flying Spot MK III Color Telecine, with vertical aperture corrector, electronic automatic color corrector, NTSC Encoder, and remote control system; Varotal 30, Varotal VRM, Varotal XX, Varotal 16:1 RM, and TV broadcast lenses.

Suite: NA

### RCA Broadcast Systems

Booth 500-502-504

Complete ENG systems, studio cameras, film systems, video tape systems, control equipment, audio systems, radio and TV transmitters, broadcast antennas.

**NEW:** Production model, TK-76 electronic news camera; small mobile TV van.

Suite: Conrad Hilton, Imperial South

### Recortec, Inc.

Booth 101

Video spot assembler, alternative or cartridge back-up system, VM-1000 helical video tape recorder—a broadcast quality one-inch recorder with omega format, R-MOD for quad video tape recorders—a modification package for constant tension and open the path to full automation.

**NEW:** Video spot assembler.

Suite: NA

### Richmond Hill Laboratories

Booth 100

Broadcast video production switchers, broadcast television automation, video signal test generators, video and pulse distributors, amplifiers, unipulse system, video clamping and equalizing amplifiers.

**NEW:** Three new video production switchers, models VPM 3112, VPM 3220 and VPM 3320. New test generator STG 700, new unipulse encoder and decoder.

Suite: Ambassador

### Russco Electronics Mfg. Inc.

Booth 551

Turntables, broadcast audio consoles, rack mounted audio amplifiers, phono preamps, speakers, microphones, headsets, tone arms.

**NEW:** Ten channel consoles—both stereo and mono.

Suite: NA

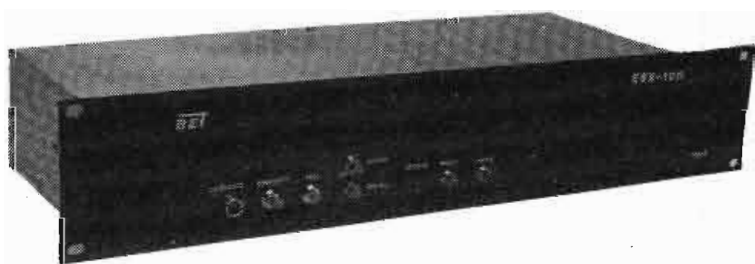
### Scully/Metrotech Division of Dictaphone

Booth 817

Professional audio tape recorders with AC and servo capstan drives. Mono, stereo and multitrack. Broadcast

(Continued on page 141)

- **FCC Type-Accepted and Certificated**
- **\$325 Price**  
\$275 Without Receiver
- **Stereo or Dual Balanced-Line Switching Included**  
Not Optional or Do-It-Yourself
- **Complete System In a Single 3½ Inch Rack-Mount Unit**
- **CMOS Digital Comparator Decoder**  
No Tuning-fork Filters
- **Socket Mounting of All ICs and Relays**
  - **Full Testing and 2 Day Burn-in of Every Unit**
  - **Five Year Parts, One Year Labor Warranty**



**THE BET EBS-100**  
**It's Not Too Late To Change Your Mind**  
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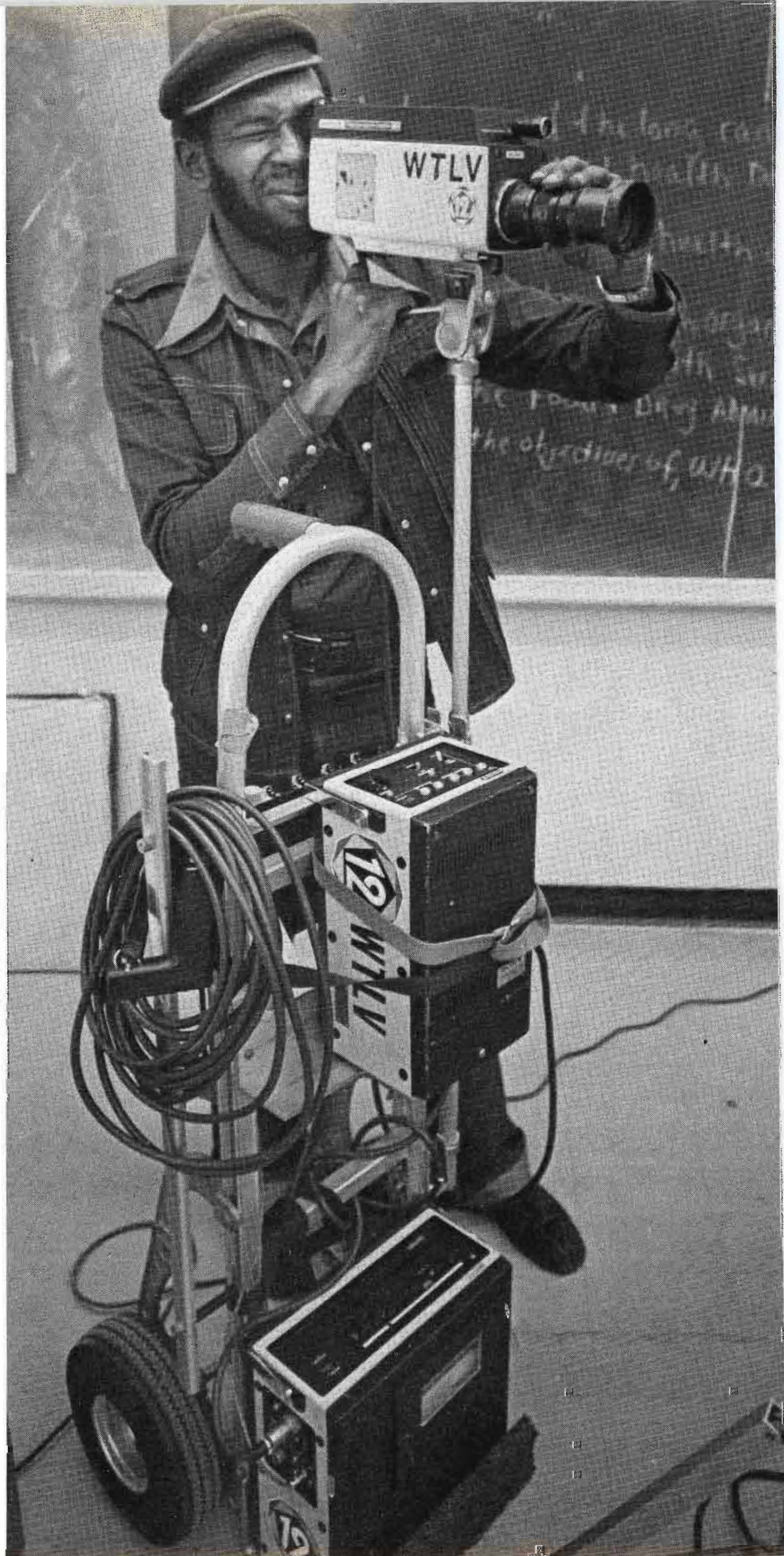
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 LEAST  
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 DECODER -  
 RECEIVER  
 SYSTEM  
 INCLUDES  
 FEATURES  
 THE  
 EXPENSIVE  
 SYSTEMS  
 DON'T.**



**This golf cart-like apparatus is used to transport ENG equipment from the van into the news scene. Below the camera is the CCU. The 3/4-inch tape machine is at the bottom.**



# FILM VS. ENG

## A state of the art comparison

By Ron Whittaker

Now that the dust has started to settle just a little on the whole film-to-ENG issue, it is a good time to do a critical examination of the ENG and film approaches to TV journalism and try to determine the relative strengths, weaknesses, problems, costs, etc. of each system.

Although the "PR value" associated with the quick change to ENG was a real competitive advantage in many markets, some stations have now found that they are suffering with some hardware-related problems that they did not expect...problems that could have been avoided if they had made some different decisions on the purchase of equipment, and problems which have resulted from trying to make ENG equipment suddenly "do everything".

What follows will be a look at ENG and film from the standpoints of (1) the relative technical quality under different conditions, (2) the strengths and weaknesses of each

approach in actual on-the-job situations, (3) the time, steps and problems involved in preparing ENG and film stories for broadcast, and (4) the total costs represented by each approach.

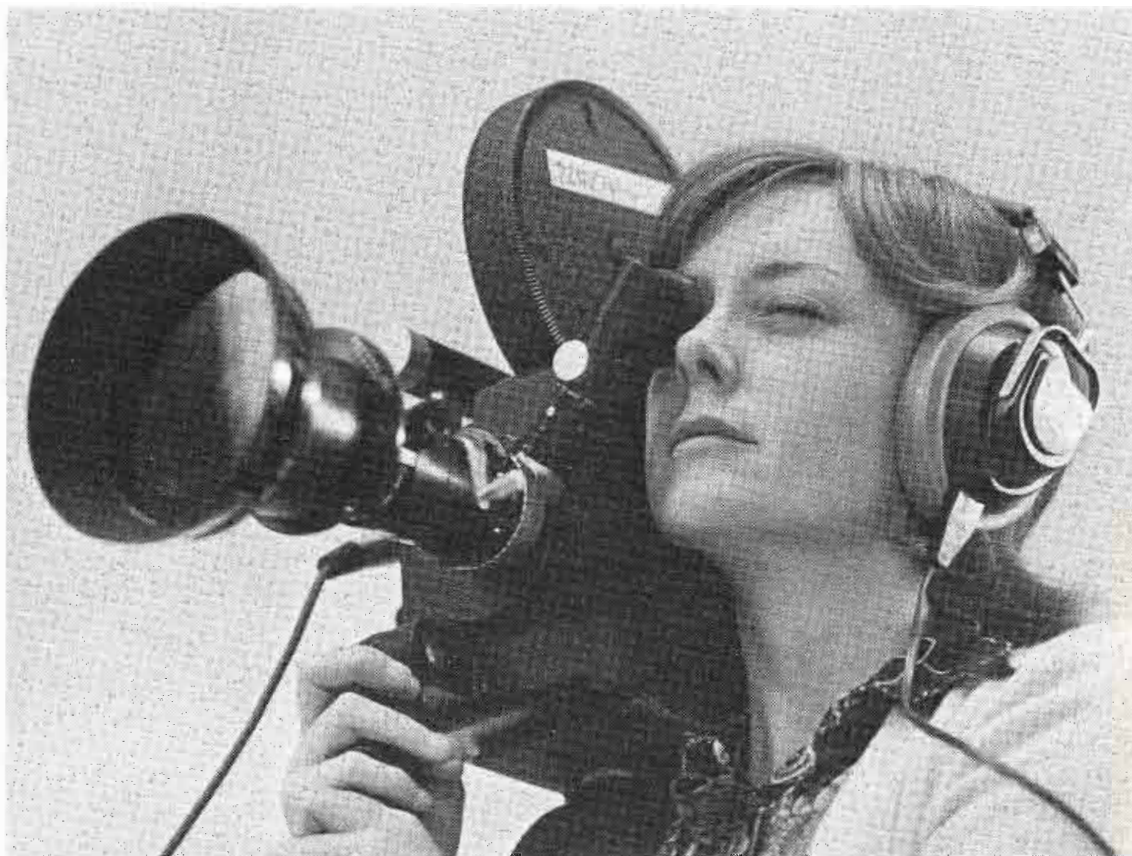
### **Relative Technical Quality**

Although technical quality is very important—especially in highly competitive markets—it is certainly not THE most important consideration in TV news. (We would be hard pressed to find a TV news director that's still working who refused to run the VTR of man's first step on the moon or the film of the assassination of Robert Kennedy because the technical quality of these pieces fell short of standards.) Just getting the story is the first consideration—"something" is better than "nothing" on an important story. After you have the "something" under control, you worry about such things as how fast you can get the story on the air, the

technical quality, etc.

But, for now, let's pass up these other issues and examine the relative technical quality of the 16mm film and ENG broadcast images. It is an interesting fact that although the information-carrying capacity of a high-quality 16mm image is 50 times greater than the resolution or detail capability of video in the U.S. system of television, this same film when presented by television will appear slightly inferior to a good quality image from an electronic camera. When translated to video, film (even with image enhancement) will appear somewhat "softer" and less "crisp" than video from a high-quality news TV camera. The reasons for this are complex, but they have to do with such things as frame-by-frame image stability and light "scatter" in the telecine optics.

It is important to note that the above comparisons are based on the highest quality video cameras—



Weighing 13 pounds when fully equipped, this 16mm sound-on-film camera can produce newfilm under low light levels and some conditions not presently recommended for ENG equipment.



**A plus for ENG** is that news deadlines can be extended by about 30 minutes. Of course, if the feed is live, you're into real time coverage. This does make special demands on the newsroom team.



**After returning** to the newsroom, the reporter plays back the news story and records a time code on the tape. The time code makes it possible to recall important segments without again viewing the entire tape.

ENG cameras in the \$35,000 plus price range. As the price goes down, so does the quality, and the superiority of the video cameras over enhanced 16mm film is lost with many of the less expensive portable video cameras.

Certain quality-related problems can be encountered with video cameras which do not plague the film camera image. Image "lag" and "smear" can be especially noticeable and objectionable with some video cameras when movement is combined with high subject matter brightness values and low overall illumination.

As electronic technology improves, the problems of image lag and smear will undoubtedly disappear, along with another problem associated with some ENG cameras right now—difficulties in handling low light levels. Although it is difficult to make direct comparisons between electronic and film cameras because of differences in

equipment and acceptable quality standards, the light sensitivity of film is presently recognized as being about three F-stops greater than ENG cameras. Ektachrome 7240 is commonly force-processed to an EI (ASA) of 500, which makes possible newsfilm in as little as 10 footcandles of light. Although the time will undoubtedly soon be here when ENG equipment will produce high-quality video under such low light levels, as things now stand, most ENG equipment requires more light to meet quality standards.

One of the undesirable consequences of this extra light requirement has been a return to the straight-on, single-light-beside-the-camera technique to provide an acceptable illumination level for interior shots. This has amounted to a giant step backward in news-production quality. The result is reminiscent of newspaper photography in the early '50s (and before),

# We've lightened your load.

## Here and here.

**Our new portable video cassette recorder/player makes eyewitnessing the news easier than ever before.**

JVC has done two things to improve your ENG capability: we've made the gear lighter and we've lowered its initial cost.

Our brand-new CR-4400U Color Portable Capstan-Servo 3/4" U-VCR weighs only 24.5 pounds, complete with rechargeable battery and standard 20-minute videocassette inside. And it sits as lightly on your checkbook as it does on your shoulder.

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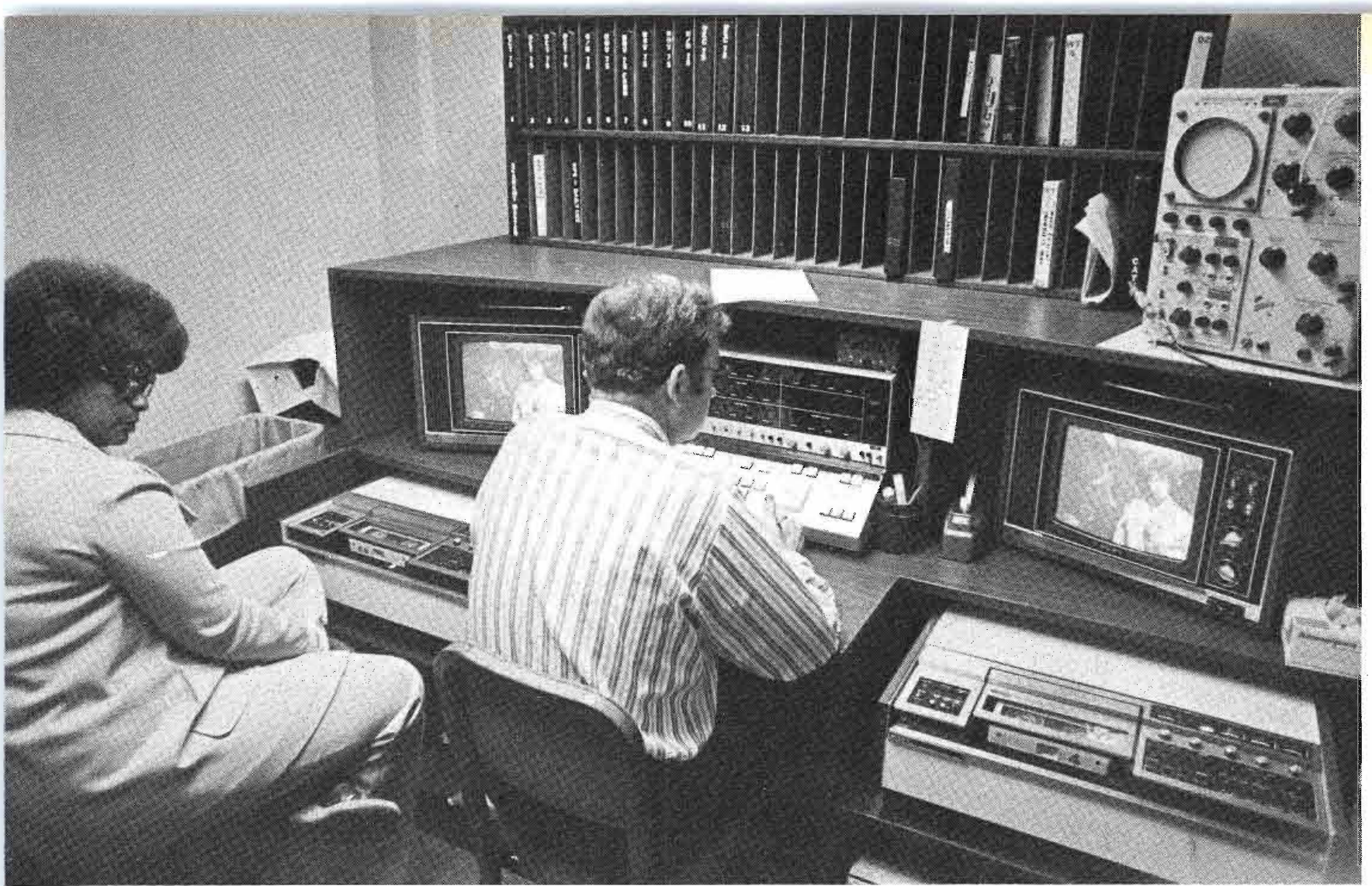
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**At the ENG console,** complex audio and video edits can be accomplished quickly and with single-frame accuracy. Here a reporter assists in the assembly of a news story she covered only 30 minutes before.

and the films by amateur filmmakers with their 8mm cameras mounted on light bars (which, by the way, has also become passé with the advent of existing light super 8 equipment in the early '70s). Except for emergency situations, such as an accident at night where there is no existing (natural) light, this single light approach (for reasons too numerous to go into here) just represents poor photojournalism and poor television production. This problem will undoubtedly solve itself in the coming months and years as new, more sensitive video cameras become available. Even now, some of the better video cameras will handle most brightly-lit interior situations without too many negative consequences.

One last thing should be mentioned to complete the quality comparison between film and ENG. With film—especially with the reversal film approach generally used in news work—dirt and scratches will quickly distract from quality.

With ENG, such equipment as dropout compensators and the so-called “super time-base correctors” will cover a multitude of “flaws” along the line and produce very clean, crisp video.

#### ***On-The-Job Differences***

The very significant advantage that ENG equipment has over film, of course, is in its immediate VTR playback and “live” coverage capability. Unlike film, there can be an immediate confirmation of content and quality, and adjustments can be made on a moment-to-moment basis by the cameraman on the scene, or by a news director monitoring at the studio. This makes for fewer content and quality surprises all along the line.

ENG equipment is still considerably heavier and more conspicuous than film equipment, however. In sensitive news situations such as civil disturbances, the obvious presence of conspicuous TV equipment has sometimes resulted

in the creation of news, instead of just the reporting of it. Small 16mm and professional super 8 film cameras are comparatively inconspicuous and can generally shoot in existing light.

Since “top-of-the-line” 16mm sound cameras, such as the Frezzolini LW-16 and the CP-16, weigh only about 13 pounds completely equipped, they can be hand-held by one person. And ENG crew making a tape of a story (the vast majority of ENG assignments are not “live”, of course) must carry something like a 13 pound camera and a 22 pound backpack, and maneuver with a 31 pound VTR unit. To this you generally need to add the weight of a VTR battery pack or power supply. Typically, a golf cart-like apparatus is used to move the equipment around at the scene of the news event. (It has been said that 16mm equipment is **portable**, but high-quality ENG-VTR equipment is, to date, only **mobile**.)

Under adverse conditions, film has an advantage over present ENG

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equipment. In contrast to film equipment, some ENG-VTR equipment cannot be used in high humidity, rain or snow. Problems also develop when ENG equipment is used in temperature extremes. (A Frezzolini will operate on its battery pack at temperatures down to -10°F.; a CP-16, down to +10°F.) Since vibration and motion will adversely affect recordings with most VTR equipment (and sometimes camera alignment) problems can also develop when this equip-

ment is used in moving vehicles.

Two more on-the-job differences should be mentioned before leaving this section. ENG equipment takes a bit of a warm-up period before it can be operated. Even though this is only about 30 seconds, there are occasions in covering news when this seems like a very, very long 30 seconds! Once a film camera is loaded, you can instantly be "making pictures" each time you squeeze the trigger.

And finally, a big plus for ENG.

After microwave paths are established in a city, stories can be beamed back to the studio from various locations, without the time-consuming and expensive need to regularly return with exposed film. The stories can either be microwaved directly back to the studio for taping as they are shot, or a VTR tape made "on location" can be beamed back later at a more convenient time, or after a simple and direct microwave path is found.

### Preparing The Story For Broadcast

In a way, both film and ENG-VTRs have to be "processed" before they can be aired. With film, this involves a rather complex and expensive chemical processing phase. With video tape, the image "processing" is accomplished by a totally electronic time-base corrector (TBC). The latter, being a real-time, on-line type of procedure, can be accomplished either as the story is transferred to a quad reel-to-reel or cart tape, or as the story is fed directly into a switcher for an on-air feed.

Time-base correctors—especially the so-called "super time-base correctors"—can accomplish some minor miracles in the area of general picture quality: improvements related to color stability and corrections, signal-to-noise ratio, velocity compensation, video compression, etc. However, as some stations have found out, they have their limits. Probably one of the biggest problems in this area has been with edits. One major station lost over 50 percent of its ENG stories until some major equipment bugs were traced down and corrected. In this case the stories simply could not survive the post-edit transfer to quad carts. The state-of-the-art requirements for ENG are still rather demanding, and anything less than first class equipment and operating procedures may result in problems.

Although the processing procedures for film are much more involved and time-consuming, the problem areas are much easier to recognize and deal with. This is primarily because film has been in use for so many more years. However, film processing also has its problems, splices that come apart in the processor, chemical contamination, etc. As things now

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stand, both the film and ENG approaches contain a degree of risk along the way from camera to screen. When all things are considered, the amount of risk for each approach is about the same, assuming each is used within the parameters of recommended procedures.

### **The Editing Phase**

In the editing phase of news preparation, the film and ENG approaches each have major strengths and weaknesses. ENG

editing by computer can be many times more flexible and creative than film editing. Highly sophisticated and exact edits with single frame accuracy are possible with VTR stories, combining, when necessary, a multitude of video and audio sources and special effects. Edits and effects can be previewed and adjusted as many times as necessary with computer editing before final effects are decided upon. With film you are typically working with the actual reversal

footage that will be projected. A-B rolls are not quite as easy to set up and "pull off", and complex video and audio marriages are more difficult.

The editing of film, on the other hand, does not demand complex and expensive equipment. Film editing is much simpler and more direct. With a set of rewinds, a film viewer, sound reader, splicer and a three-by-four foot table space, you are in business. The editing of film (as things now stand) can be accomplished faster than VTR editing; at least for simple, straightforward news pieces. What puts film 20 or so minutes behind in a race to "air" is processing. In the time a piece of film takes to be processed, a typical video tape story can be edited for broadcast.

### **Relative Costs**

And now we arrive at the bottom line of the whole ENG-film comparison—how much does each cost?

The initial investment for a typical, good-quality ENG unit is somewhere in the neighborhood of \$85,000. This assumes \$40,000 for a camera, \$13,000 for editing units, \$10,000 for a TBC, and \$20,000 for a microwave link. Obviously, the total can vary greatly, depending upon needs and preferences. For a large broadcast operation, a typical figure for getting into the ENG ballgame is \$200,000. If you are willing to accept the quality of modestly-priced equipment, it is even possible to "go ENG" for as little as \$7,000.

Turning to film, a first class film unit will cost about \$25,000. This assumes \$10,000 for a top-of-the-line SOF camera, \$11,000 for a processor and \$4,000 for editing and associated equipment.

Obviously, as far as initial costs are concerned, film has a tremendous advantage over ENG. However, once the initial investment is made, the cost advantage starts to move rapidly toward ENG.

For film and processing, 16mm film costs about 11 cents a foot, or about \$15-\$20 for average news stories (shot at a 2:1 ratio). Because video tape is reusable, the cost for ENG recording is a fraction of this—probably little more than \$1 per assignment under average (3/4 inch) tape life conditions. With such a cost difference, an \$85,000



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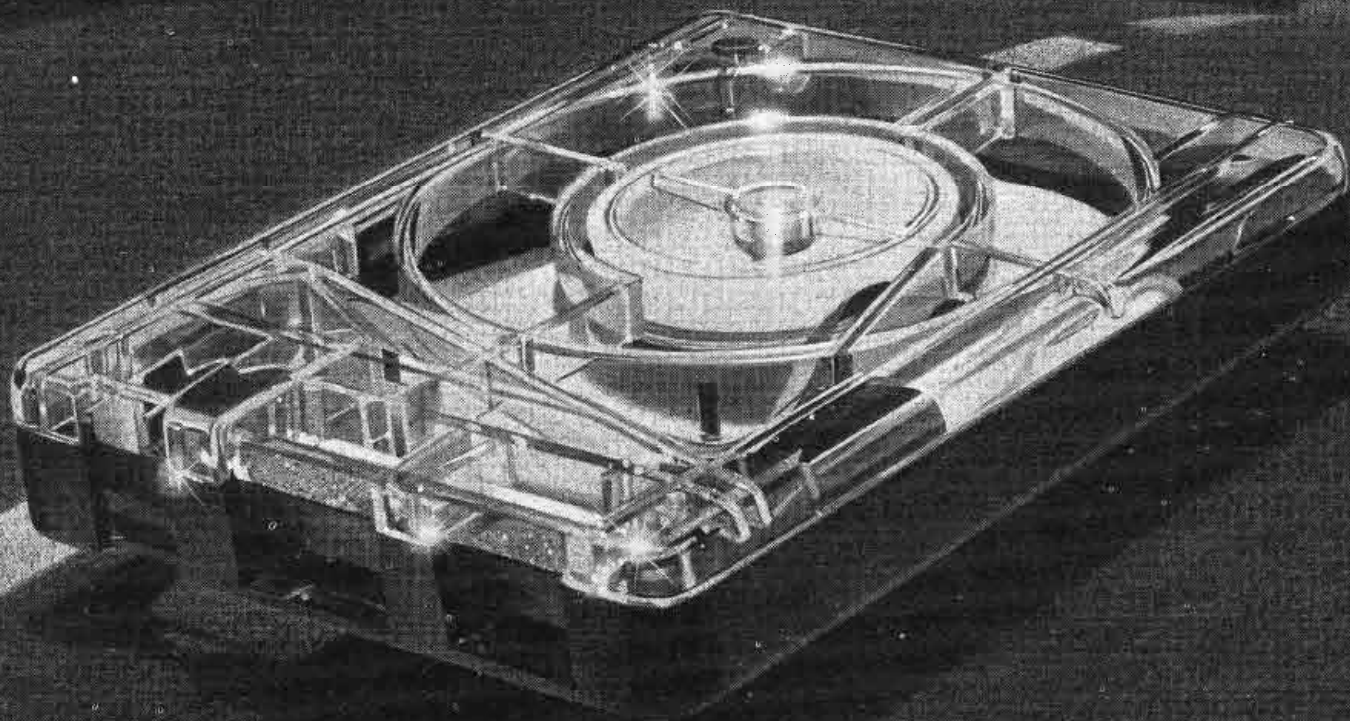
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investment in ENG equipment can be recovered in a few years.

One important thing needs to be stressed in relation to comparative tape-film stock prices, however. With film you have a permanent record of the news event which can be filed away and dug out at any future time for use in news "flash-backs", documentaries, or just to hold as an archival record. As long as the news tape is not "controversial", there is no present FCC regulation that would forbid the station from immediately reusing (erasing) the video tape. And, of course, regular tape reuse would offer maximum economy. But, it is indeed disquieting to want to "flash back" to an important news story and find upon checking that the tape now contains the 14th annual meeting of the Sopchoppy Daffodil Society!

A somewhat more prudent (but less economical) approach is to dub all news tapes onto a monthly master tape, as they appeared on the air in their final edited form. This will not give you the "out takes" that were originally shot, but

it will provide you with a second or third generation record of what was broadcast. The original tapes are then reused until they accumulate 100-200 passes. The great savings at this initial point encourages the shooting of both more "footage" and more stories. With more to select from, news editors should be able to improve the quality and quantity of local coverage. Some stations, in fact, have found that they have increased on-air "actuality footage" by 20 percent since investing in ENG equipment.

Turning to other expenses, repair costs (parts and labor) on equipment can be figured at about 10 percent a year on equipment with "moving parts", and at about two percent a year for totally-electronic equipment. Using these formulas, the upkeep on ENG and film equipment would probably be about the same.

The greatest expense, of course, will be labor or wages. The long-term advantage of ENG can be quickly erased if extra people are required. In going to ENG, a part-time or full-time man will be

saved in the area of film processing. In some cases this just amounts to a shift in position, however, if an extra person is needed to handle the portable VTR and/or microwave equipment. Because this area will represent your greatest long-term expense, you should check over the possibilities carefully here—especially if there are union implications involved.

#### *In Summary...*

ENG offers some important advantages over film **when** good ENG equipment is used under the proper conditions. As pointed out, however, film still has a number of important strengths. These strengths are primarily related to an ability to handle tough lighting and weather conditions...conditions that are often encountered in the TV news business. As things now stand, the best approach is to use both ENG and film, and in this way not sacrifice any news-gathering ability. In the highly demanding and competitive business of television news, all available technology needs to be used to its best advantage. □

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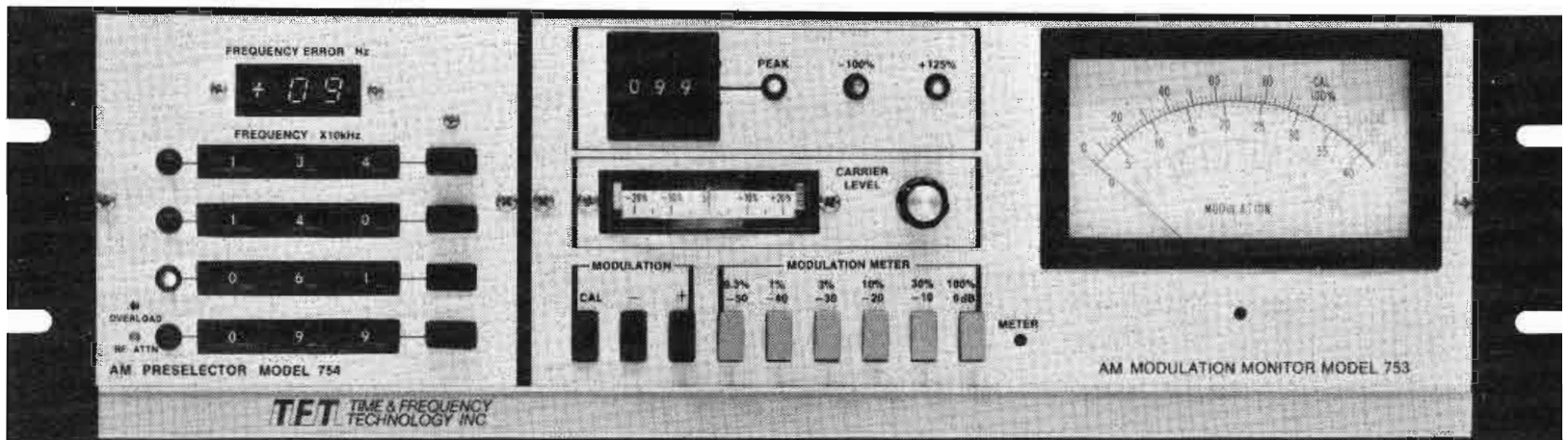
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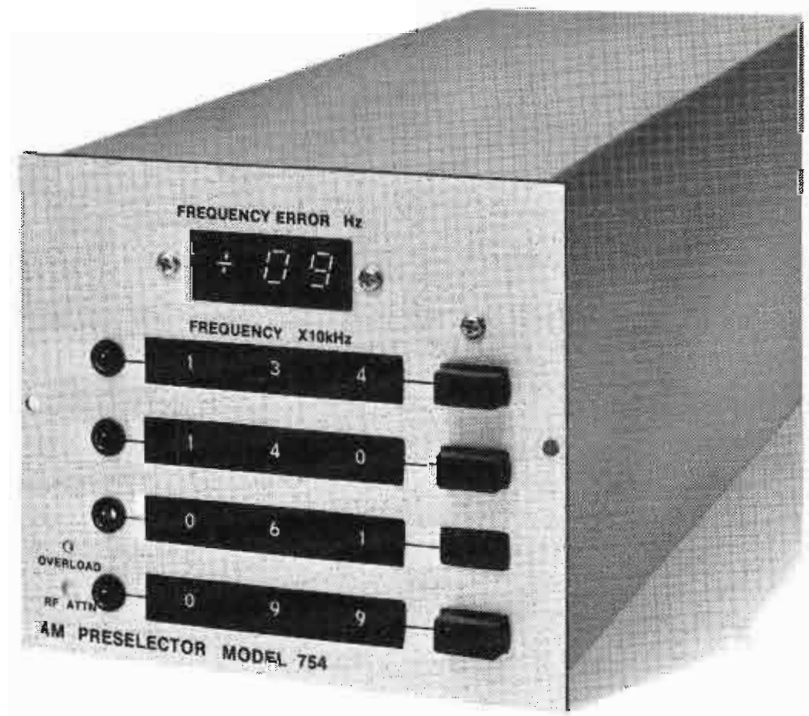
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# WBRE-TV Cuts Into Random Film Handling Costs

By George Andresky, Chief Engineer, WBRE-TV, Wilkes-Barre, Pa.

With all the talk we hear today about electronic news gathering (ENG) and video-tape, film is still an important part of our operations at WBRE.

We originate a tremendous amount of film, both for news and for location production of commercials. Also, about half of the commercials, promos and public service spots we receive are on film.

We are not rushing to convert our news capabilities to videotape. One reason is that our president, David Baltimore, sees problems with TV cameras, so we are moving ahead cautiously at the moment. We have four sets of film editing equipment for the news department which provide sufficient capacity to get our news film edited and on the air.

Film projectors also cost less to purchase and operate, considering head wear and general maintenance overhead for videotape equipment. Our film projectors require maintenance, too. We clean the gates regularly and spend some time in adjustments, but in the long run, it is much less costly on a day-to-day operating basis.

We also do very little conversion to videotape cassettes. Most national spots that come in reel-to-reel on videotape are used that way. The exception is when we get a spot which is used frequently. Then, we transfer it to a videotape cassette for convenience.

For local commercials, we do all of our location shooting on film, usually using Kodak Ektachrome MS film 7256 which is processed in

our own Pako EK 28 processor. Our art department usually films the commercials, and they are set up to do simple opticals, including double exposures and wipe-on lettering. When we need special effects, we dub the film to videotape for post-production.

When a film is cued in the RCA TCP 1624 cartridge projector, the first frame can be shown as a freeze-frame on the monitor at the control board. The center monitor shows the first frame of a Seven-Up commercial. The projector is cued from the board. However, a one-second delay has been built in because the projector reaches speed almost instantaneously.

## Random Access Film

Film is not without its problems, though. One problem has been the handling of random film—especially national commercials, promos and public service spots. Like most stations, we have been splicing each spot on long reels, in the order it appears in the schedule. Anything that had to be repeated was held for a run-separate machine.

David Baltimore had been talk-

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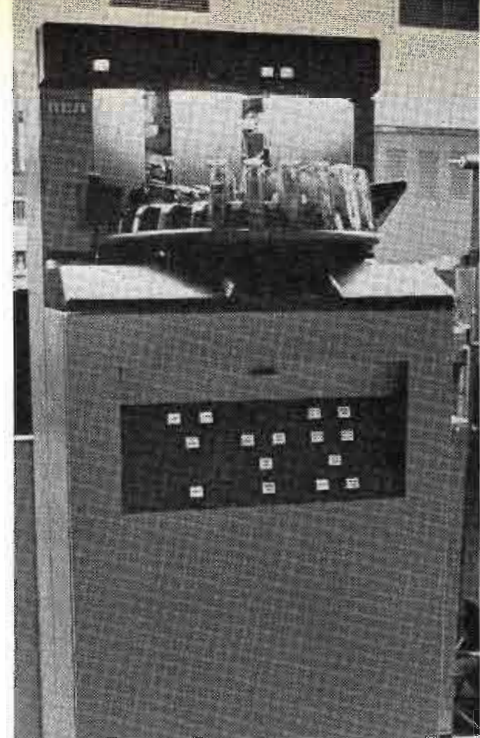
ing with people at RCA for several years about the need for a random-access projector. When they announced the RCA TCP 1624 cartridge projector, we were one of the first stations in the country to install one. The projector was delivered last April. We put it on an island, which was installed a year earlier with a multiplexer, a TK28 camera and a TP66 projector. We knew the projector was coming, so we left a port open for it. Within a week of its arrival, we were using the new projector.

### **Film Spots**

It greatly simplifies using film spots. The idea is to handle random film as an individual package contained within its own cartridge.

Within three months, we put about 700 commercials, promos and public service spots in film cartridges. As new film becomes available, it is automatically loaded into cartridges.

The unit consists of two self-threading projectors. These operate independently and are controlled by internal logic. Most of the time, each projector is loaded with a film cartridge, and both are in "ready" condition—stopped on the first frame of the film. The automation operation activates the button for the first film and the correct projector is put on the air. After the film is finished, the other projector can be activated while the first one automatically rewinds its film back into the cartridge, de-



**One of the first** production models of the RCA TCP 1624 was installed at WBRE-TV for use with promos, commercials, and public service spots.

**For multiple runs** of a spot, or schedule changes, the carts can be removed and repositioned.



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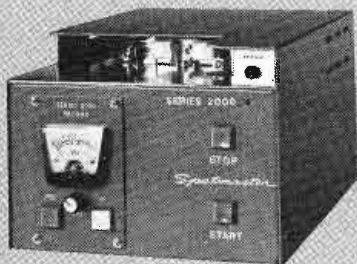
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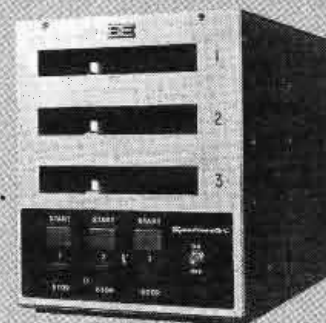
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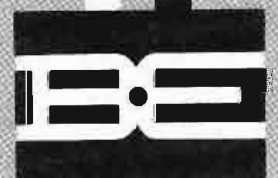
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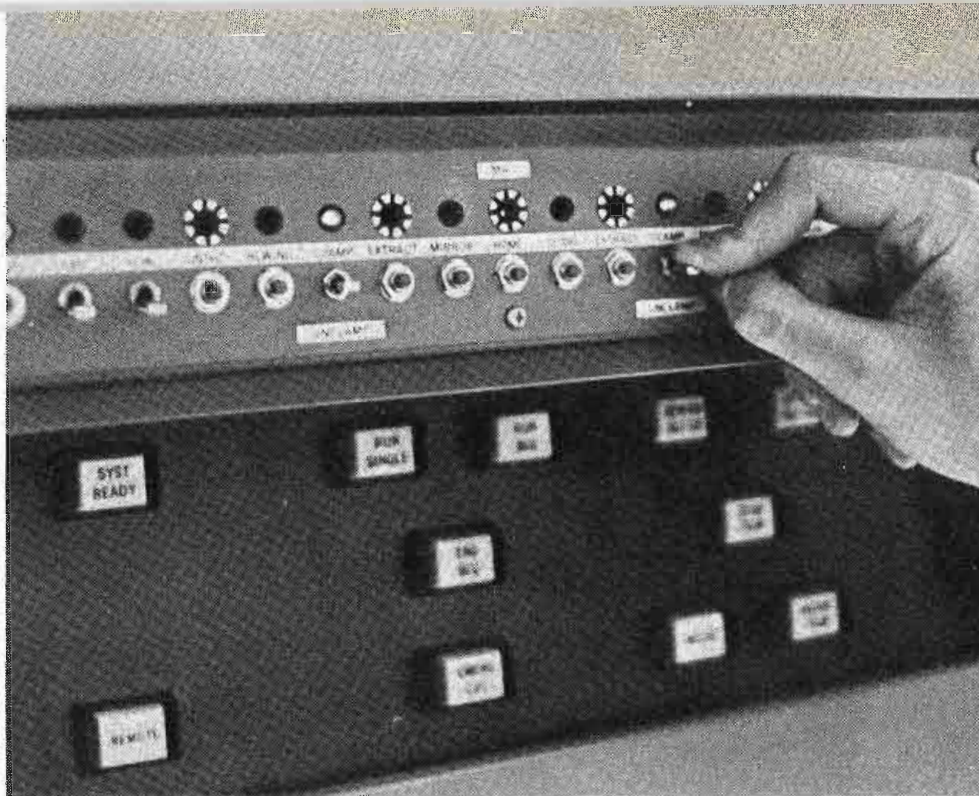
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The "library" for film and tape carts was designed by WBRE president David Baltimore. The film racks move across the racks for video tape on tracks (note racks in center of photo). Baltimore estimates the storage capacity has been increased by two or three times.

Though it usually is operated from the board, the cart projector can be operated from its own panel.

positing it in its designated slot in the tray. Then, it goes on to the third film, loads the cartridge and cues the film.

When we set up the schedule for the day, it is easy to pick out and load the cartridges into the tray in order and mount the tray on the projector. If there is a schedule change, we just change the position of the cartridges in the trays. The same goes for repeats of the same commercial. After it has run, we either shift its position or take it out and move it to another tray.

### Cart Advantages

The advantages are obvious. Each cartridge holds up to three minutes of film, but most of ours are 10, 30 or 60 seconds in length, so we have additional capacity if we need it. Now we can run all of our





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random film on one unit instead of using two or three projectors.

In addition, we get better air quality. It is obvious that the less film is handled—or videotape, for that matter—the less chance there is for it to pick up dirt, or be scratched or damaged. We put the film in the cartridge once and leave it there. There's only one splice, and no rehandling. We're already seeing improved performance and longer life out of our film.

The ease of handling with the new projection unit has changed some of our thinking about local origination. We used to dub all of our local commercials to videotape to avoid splicing. Then we filed the originals. But now we put the film commercials right into the cassettes—splices and all—and save the time and money we used to invest in transferring to videotape.

We have had to compensate in our roll times somewhat with the new film projector. We previously programmed two pre-roll times. There was a five-second roll time for videotape lockup and a one-second with the film projectors.

With the newer VTR machines, videotape is coming down to one second for lockup, bringing it to about the same time as the reel-type projectors.

But the RCA TCP 1624 cartridge projector comes up to speed almost instantaneously, with no distortion. Since our reel projectors take one second to get up to speed, we have to live with that standard for the time being. We have programmed the cartridge machine to delay one second after the pulse comes from the automation.

We feel that it is a specialized machine, though, and we use it entirely for random-access film. We still maintain two reel-type projectors for longer lengths of film, such as syndicated programs and news.

**But Not For News**

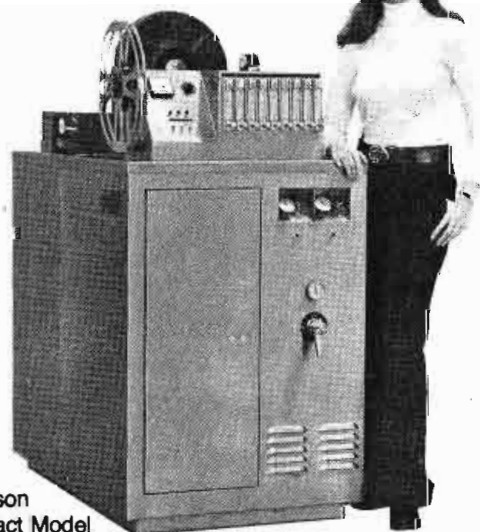
We don't use the projector for news, because news film usually is for one-time broadcast. Once the film is spliced, it is rare that the show changes. So news film really isn't random, and we can save the time it would take to load it into

cartridges by splicing and running it in the conventional projectors.

Having the random film in cartridges also gave Baltimore another idea. We used to store the film in cardboard storage boxes on shelves. We had four shelves for film and one for videotape cartridges; and the place was quite cluttered. He designed a set of racks which fit against the wall. The videotape racks are fixed, and the film racks roll on a track. To get to the videotape cassettes, we roll the film racks back and forth in front of them. Now we have two to three times the storage capacity in less space than we needed before.

We expect that film will be an important part of our operations for a long time, and so will the RCA TCP 1624 cartridge projector. We average running about 80 cartridges a day on it, and we expect it to pay for itself in time and money savings.

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# A New Approach To FM Peak Control

By Dennis Ciapura

The FM Volumax is a universally recognized piece of signal processing equipment because it represents a pretty good attempt at having one's electronic cake while eating it too.

Because of the pre-emphasis employed in FM broadcasting, control of high level high frequency audio

energy has always been a sticky problem and many schemes have been devised. The heart of the FM Volumax is a circuit called the Dynamic Frequency Compensator (DFC), which is really a voltage controlled treble cut circuit. The older 411 series of Volumax produced by CBS before the audio line

was taken over by Thomson CSF, contained a single DFC which operated between 400 and 15000 Hz in exact symmetry with the standard 75 usec pre-emphasis curve to prevent preemphasized treble bursts from overmodulating the transmitter.

The beauty of this system was in

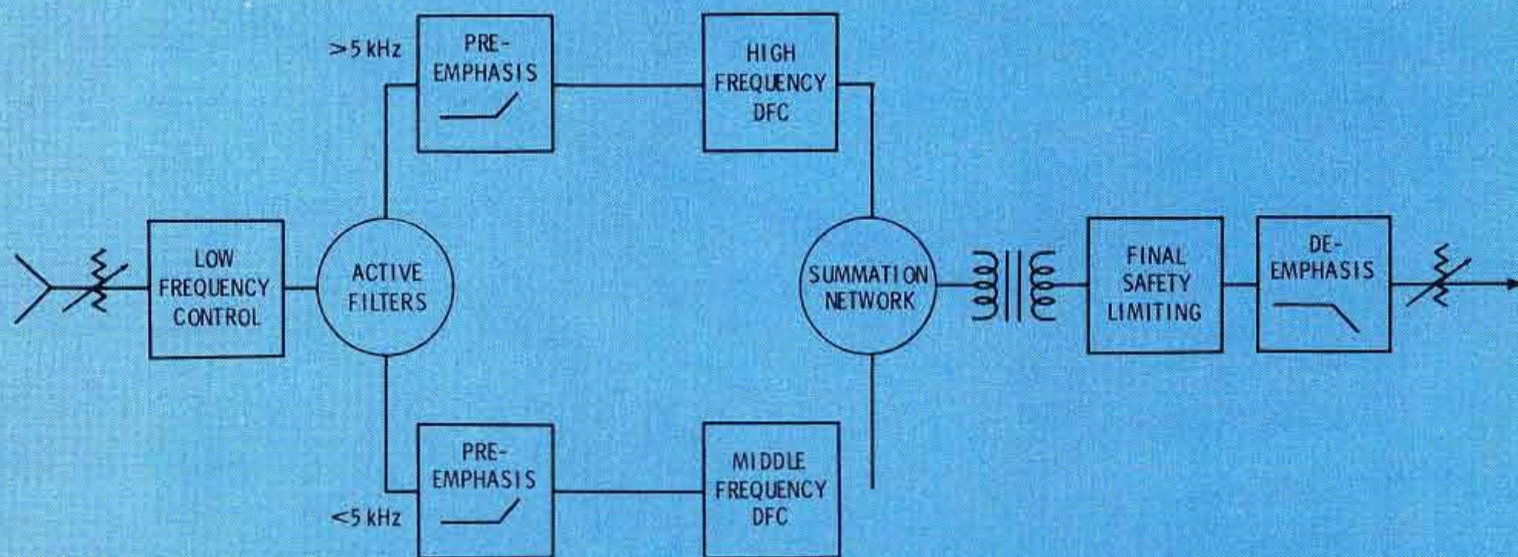


Fig. 1 Simplified block diagram of the 4101/4111 Volumax.

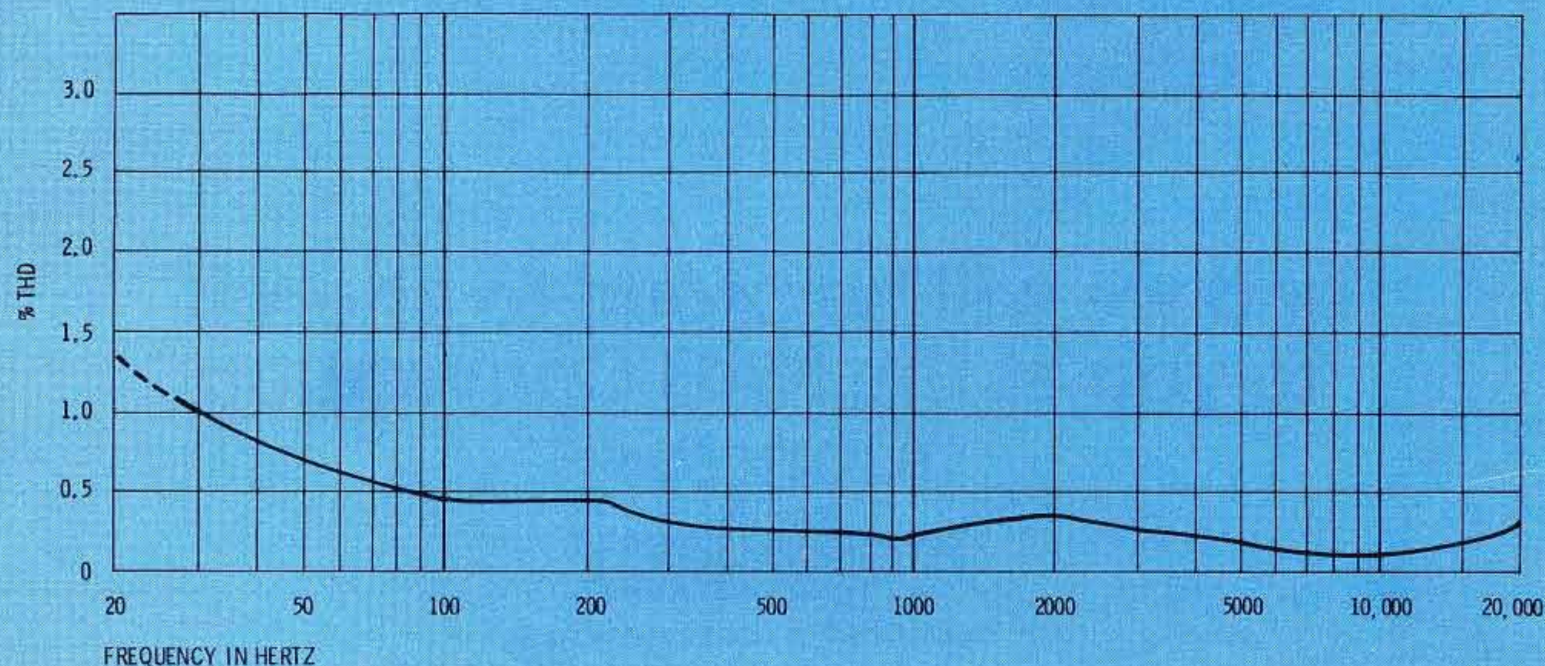
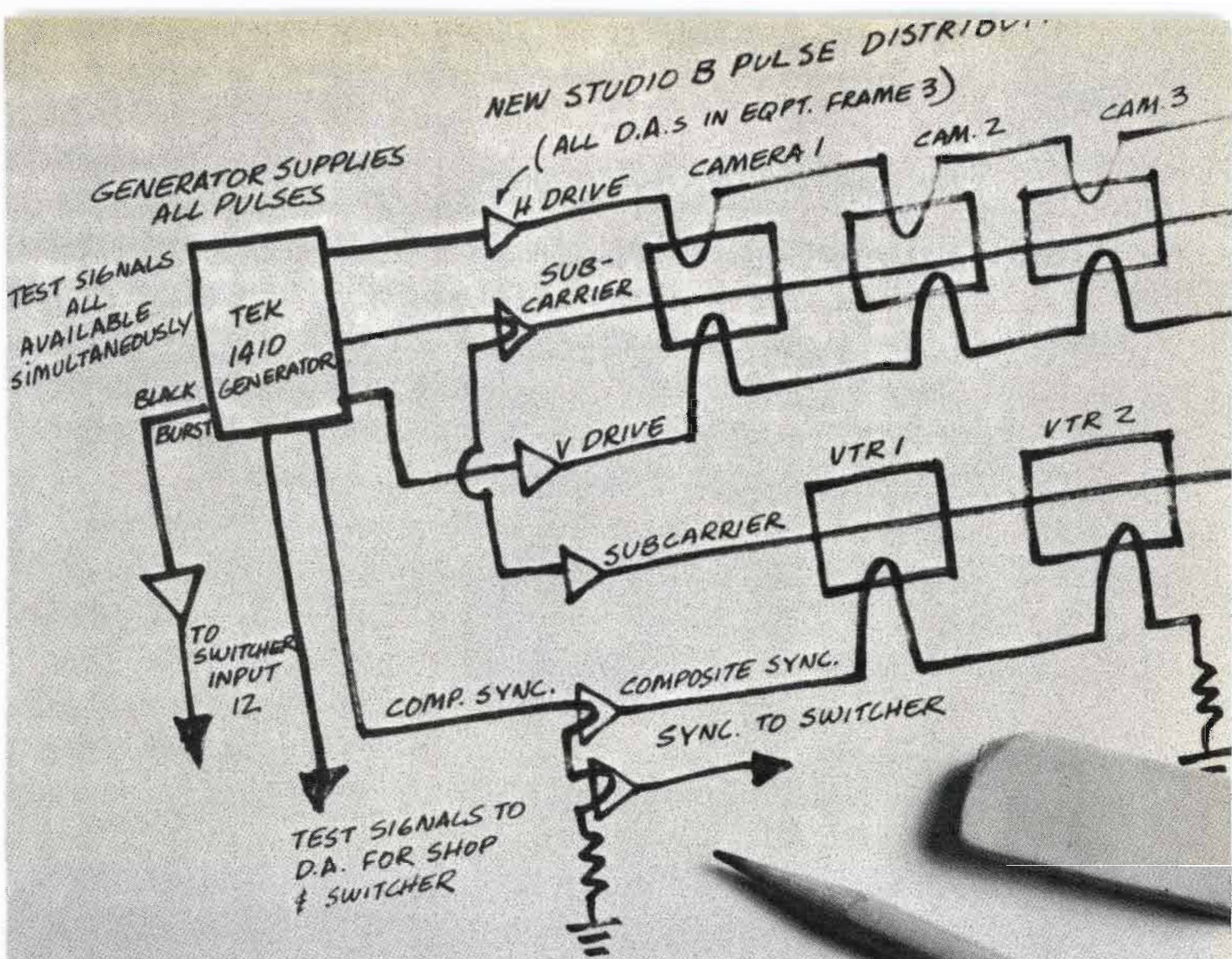


Fig. 2 Typical total harmonic distortion as a function of frequency.



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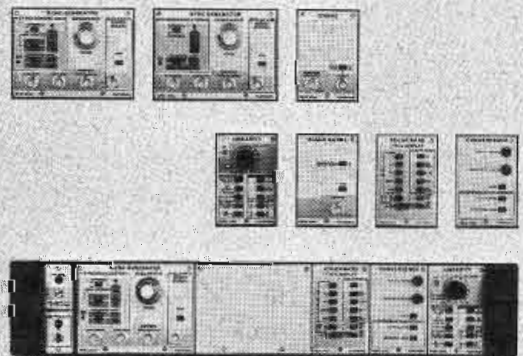
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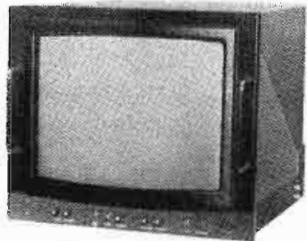
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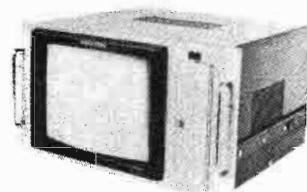
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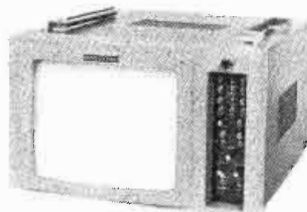
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the fact that a high frequency peak could be handled without causing a loss of level in the lower midrange and bass portion of the audio spectrum. The only disadvantage of the earlier system was the loss of the top octave if some strong energy in the 5 kHz region caused the DFC to roll-off from the top down. Even though a surprising amount of processing could be attained before a loss of brightness could be detected, the limit placed on the compression level by the loss of highs forced many users to operate at a moderate average level for fidelity's sake.

A major evolutionary change came when the 4010 FM Volumax was introduced. The DFC was retained for control up to about 5 kHz, but a high frequency clipper was used for the 5 to 15 kHz band. This modification allowed for a higher compression level before a loss of highs became apparent because the midrange and treble could be handled separately, each limiter section having attack and release times optimized for the relatively narrow band of frequencies that it had to handle.

Although this improvement was a step in the right direction, the waveform distortion produced by the high frequency section was found to be objectionable by some stations looking for minimum distortion components for their audio chains.

Thomson-CSF Laboratories has just introduced a third generation FM Volumax dubbed the 4111, which the company believes to be an incorporation of the best features of both of the earlier versions of the Volumax line. The new unit employs DFC's in both the mid and high frequency sections and is designed to be virtually distortion free at any frequency and any reasonable level.

Figure 1 is a block diagram that pretty well describes the theory behind the 4111's operation. The frequency control stage passes the entire audio band but only acts as a peak controller at low frequencies. Its attack and release times are selected to provide less than 1% distortion at 50 Hz, with faster peaks being passed on to the following stages. The active filters send the low and mid-range audio to the mid-range processor and the

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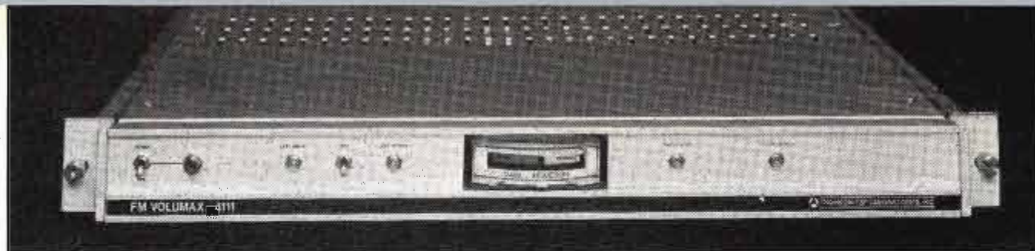
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The new Volumax tested and described in this article.

high end to the high frequency processor. Although the mid band DFC passes low and mid-range audio, it only controls the mid band peak level, and its operation is optimized for that band. The high frequency DFC is very fast and handles only the high end. The audio band is reassembled in the summation network and amplified by an output line amplifier.

Final safety limiting is via zener diodes at the output of the line amp. In theory, it looked like this might be some kind of limiter, so, we decided to take a look at one of them to see how they worked out in practice. We conducted a three part test series consisting initially of checking the unit out in the lab to see how it stacked up against the manufacturer's specs, a comparative test with musical inputs and finally, a field test on the air under actual broadcast conditions.

### Comparing Specs

Figure 2 gives what the manufacturer says is typical distortion vs. frequency for the levels indicated. This is the operational performance that could be expected if the unit were operated with 6 dB of low frequency compression and the program input had a flat output vs. frequency characteristic. As you can see from the chart, the preemphasis results in 23 dB of limiting at 15 kHz. This is really a pretty tough test for an FM limiter because musical recordings seldom exhibit that much energy at the high end and a proof would be made with an input signal of diminishing level vs. frequency.

Our test unit was very close to the typical performance shown in Figure 2 and far exceeded the 1% distortion spec listed by the manufacturer. As a matter of fact, we had to use a low frequency spectrum analyzer to accurately measure the distortion at the high end because it's down in the noise level when the unit is operated below the limiting threshold.

Figure 3 gives the response and

distortion data that we measured under less demanding circumstances. The distortion run was made at the threshold of limiting and the frequency response was checked at 30 dB below. These conditions more closely simulate what the unit would do under proof of performance test conditions.

We found the 4111 to be essentially a piece of wire with gain when operated below the limiting threshold and very nearly distortionless at relatively high compression levels. With steady state tone inputs, the frequency response is the inverse of the 75 usec. pre-emphasis curve, but the release times of the DFC's are so fast that the losses last only as long as the offending peak persists, so, the subjective loss of brilliance is amazingly small, as we shall see in the next phase of our tests.

The I.M. distortion was also extremely low; just over 0.1% with 60 and 7000 Hz mixed 4:1. The signal noise ratio was 76 dB, which once again was better than the specification. The 4111 uses a balanced differential input stage and no input transformer and would get a little noisier (about -67 dB) when operated in a strong TV/FM RF field; however, a transformer would be an easy addition if required and most stations could benefit from the cleaner transformerless input as shipped.

The front panel meter indicates the low frequency limiting values, so care must be taken in interpreting the meter readings when setting up the unit. If, for instance, a 10 kHz input signal was applied to the unit and the level increased until the meter just began to show gain reduction, the unit would be compressing 14 dB because the meter is referenced to the threshold of limiting below 400 Hz.

### Comparative Tests

For the next phase of our test series, we rigged up a switching system that would allow us to



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As for the Beyer DT109 microphone/headphones, they are in a class by themselves. Highly sensitive and capable of withstanding immensely high sound pressure without overload or distortion, they feature modular

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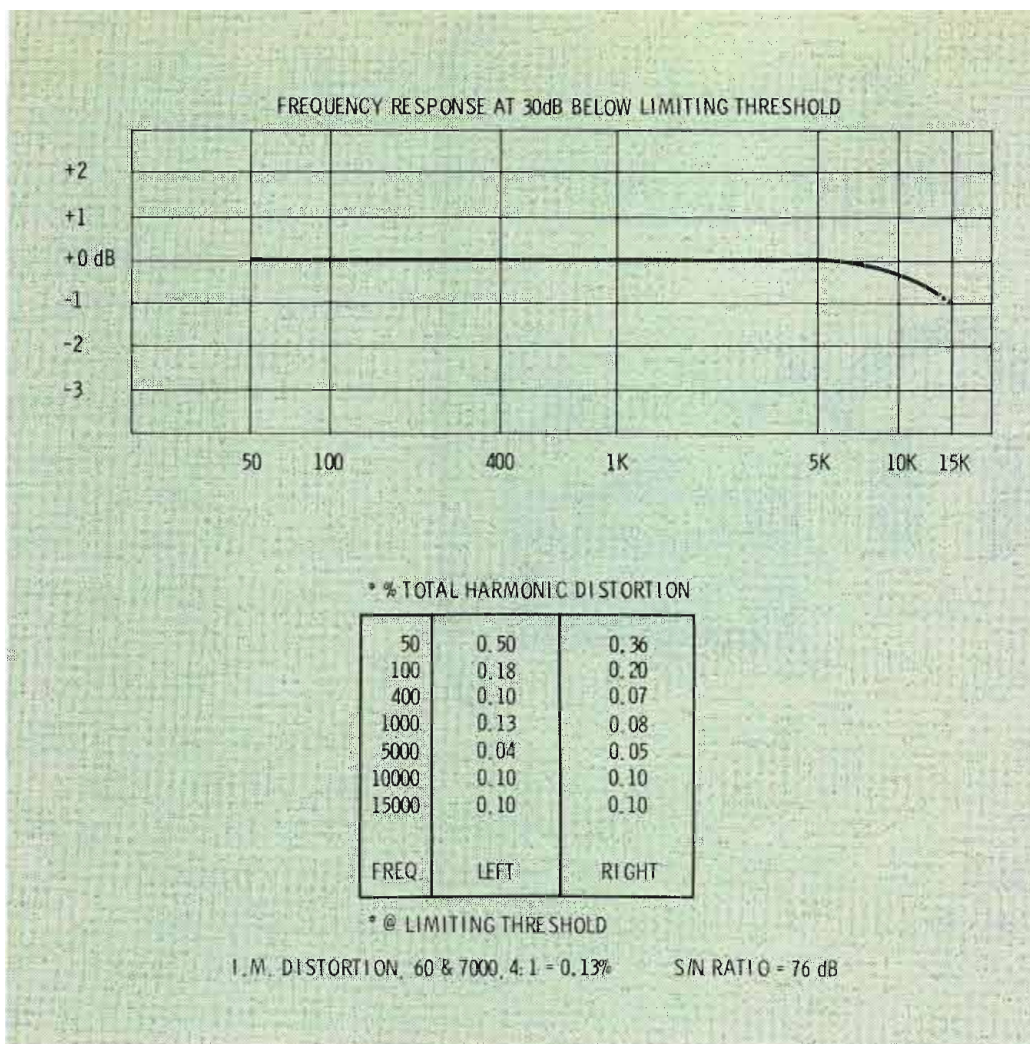
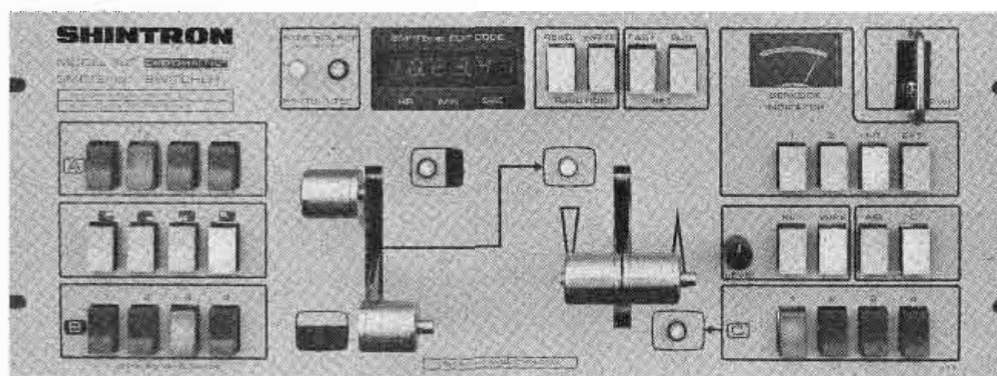


Fig. 3 Distortion and frequency response data for the 4111.

instantly compare the 4111 with the other 411 Volumax and then compare either one to wire straight through with program inputs from tape and record.

The input levels were gradually raised so we could compare each of the units to the original program input and gauge the loss of highs as the input was raised. With the front panel meters swinging the length of the green or "normal" area on their gain reduction scales (about 6dB of low frequency limiting) the 411 was audibly duller than the 4111 with most program material containing appreciable treble energy. The 4111 sounded very close to the original program input with a slight loss of highs apparent in a direct A-B comparison with very bright music. With the input level below the low frequency threshold of limiting (no compression below 1 kHz) both limiters sounded virtually identical and both sounded very close to the original program material. With very clean records and tapes, the new 4111 has a very transparent sound and is audibly better than the older 411.

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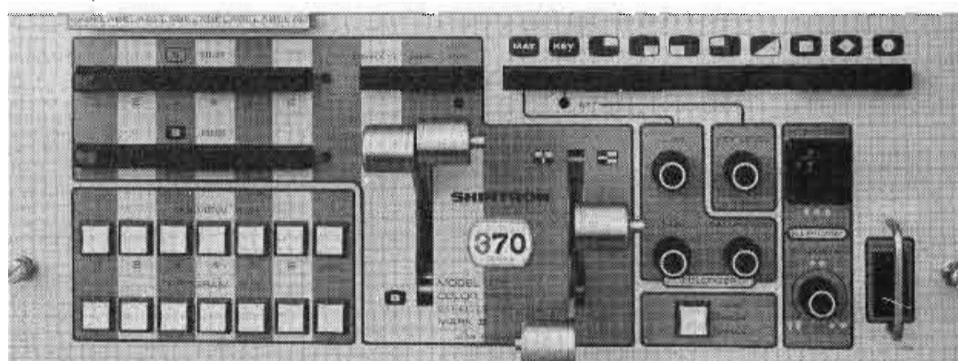
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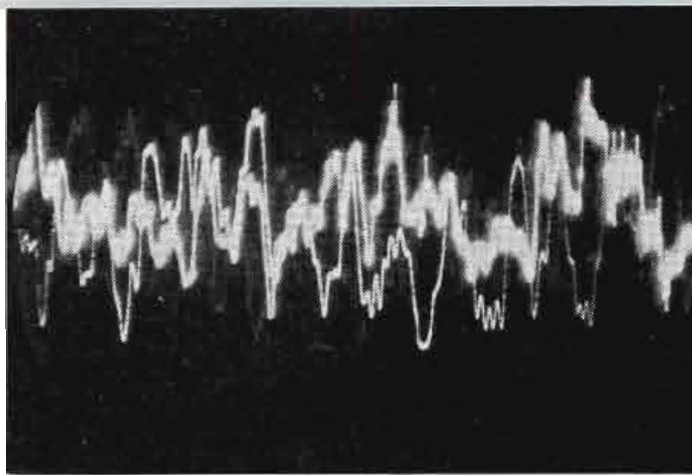
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**Fig. 4** Scope photo shows limiter output after pre-emphasis with musical input.



### How About Clipping?

Next a preemphasized scope was connected to the limiter output to see how much clipping, if any, was taking place with an actual program input. The setup described in Part 2 of the transient response series in BE, January 1976 was used. Figure 4 is a photo of the pre-emphasized output of the 4111. Note that there is no flat-topping visible, which indicates that almost no peaks are reaching the safety limiters. The DFC's are very effective rise time limiters because of their roll-off type characteristic.

The 411 did show clipping with the same input level and program material.

All in all, the audio quality of the 4111 seemed to be top notch and quite comparable to state of the art audio gear in general, so, the next step was to find out if it could provide the overmodulation protection that is really a limiter's *raison d'être*.

### Overmodulation Protection

The 4111 was inserted into the program line of the main transmitter of WLAK-FM atop Sears tower

in Chicago for about ten days to test its operation in the field under actual broadcast conditions. Resistive pads were used to isolate the limiter's output from the transmitter input and no installation problems with respect to matching were encountered.

The unit provided the same overmodulation protection as the older 411 and since a higher input level could be used for the same subjective spectral balance, a higher average modulation level was obtained. With the "beautiful music" format in use at WLAK a 2 to 3 dB increase in average level, no apparent loss of fidelity resulted from substitution of a 4111 limiter instead of the older 411. After many hours of extended listening over the next ten days, there was never any feeling that a limiter was in the circuit, which is as it should be. Stations with a rock, country or MOR format may choose to operate the limiter at a higher input level and get an even higher average modulation level if a slight loss of high-end response and midrange balance can be tolerated.

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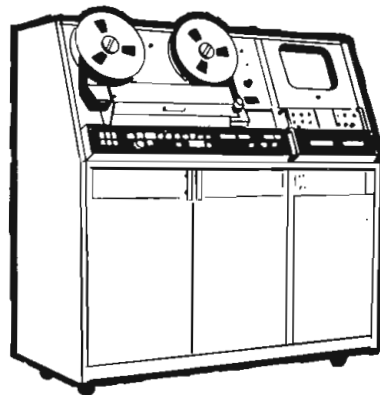
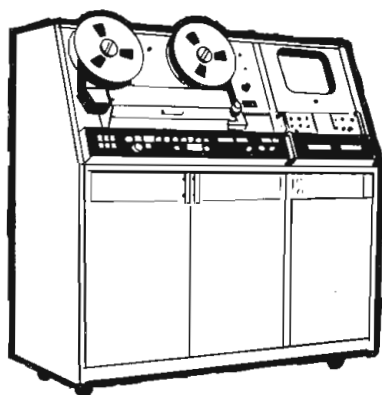
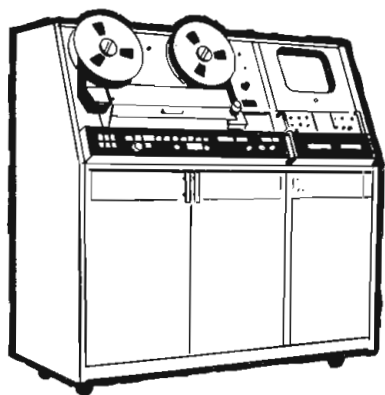
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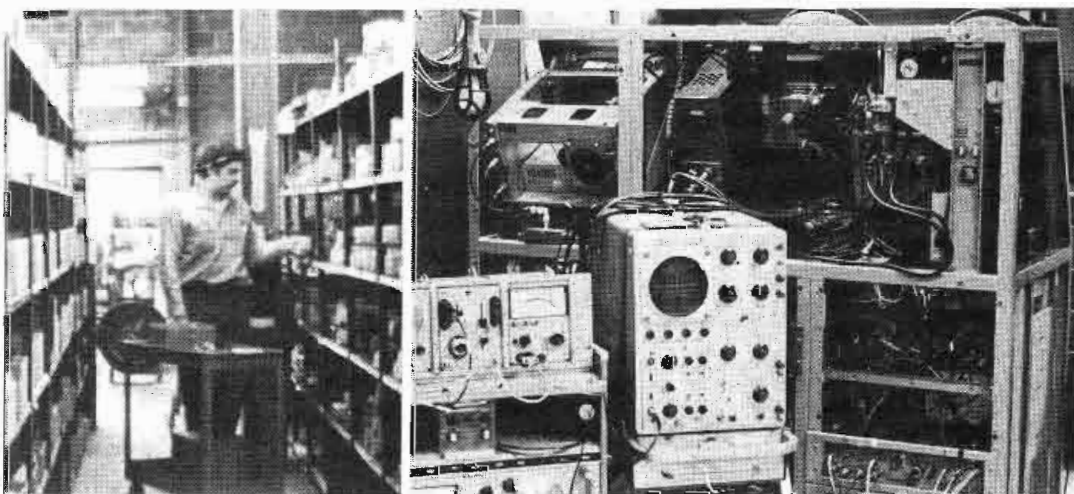
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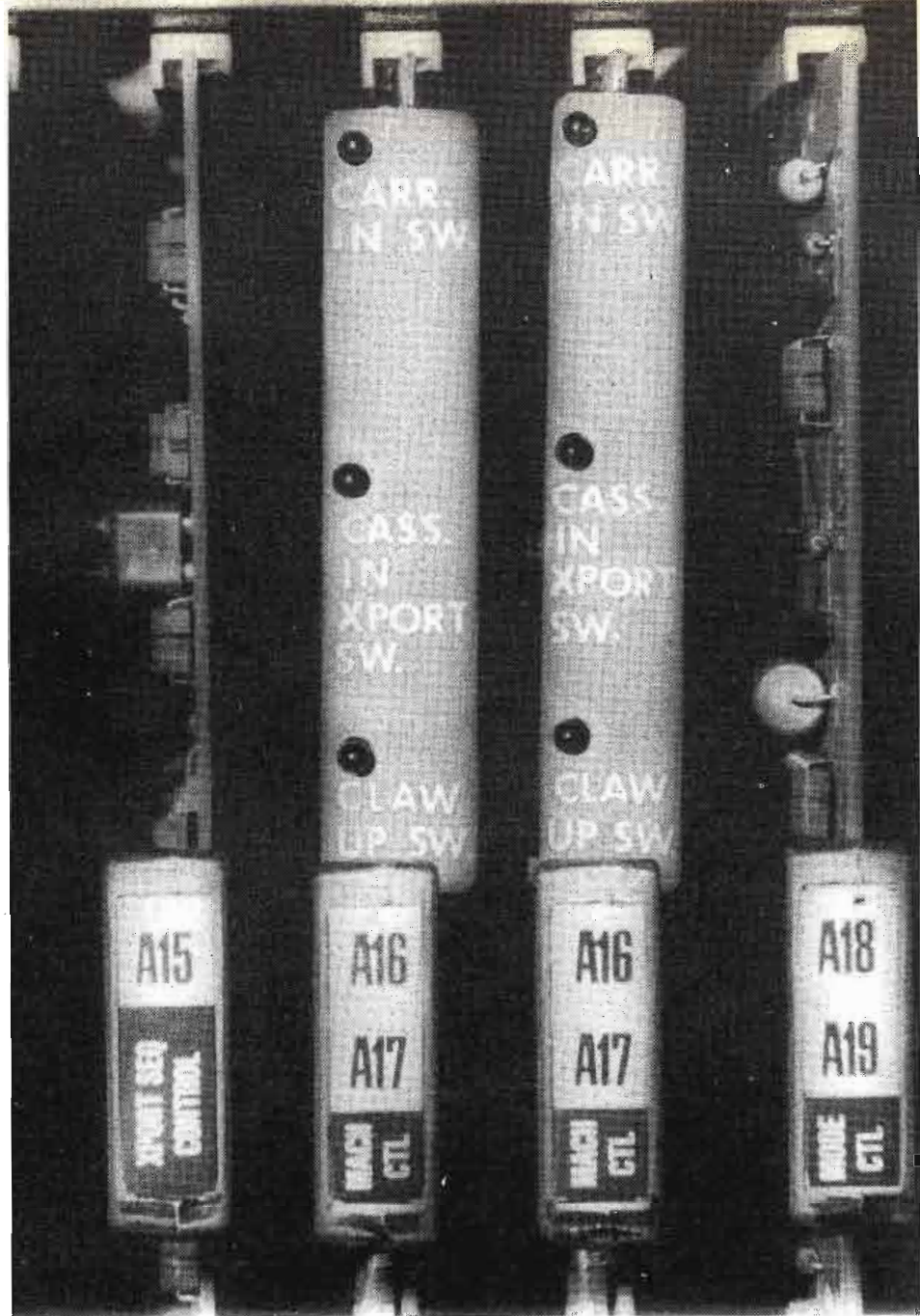
With LED's in-circuit, visual proof of what's happening is obvious at a glance.

# Using LED's Logically For Automatic Proof

By Elmer T. Schorle  
Plymouth Meeting, Pa.

The present technology of today's broadcast equipment is utilizing more digital logic circuitry to control the operating functions of cassette VTR's, cameras, projectors, etc. However, we still come across a fair number of discreet mechanical devices (Micro type switches telling the logic circuits data of events taking place). An example in cassette VTR's is that a cassette is in one position or another, or the carousel is "pinned" or stable.

As every technician who has traced the intermittents that occur as a switch is beginning to malfunction knows, some very unusual things can happen when an electro-mechanical device thinks one thing is happening electronically, when something else has taken place mechanically. The more complex the equipment is, the wilder and stranger the effects can become!



I have been using a method of ascertaining the operation of the micro-type switches in Ampex ACR-25 Cassette VTR's in my care which gives an immediate visual indication of their performance, and at the same time renders a quick overall view of machine functions to spot trouble areas.

## LED's To The Rescue

On the circuit boards using the data sent by the switch operation I have mounted small red LED's, with each labeled to designate what has taken place as they illuminate. Thus, at a glance I can tell that a "Cassette is in Transport", or the "Carriage is in Transport", or that an extractor "Claw is up", or down, or that the "Carousel is pinned". Each of these items occurring at the proper time in sequence is necessary for the ACR-25 to oper-

ate correctly, and switch intermittents are one of the most encountered forms of trouble. With the LED, I have a visual confirmation that the switch worked, or didn't, if perhaps the LED was on without the switch lever being actuated, and can eliminate sources of trouble possibilities at a glance.

## LED Mounting

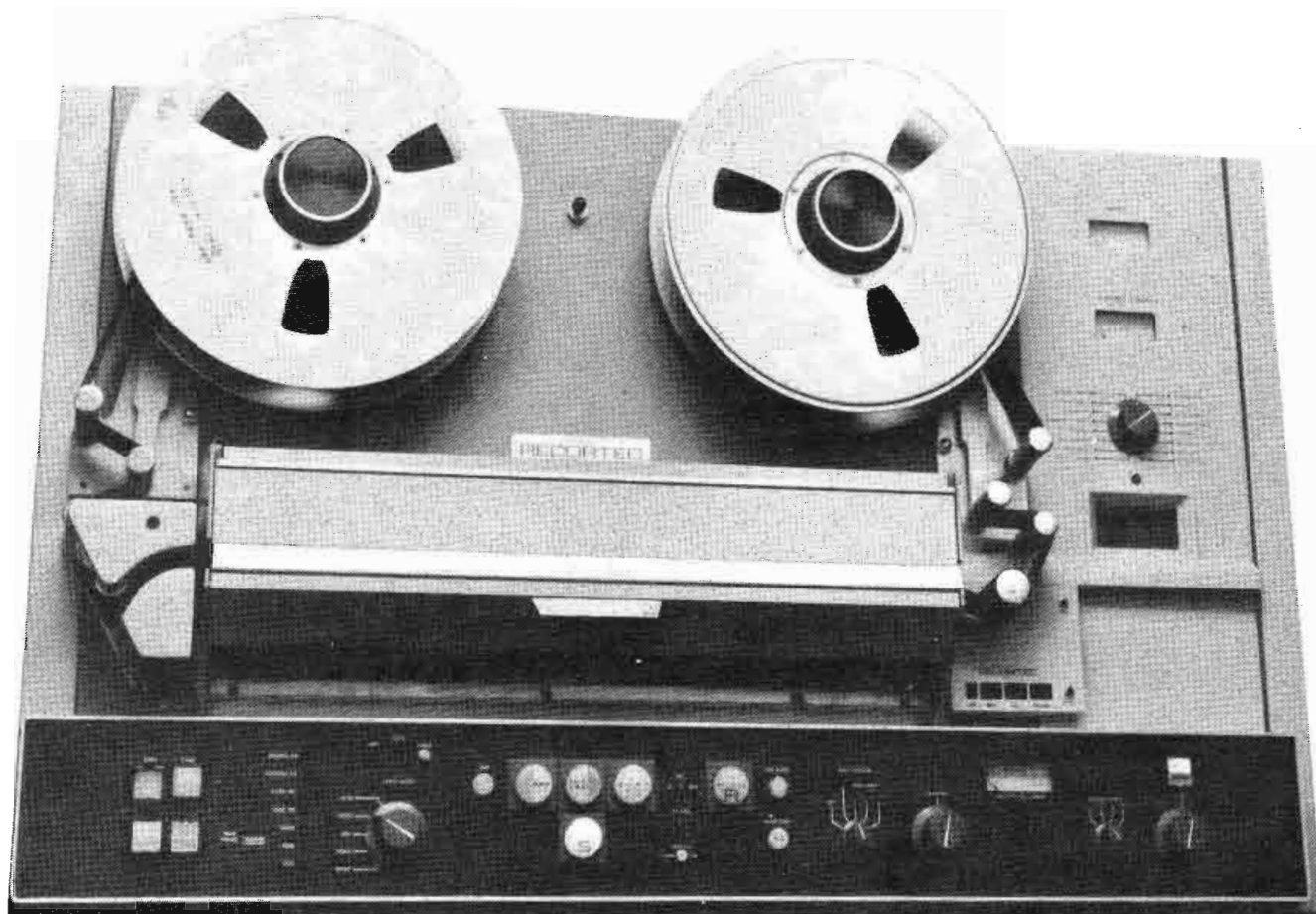
To mount the LED's in a professional manner, I used a 1/2-inch wide strip of the same type of material that the original PC board is made of, (usually pirated from discarded jumper modules) cemented to the front edge of the module using the data sent by the switch in question.

Each LED is inserted into a snug hole made near the edge of this faceplate, and labeled to designate what has occurred as it lights. They

(Continued on page 104)

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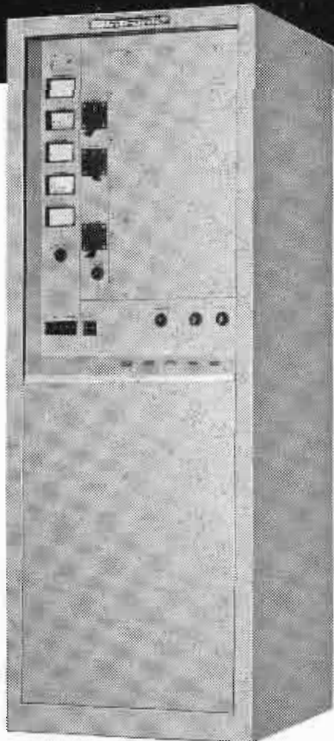
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## Chapter Reports

(Continued from page 14)

technical quality control throughout the Industry, will gladly supply them to stations, production houses, agencies, etc., who originate programs or commercials.)

Ken Steininger, special projects engineer, then took his turn, and spoke about the NBC radio network and its News and Information Service. The Schafer 903 Automation System, used in conjunction with the Chicago WNIS, was discussed in detail, and brochures were made available to all attending.

### Chapter 28: Milwaukee, Wisc.

With April 15 just around the corner, several SBE Chapters have held meetings on the FCC's new EBS two-tone ruling, and Milwaukee Chapter 28 was no exception. On January 27, members met in the Radio City Auditorium at WTMJ to hear speakers Joseph Wu and Terry Loyd from TFT discuss these standards. Mr. Wu, assisted by TFT Applications Engineer Loyd, gave a slide presentation on the design, manufacture, and computer testing of the TFT two-tone receiver.

### Chapter 32: Tucson, Arizona

The regular meeting of Chapter 32 was held Wednesday, January 28 at KGUN-TV. The primary business for the evening was to select a slate of candidates for local elec-

tions, scheduled to be held in conjunction with the National election of officers.

### Chapter 36: San Diego, Cal.

The first meeting of 1976 for Chapter 36 provided an interesting program on digital information. Leroy Bellwood, director of engineering of Channel 10, presented "A New Digital Cassette Training Course" that is available from the University of Michigan. This course is pertinent to technical skills required in the commercial and non-commercial world of television.

Mr. Doug Curé, Tektronix Information Display Group, spoke on "The Distribution of Digital Information on Video Distribution Systems." His presentation was very informative, and led into a discussion of changing technology and concepts which we will all be confronted with in the years to come.

The Pacific Telephone Company also joined the program with a report on the problems and techniques in tying remote locations to a central switching or distribution point for audio and video.

### Chapter 37: Washington, D.C./ Northern Virginia

The Audio-Visual Center at American University was the site of Chapter 37's meeting on January 28. The tentative schedule for the February meeting features Eric Small's presenting a paper and demonstration on the Optimod, a topic which should be of interest especially to FM and TV broadcasters.

---

CHAPTER 38—EL PASO, TEXAS. Frank Jordon, Chairman, KDBC-TV, P.O. Box 1799, El Paso, Texas 79999, (915) 532-6551.

CHAPTER 39—TAMPA, FLORIDA. George Shideman, 1561 S. Jefferson Avenue, Clearwater, Florida 33516 (813) 442-9133.

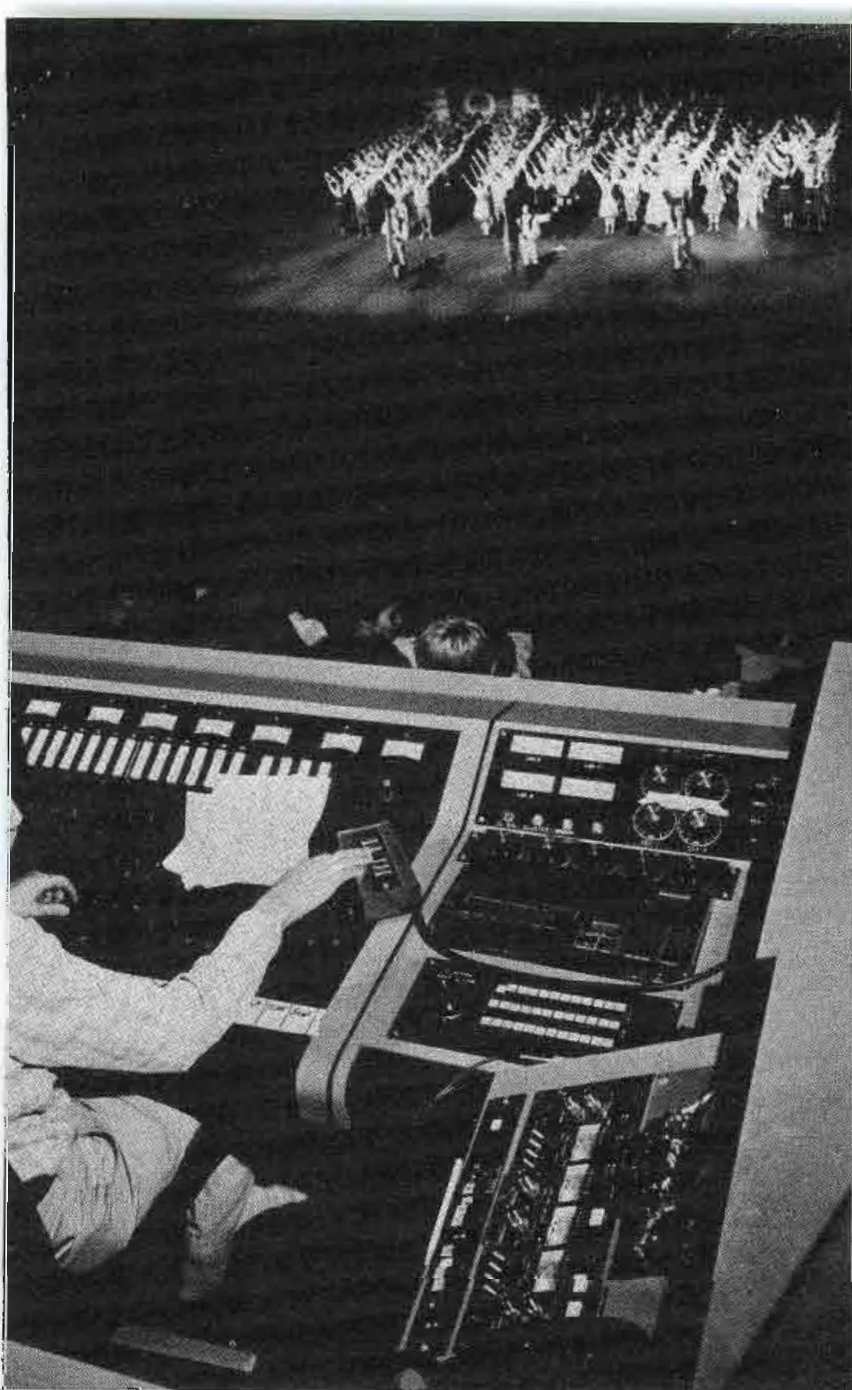
CHAPTER 40—SAN FRANCISCO BAY AREA. Robert B. Daines, Secretary/Treasurer, Telemet, Western Regional Office, 1261 El Curtola Blvd., Walnut Creek, California 94595, (415) 938-8887.

OKLAHOMA CITY, OKLAHOMA. Josh Socolof, Acting Chairman, KKNG(FM), 110 N.E. 48th Street, Oklahoma City, Oklahoma 73105, (405) 525-5595.

ORLANDO, FLORIDA. John Weyrick, Chairman, 5765-F Kingsgate Drive, Orlando, Florida 32809, (305) 857-3729.

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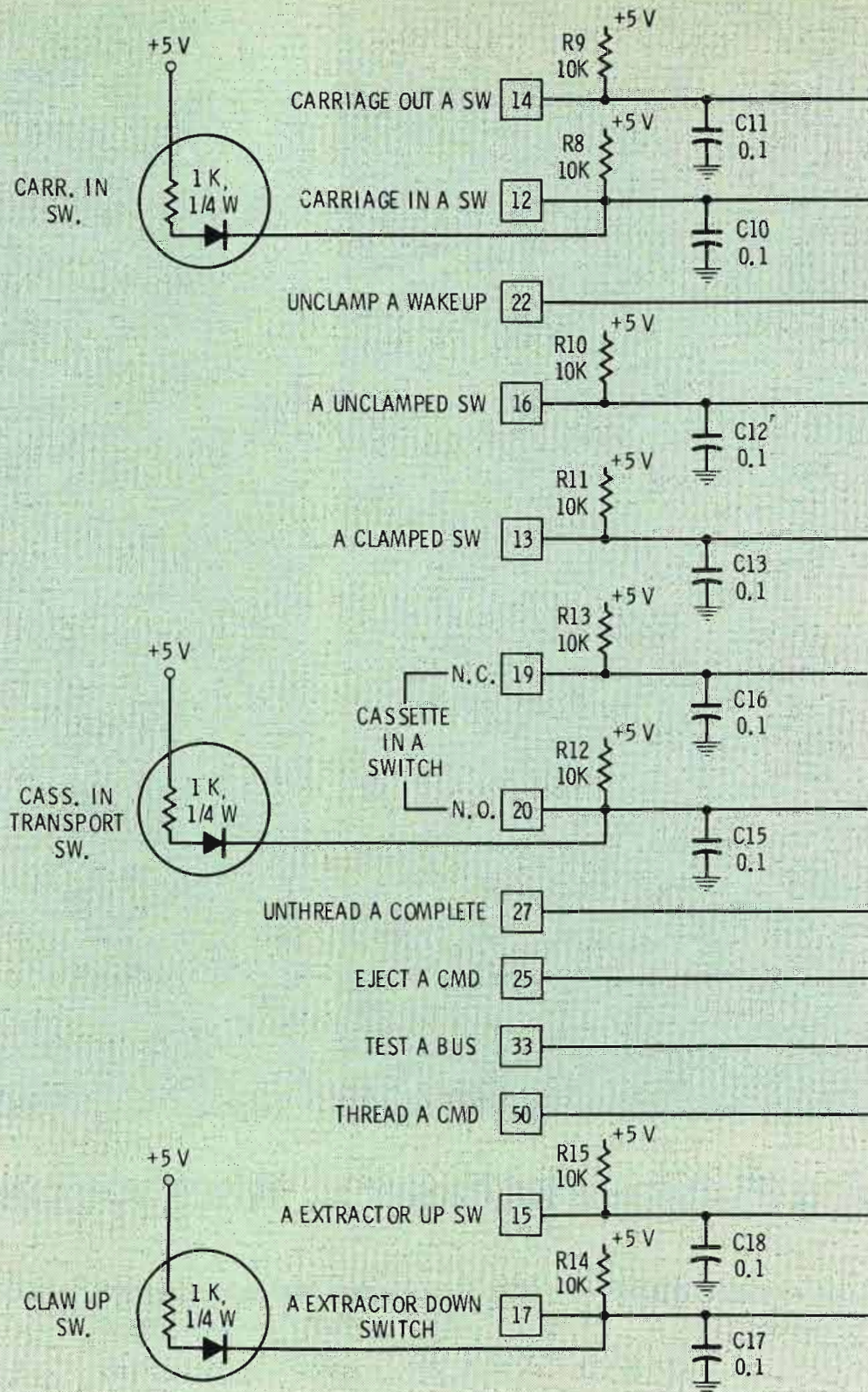


Fig. 1 A portion of the ACR-25 schematic of logic board A16/17 showing wiring of LED's.

(Continued from page 100)

are placed at intervals determined by available "real estate" on the PC board module to accept the two LED leads, and a 1K 1/4W resistor, which is routed to the nearest plus 5v trace.

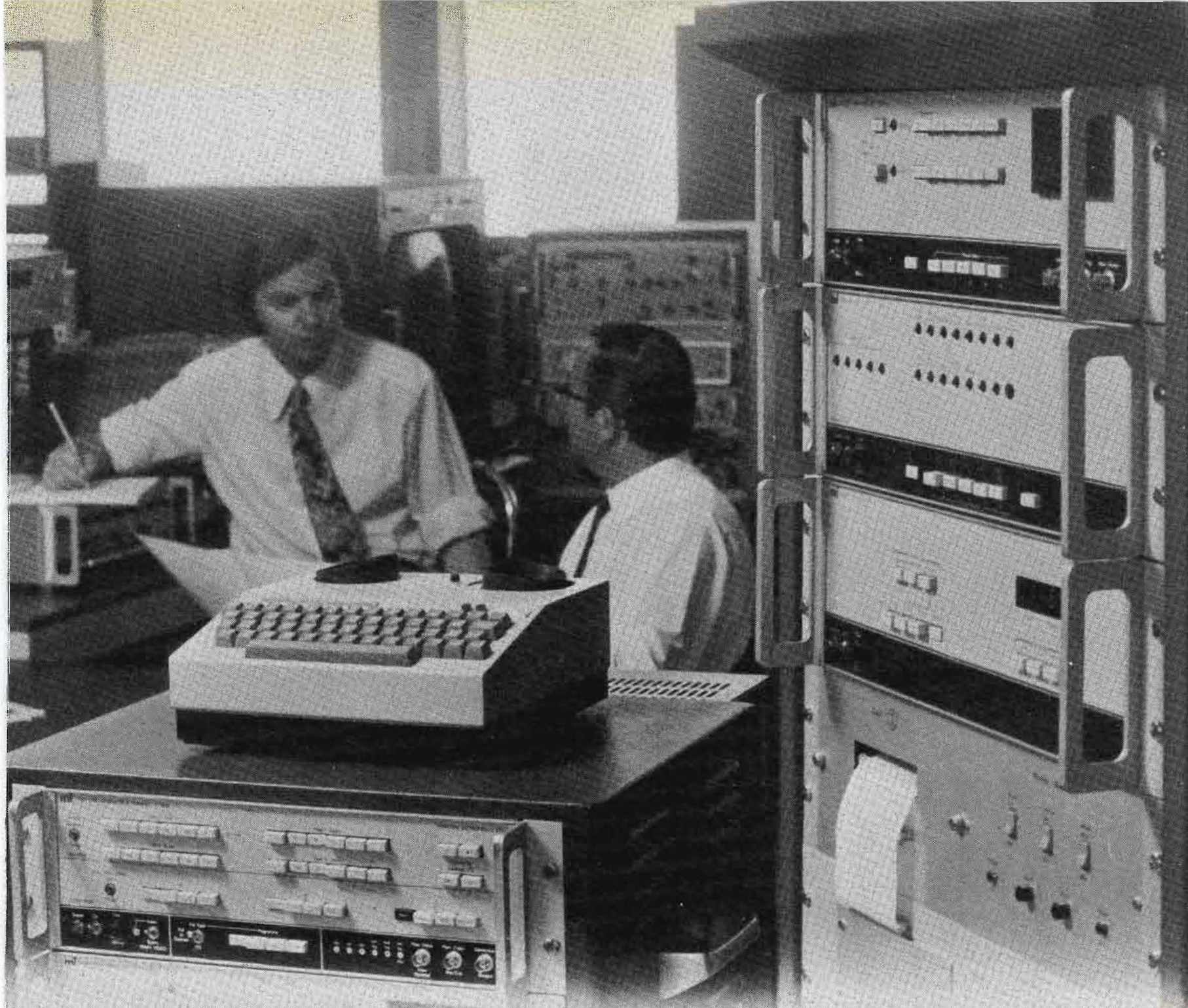
The cathode of the LED is connected to a piece of solid insulated wire, and routed to tie to the appropriate connection on the board. A sample hook-up of three LED's I have on one card is shown in the accompanying picture, with

how it looks wired in the schematic diagram.

Ampex has the switches going to ground potential to signify verification of the function, though if other methods or voltages are switched, appropriate LED circuitry can be made to fit the needs. This method can easily be expanded to verify other switch actions, and can save hours of guessing when tracing intermittent gremlins in equipment. Any place a switch is used to tell

circuitry something actuated it could be given a LED indicator, but I think it should be left to areas that could cause the worst conditions. If you had too many LED's to look to in times of trouble, it could become as confusing as it is to the electronics.

**Note—Many brands of LED's would be adaptable, though I used Chicago Miniature Lamp Co. CM4-23 series, which are readily available in our area.**



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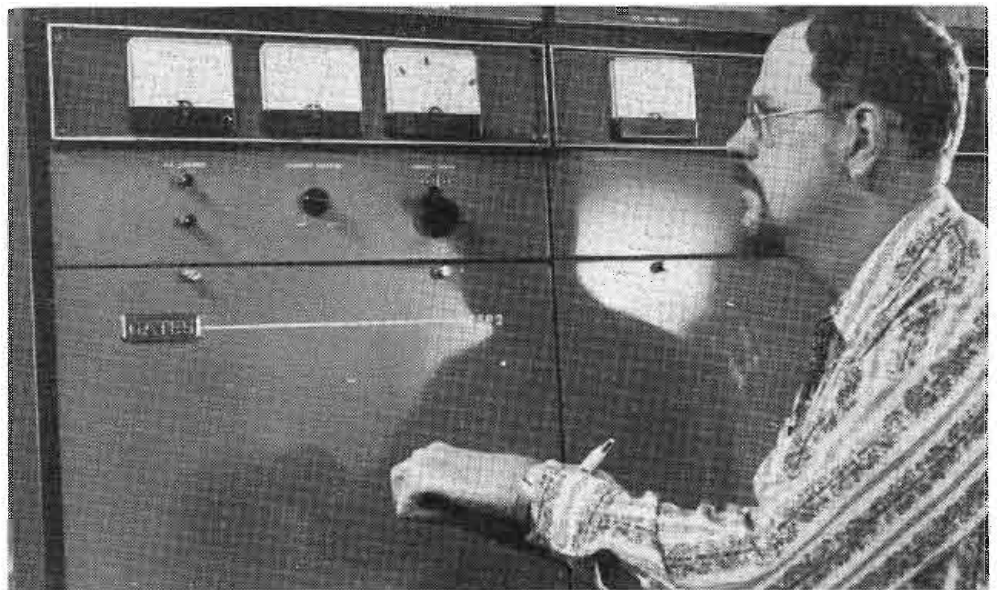
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117R-8

# Small Market Radio Workshop

*Part 1 of a continuing series for engineers working in small market radio stations.*

By Jim Purcell



There's a lot more to engineering than meter reading. The author, shown here, opens part one with some rather basic hints. Later parts will be dealing with specific problems.

## **Management Highlights**

Most small market station owners don't have the technical knowledge necessary to properly evaluate the performance of their technical help. This article will not only give station management some insight in this area but also will help the station owner appreciate some of the problems his technical personnel face so that he can give them the support that often makes the difference between a well-run station and the other kind.

Newcomers to broadcast engineering are faced with a real dilemma today because so many stations have a small engineering staff. First Phone operators have a difficult time obtaining supervised training. Many new operators accept positions with small market stations and find themselves the only licensed personnel on the staff. With little or no experience, it can be a real hassle knowing what is necessary to keep a station operating efficiently and properly. It's also difficult for the new operator

to know where to turn when stumped by some technical problem.

Having been through the trial-by-fire that is small market engineering, I feel obligated to share some of what I've learned while trying to cope with problems common to small market stations. In addition, I'll also try to share ways the new operator, who is trying to break into broadcast engineering "by the seat of his pants", can help the owner of his station realize that the broadcast engineer can be a valuable member of the total broadcast team rather than simply a millstone which the Federal Communications Commission has hung around the broadcaster's neck.

## **What You See Is What You Get!**

How many broadcasters today can still recall the days when engineering excellence was taken for granted at most stations. Today even some larger stations are victims of less-than-professional en-

gineering practices. And smaller stations are frequently victimized by a succession of inexperienced operators, most of whom have no greater claim to fame than the fact that they have obtained that First Phone Ticket.

So it's a good idea for a new operator to determine as soon as possible just what shape his station is in with regard to engineering. Perhaps you should even go so far as to put your findings in a report so that management will understand why any future changes you make or suggest are necessary.

Here's what to look for during your initial inspection:

**TECHNICAL FILES** (if any): Should be neat, orderly, complete. Filed in proper location, that is, where the equipment is located—studio manuals at studio, transmitter manuals at transmitter site, etc. I'll discuss later some of the materials that should be in your technical files.

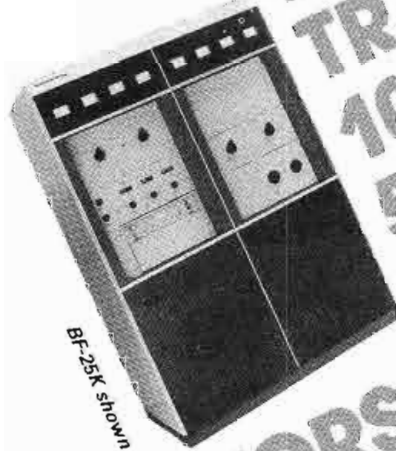
**STATION CLEANLINESS:** Check inside equipment racks, con-

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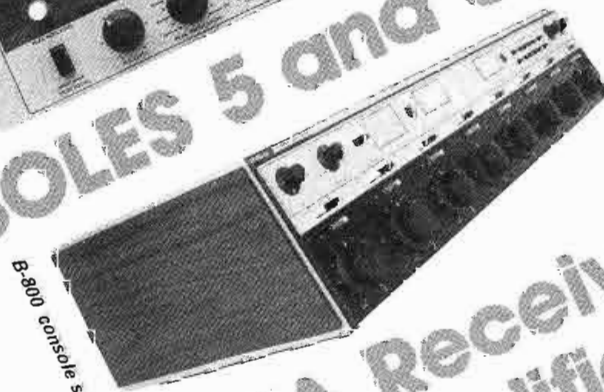
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soles and transmitter, especially air filters, for excessive accumulation of dirt. These factors may indicate the necessity for thorough cleaning of all equipment which will also be discussed later.

**EQUIPMENT OPERATION:** Using equipment manuals as a guide, make sure all equipment operates as it should, including correct meter readings control settings and that all controls function as they should. Make certain all personnel know how to properly operate equipment. Poorly trained operators may shorten equipment life. If improper operation has continued for any length of time, this may indicate that repairs will soon be due on the equipment in question.

**SPARE PARTS INVENTORY:** An adequate stock of replaceable parts like tubes, fuses, panel lamps, transistors, resistors, capacitors, etc. should be on hand so that necessary repairs can be made quickly. Later we'll discuss in detail the job of reordering a neglected parts inventory.

### The Buck Stops Here

You're the one now responsible for the proper maintenance of your station, so start right away to correct any deficiencies you may have noted during your inspection. Any improvements you can make will bring you steps closer to a more dependable, better-sounding station. In the process you may also be able to minimize breakdowns. The technical files are a good place to begin your improvements.

Here's what your files should contain:

1. Maintenance Manuals for every piece of equipment in operation, filed where the equipment is installed. Missing or incomplete manuals may be replaced by writing to the manufacturer. More completely detailed manuals, such as those for transmitters may cost something to replace. And manuals for older equipment may not be available.

2. Logs And Records filed by date as far as two years back—at least.

a. Maintenance logs containing data required by FCC. I usually also keep a maintenance notebook, more detailed than that required by the FCC on maintenance logs. Each piece of gear has a section in the notebook devoted to it and all maintenance is recorded. This is valuable when trouble-shooting because it not only suggests solutions to remedy repeated symptoms but a continued repetition of a certain fault may suggest a different remedy to correct the **real** cause, or a deficiency in design that should be corrected.

b. Frequency reports from monitoring service...filed by date.

c. Proof of performance data. It's best to keep all proof data even though the Commission requires they only be kept for two years.

3. FCC Regulations: Keep your copy up to date and study it often. You're expected to know the law.

4. Broadcast Services Information: Names and addresses of firms that paint towers, repair monitors, rebuild tubes, etc.

5. Technical Literature:

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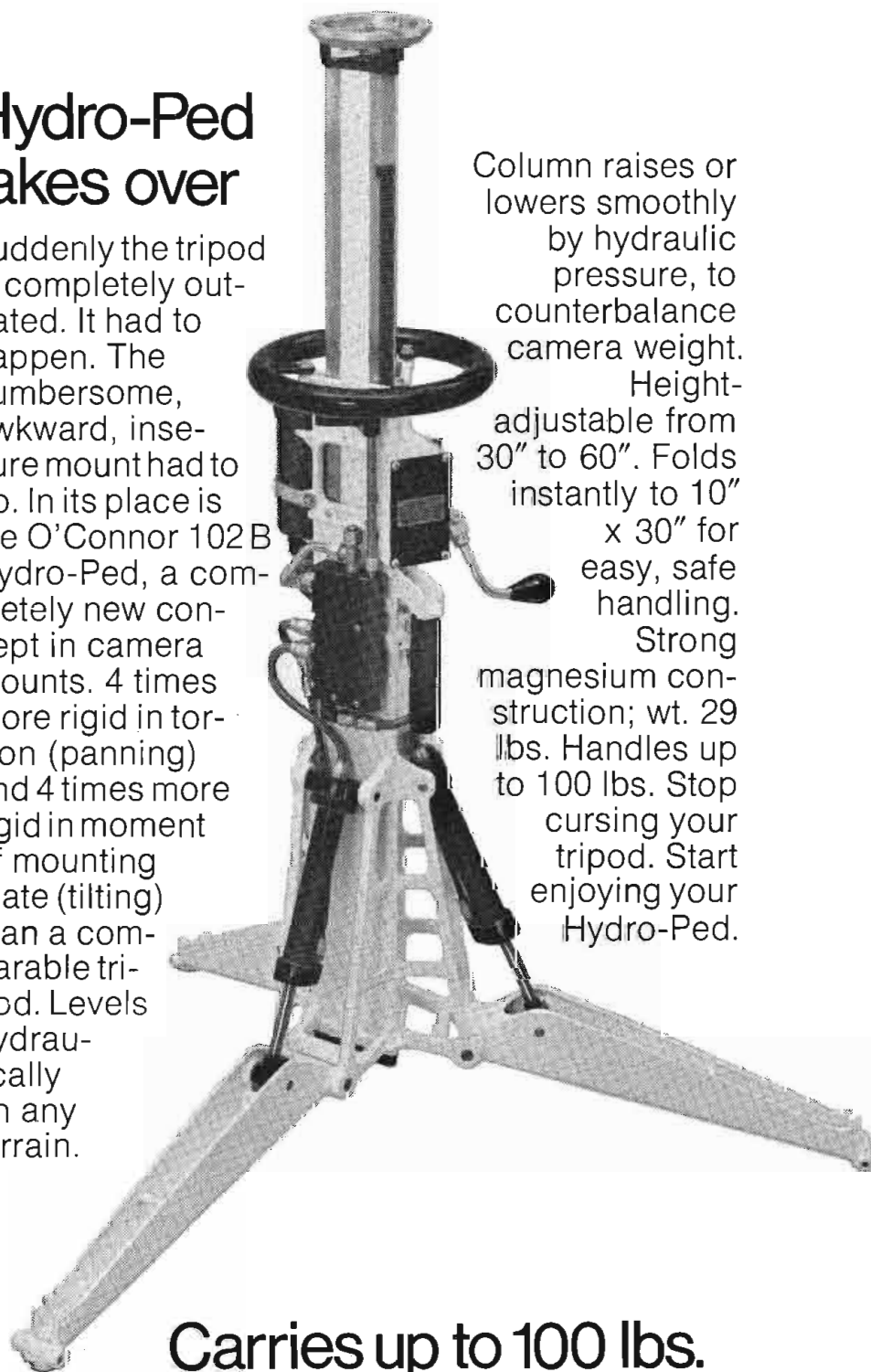
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- a. Tube & Transistor manuals.
- b. Engineering practices manuals. (NAB Handbook is excellent, though quite expensive.)
- c. Engineering charts and tables.
- d. Engineering magazines including those non-broadcasting electronics magazines. I usually cut mine up after a few months and file articles according to category, i.e. "Remote Control Circuits", "Transmitter Data", etc. This makes my file of magazine articles an extremely valuable source of information.

6. New Equipment Literature: It pays to know what's available on the market and how much it costs. If a piece of equipment is continually causing trouble or is the source of down time, it's about time to replace it. You may have your own replacement brand preference, but you'll look more professional to approach management with a proposal on what to buy based on your files. You are supposed to know. And the more you know about broadcast equipment, the more management will come to rely upon you for key purchasing decisions.

So, your new equipment literature is an important file. And you can keep it well stocked by using the Reader Service card in this magazine to get the information you need.

You don't need to keep an elaborate filing system. Just one where you can easily find what you need. For example, it would be enough to file equipment by categories. At the front of this kind of file, you should keep an uncut, unmarked copy of **Broadcast Engineering's** Buyer's Guide. It contains all the active manufacturers, their addresses, telephone numbers, and several hundred categories of equipment.

You'll gradually discover additional things you may want to add to your files. The important thing is to use them. Equipment manuals, for example, can be an important source of operational theory and trouble-shooting data. Study manuals often and become familiar with the equipment. Familiarity cannot be stressed too much as an element in good engineering.

Equipment manuals also contain information that can be posted in strategic locations to aid in equipment evaluation. Typical meter



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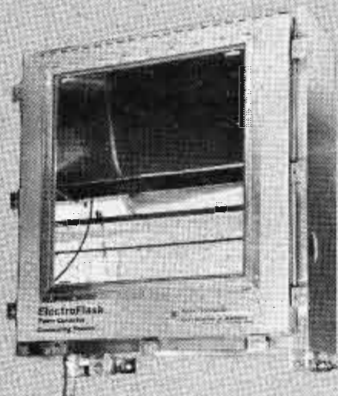
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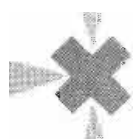
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readings may be determined from the manual and posted near each meter so that you can tell at a glance whether a piece of equipment is operating as it should.

In some cases, I actually mark the meter faces at the point where the needle should be. If the meter is used for two or more modes of operation or as a multi-meter, I locate numbers on the meter face corresponding to the meter switch position.

### **High Priced Stock Clerk?**

If you found that you have an adequate supply of spare parts on hand, you can skip on to the next section. However, don't make your judgment too hastily since having replacement parts is important in getting the station back on the air after equipment failure.

Your inventory should include all parts which frequently need to be replaced, such as tubes, fuses, transistors, lamps, time delay relays, resistors, capacitors, rectifiers, etc. Equipment manual parts lists will guide you in preparing an inventory list. Parts should be grouped according to type, such as all tubes together, etc. Then list them in alphabetical/numerical order. Beside each part number indicate the quantity you've decided to stock (see below). You may want to keep a separate quantity number for each location, i.e. transmitter and studio locations. Beside the number indicating normal inventory quantity, you can maintain a running inventory of actual "on hand" quantities.

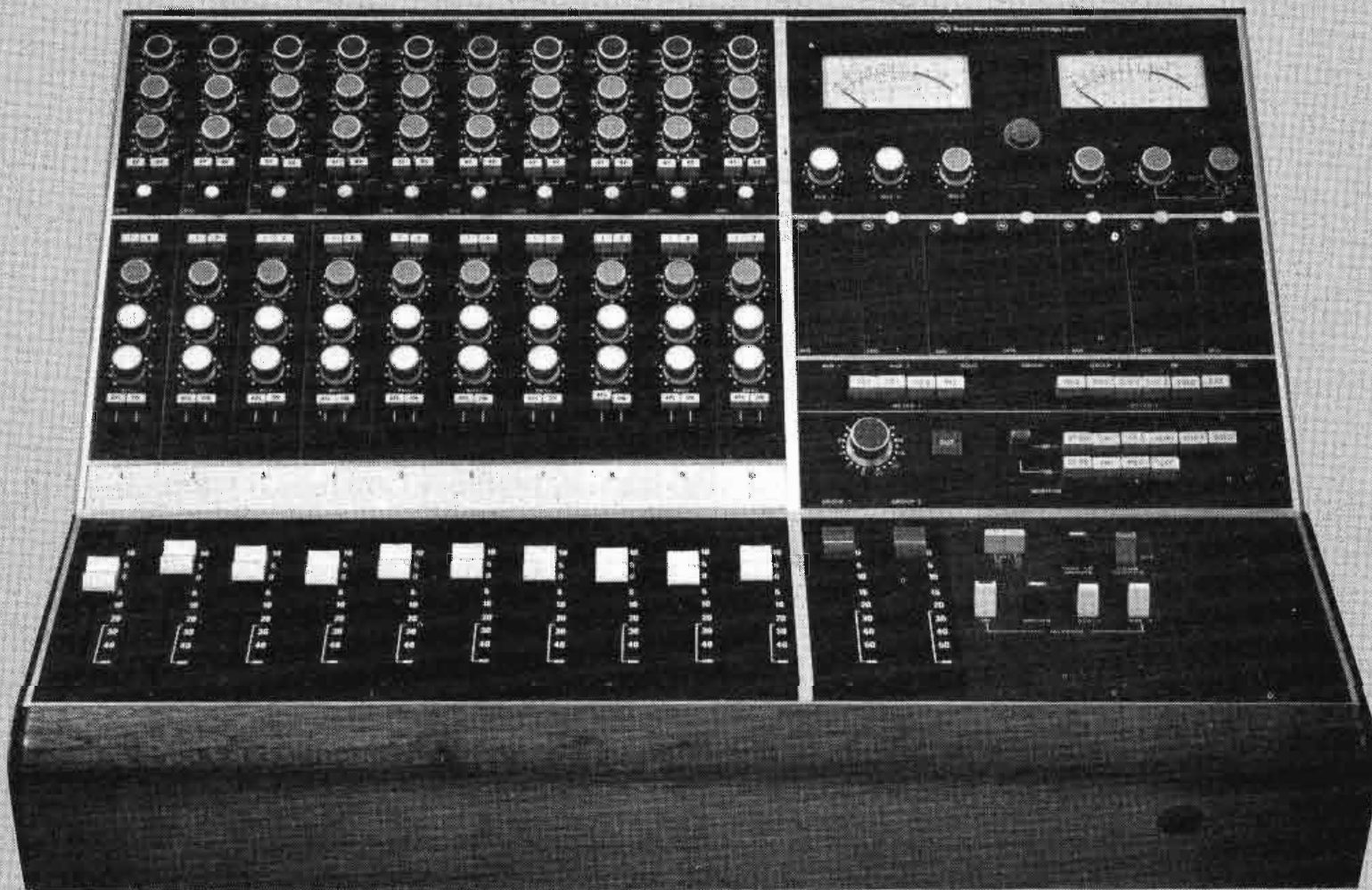
Whenever a part is used it should be replaced as soon as possible so that you won't find yourself caught without spare parts. Whenever I use a tube I remove the end of the carton containing the type number and use these for reordering.

Deciding on the quantity of each part to stock will depend on such factors as budget, how each unit will affect the station's capability of staying on the air legally, and the cost of down time compared with the cost of the replacement part. Always keep at least half as many of each tube type on hand and at least one of each transistor. Fuses, on the other hand, should be stocked in quantity, a whole box for every individual fuse used. Of

# The Neve remote console.

## \$7,950\*

### No need to compromise!



The Kelso model 8301 is a fully professional transportable sound mixing console of extremely compact dimensions, designed for high quality mono or stereo recording and broadcast production. This 10 channel console of the highest technical performance and built to exacting quality standards is ideal for location recording, mobile units or the smaller studio. Each console is supplied with a comprehensive technical manual and a spare parts kit.

It features 10 input channels for line or microphone level, equipped with LF and HF controls with shelving curves to a maximum of  $\pm 18\text{dB}$  boost or cut, and a 3 frequency high pass filter with  $18\text{dB/octave}$  roll off. Pan potentiometers on all inputs. 2 main group outputs which can be combined to provide 2 independent mono outputs. 2 auxiliary outputs with separate level controls on each channel. Cue (AUD) facilities with a headphone monitoring output.

Stereo recorder playback lines provided for monitoring. 2 speaker monitoring outputs with push button source selection. 2 VU meters with source selection. A five frequency line-up oscillator. Talkback and routing keys are provided, with a console mounted microphone. Transformer inputs and outputs are balanced and floating, terminated on XLR or compatible connectors. \*FOB Bethel, Connecticut Plus applicable sales taxes.

The 8301 is generally available from stock. Optional facilities as well as custom modifications available. The Kelso is one of more than 20 stock console designs available from Neve. For more information on stock and custom consoles, contact:

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Rupert Neve of Canada, Ltd., 2717 Rena Road, Maiton, Ontario L4T 3K1, Canada Tel: (416) 677-6611  
Rupert Neve & Company Ltd., Cambridge House, Melbourn, Royston, Hertfordshire, SG8 6AU England, Tel: (0763) 60776  
Rupert Neve GmbH, 6100 Darmstadt Bismarckstrasse 114 West Germany, Tel: (06151) 81764

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 **Neve**

course keep plenty of common value resistors and capacitors on hand as well as an adequate supply of hand tools. Another factor to keep in mind is that older equipment may sometimes be kept from becoming obsolete by ordering replacement parts that may become difficult to obtain later. This especially includes costly transformers, etc.

### Really Taking Charge

If the work so far described sounds like a lot of puttering, pay attention! Here's the real stuff of broadcast maintenance—Preventive Maintenance. Ignored by some operators as too time consuming, this phase of the operator's job is actually the most effective in maintaining good performance from the station. Unfortunately, I've seen stations where routine maintenance had been so long neglected that it seemed that if anything was disturbed the whole system might crumble like a house of cards.

You can begin a preventive maintenance program on your next

trip to the transmitter for the weekly inspection. Instead of giving the equipment the once-over and signing the log just before you take off, why not do a real inspection and maintenance routine. Check **every** meter reading and investigate any deviation from normal. (Here's where posting those readings comes in handy.) Dip the plate current on the transmitter and re-tune according to the manual (usually this involves tuning to some plate current value slightly higher than minimum).

While at the transmitter site you should vacuum the building thoroughly. Don't use a broom; it will raise too much dust. Keeping the building clean will minimize the amount of dust the transmitter blowers suck into the air filters. The filters themselves should also be vacuumed at this time, making sure to apply suction in the **opposite** direction from normal air flow. Vacuum equipment racks too, especially in summer when bugs seem intent on clogging the works everywhere.

The weekly inspection is also a good time to calibrate remote meters. First record on the maintenance log the actual readings obtained from the transmitter itself, as well as the remote meter indications as reported on the phone by someone at the studio. Then re-calibrate the remote readings to agree with the local ones and record both on the maintenance log again.

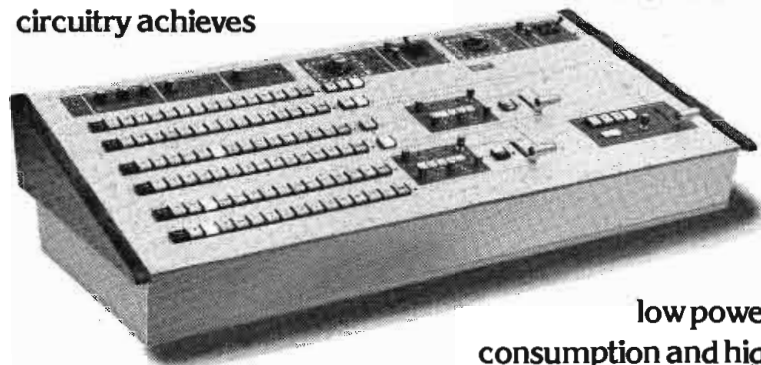
In some cases remote control units have the calibrating controls located on the studio unit. If there is no one at the studio competent to make those adjustments, you'll have to do so yourself when you get back. Don't simply adjust studio readings to agree with those at the transmitter when you were there. Make adjustments on the basis of the **difference** between remote and local readings at the time you were at the transmitter site.

### Next On Tap

Next month we'll continue with a look at monthly maintenance, tape maintenance and coffee in the pots!

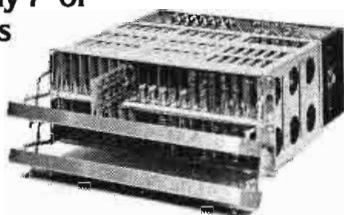
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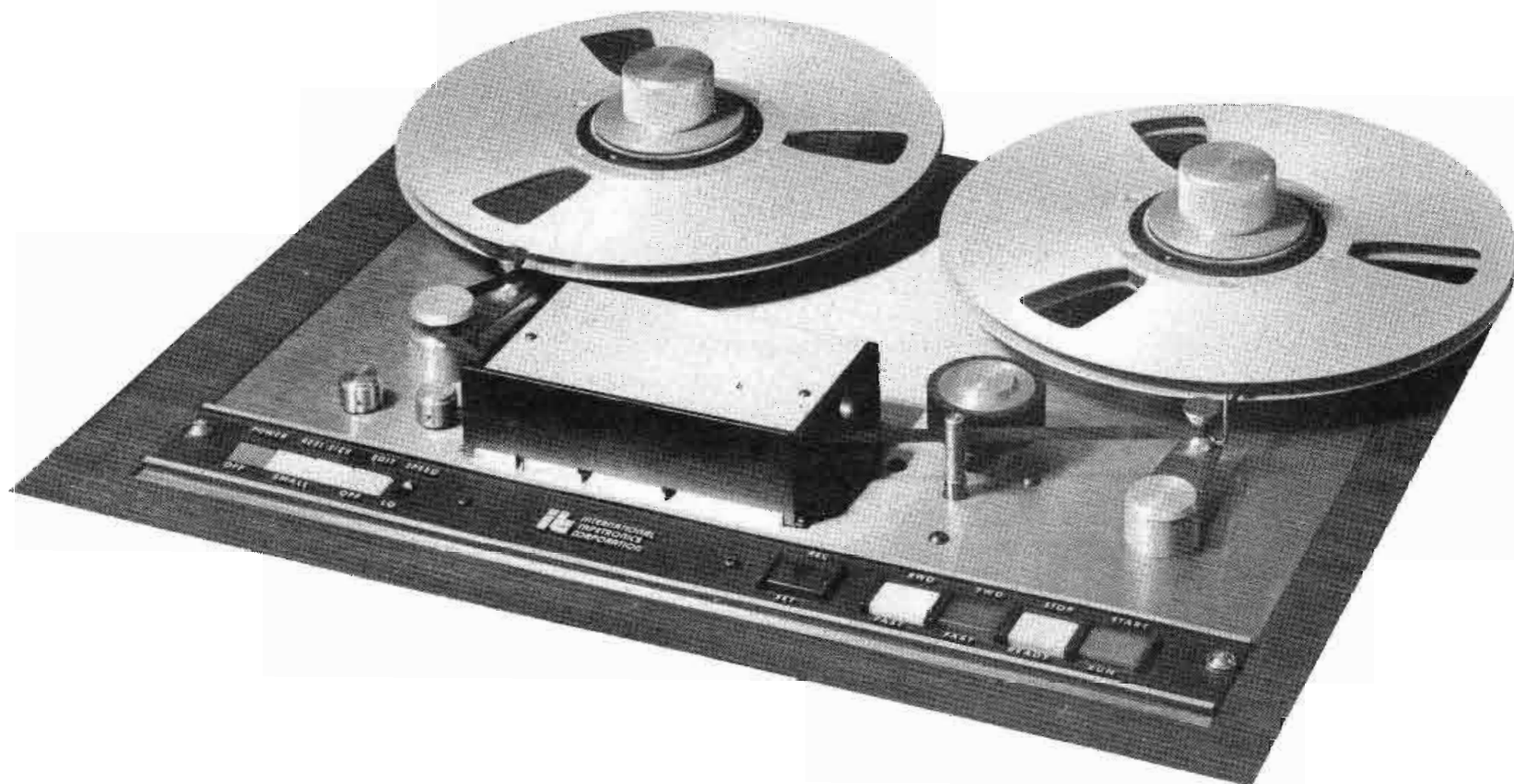
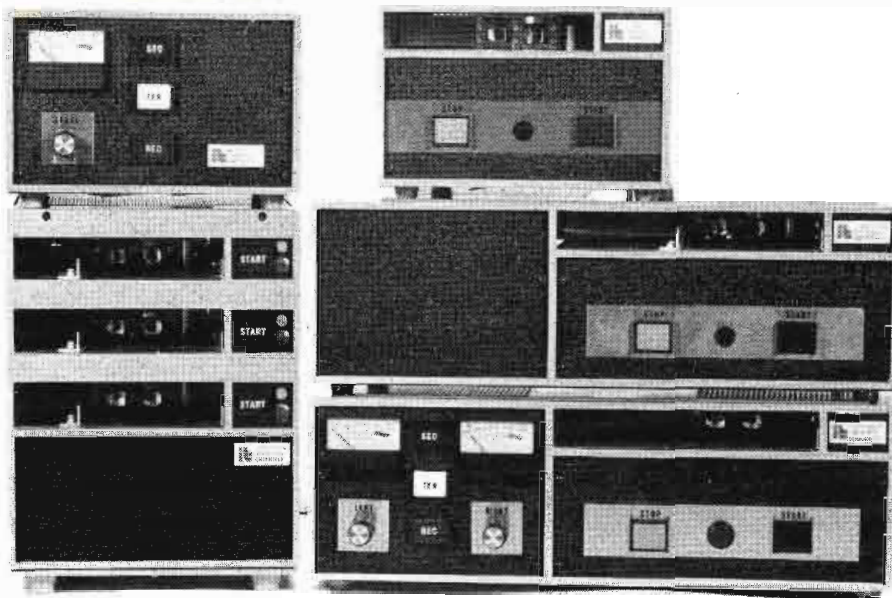
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# Segmented Helical Scan VTR Review

By Joe Roizen

Television stations throughout the world have continued to increase their reliance on video-tape recording as a means of bringing programs to their audiences in a smoother, more efficient manner. This is quite evident when one considers that many prime-time movies are copied on tape before airing to facilitate commercial inserts and simplify equipment scheduling.

The use of very expensive and complex quad cart machines for fast paced station breaks and commercial spots is another indication of this trend. The most prevalent type of VTR assigned to primary studio applications is the

quadruplex format machine, of which more than 8,000 are now in use. To date, all attempts by other VTR formats to invade the broadcast market have had only limited success, and mostly in peripheral applications.

However, 1975 witnessed the emergence of a new breed of recorders that can best be described as hybrid machines which combine the best features of the quad (high writing speed, short scan length) with some of the benefits of helical formats (long head life, low tape usage).

The recorders, made by three manufacturers, are defined as seg-

## SEGMENTED HELICAL VTR COMPARATIVE CHART

From Published Manufacturers Specifications

TECHNICAL SPECIFICATION	BOSCH/FERNSEH BCN	ARVIN/ECHO PILOT I	IVC/RANK/THOMSON 9000
TAPE WIDTH	25.4 MM/1.0 INCHES	25.4 MM/1.0 INCHES	50.8 MM/2.0 INCHES
TAPE SPEED	24.3 CM/9.5 IN./SEC.	38.1 CM/15.0 IN./SEC.	20.3 CM/8.0 IN./SEC.
HEAD SPEED	24.0 M/950 IN./SEC.	37.3 M/1470 IN./SEC.	38.1 M/1500 IN./SEC.
RECORD TIME	52/95 MINUTES	30/60 MINUTES	120 MINUTES
SCAN ANGLE	14.3 DEGREES		19.5 DEGREES
SCAN LENGTH	80 MM/3.14 INCHES		133.2 MM/5.24 INCHES
SCAN SEGMENTS	NTSC - 5/SECAM/PAL - 6		NTSC - 5/SECAM/PAL - 6
PROGRAM AUDIO	TWO TRACKS	TWO TRACKS	TWO TRACKS
CUE AUDIO	ONE TRACK	ONE TRACK	ONE TRACK
ADDRESS CODE			ONE TRACK
SIGNAL SYSTEM	HIGHBAND	SUPER Highband	SUPER Highband
VIDEO S/N	PAL 43 dB		PAL 45 dB, NTSC 47 dB
DIFF. GAIN	4 PER CENT		4 PER CENT
DIFF. PHASE	4 PER CENT		4 PER CENT
K-FACTOR			2T SIN <sup>2</sup> PULSE 1%
MOIRE	PAL -35 dB		PAL -40 dB, NTSC -50 dB
TBC ERROR	±2.5 NANOSEC.		±2.5 NANOSEC.
AUDIO S/N	55 dB/DOLBY 65 dB		55 dB
FLUTTER & WOW	0.1% PEAK		0.15% PEAK
TAPE TYPE	CRO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>
HEAD WARRANTY	300 HOURS		1500 HOURS

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If the log shows a commercial spot at a specific time, rest assured it will appear exact. There is no error because of the confusion of the moment, no missed or delayed events, no disgruntled sponsors, no makegoods. *Automated programming is accurate and precise. And, good business.*

### Control Your Costs 24 Hours a Day.

It makes no difference if it's 3 PM on Tuesday or 3 AM on Sunday. Automation constantly gives the same quality, at the same cost, and with the same thorough attention to time and detail. The equipment can be programmed for 7 days of hands-off operation, sequencing up to 8,000 events from a multitude of sources. *Automation controls costs.*

### People Are Important.

Each of your key men wears many hats. By eliminating the tedium of the day-to-day operations, they are freed for more profitable assignments . . . special local programming, sales, market planning, financial management. *Automated stations have better personnel utilization, higher pay scales, more job security.*

### Meet Competition Head

**On.** The automated station is in the best possible posture. It can provide top talent and entertainment like the largest conventional station: programming that is out of the reach of competitive size stations. It has firm control over costs. It frees personnel to better meet the radio needs of the community, and to more effectively sell and service customers in its marketing territory. *The automated station has the competitive edge.*

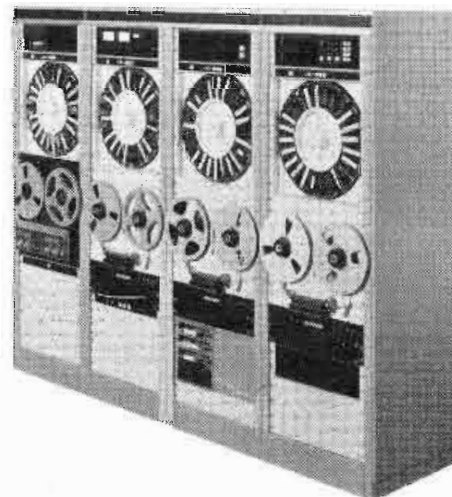
### Increased Sales, Higher Profits.

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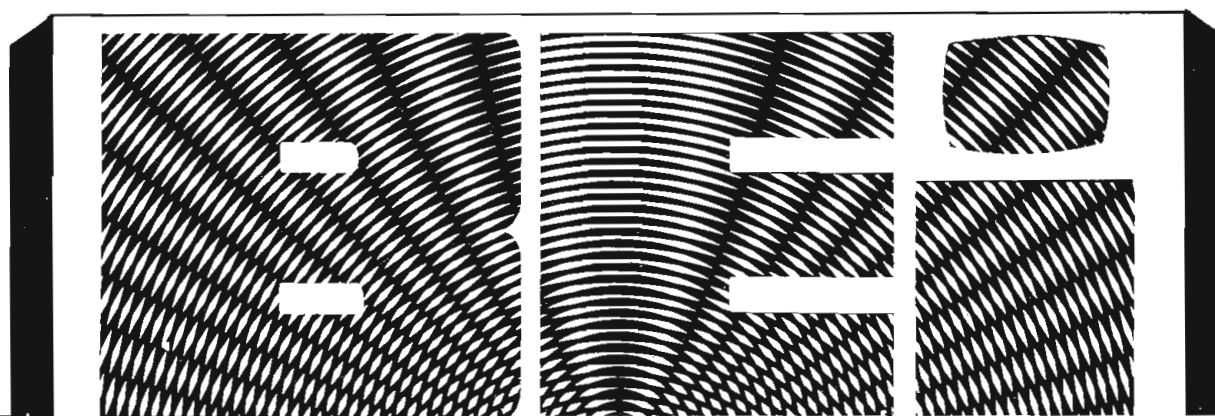
For More Details Circle (60) on Reply Card



European engineers inspecting the Echo Science Pilot 1 backpack at the Montreux Symposium. Arvin/Echo had several on display in both portable and console configurations.

mented-scan helical machines because they all divide the TV image into segments (like the quad does), but use a different number of TV lines for each segment or head band. The three recorders are called the IVC 9000, the Echo Science Pilot 1 and the Fernseh BCN. They are not compatible with each other as each has a different set of geometric parameters and dissimilar electrical operating characteristics.

The IVC 9000, which is also sold by Thomson-CSF and Rank Cintel, was first introduced at the Montreux conference in 1973 and has been to the major broadcast conventions since. Over 60 of these machines are now in use. Both the Fernseh BCN and the Arvin/Echo Pilot 1 VTRs were shown at last year's Montreux Symposium in May, and elicited considerable interest among broadcast representatives at that conference. While these three recorders show some similarity in design philosophy, they are different enough to require separate descriptions of their tape formats and operating features.



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A hand is shown holding a black business card. The card features a white logo consisting of three stylized, overlapping shapes forming a triangle. Below the logo, the text "THOMSON-CSF LABORATORIES, INC." is printed in white, uppercase letters. The card is being held over a light-colored surface, possibly a desk or a piece of equipment.

A black business card is shown, partially overlapping the one above it. It features the text "CBS LABORATORIES" in large, white, uppercase letters. Below this, in smaller white text, it says "A Division of CBS Inc." The card is held over a light-colored surface.

## One good name becomes another.

CBS Laboratories Professional Products Department, responsible for the development, manufacturing and marketing of broadcast products, has become Thomson-CSF Laboratories, Inc., a wholly owned subsidiary of Thomson-CSF, S.A.

Thomson-CSF, S.A., one of the world's leading professional electronics companies with over 48,000 employees, has, with this acquisition, further increased its commitment to the American broadcasting industry.

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### Bosch/Fernseh BCN

This recorder was developed to meet European LIVE journalism requirements and to serve as a mobile or portable VTR for program acquisition away from the studio.

The recorder is a segmented helical machine using two heads, and one-inch tape. It comes in portable, mobile or studio configurations, with the smallest package (BCN 20) weighing 20 kilos (44 lbs.) without batteries or tape. The

studio units (BCN 40 and 50) are in console form and can include over-transport monitoring facilities.

The track pattern on the one-inch CRO<sub>2</sub> tape includes one video track, two program audio tracks, an auxiliary audio track that can serve as a cue or address code track and a control track.

Longitudinal tape speed on the BCN series is 24.3 cm/sec (9.5 ips), and this gives a 52 minute recording time on the portable. The console units which accept larger reels

can provide up to 95 minutes of record or playback time. Head writing speed is 24 m/sec (950 ips).

The video headwheel has two video heads, 180° apart, and two erase heads for "flying erasure" to accommodate editing needs.

The SECAM and PAL image are segmented into even 52 line segments, with 6 tracks forming one field. The NTSC version will use an odd segmentation of 5 tracks per field. A line-by-line autochroma eliminates or minimizes head banding.

As far as video and audio performance goes, the BCN units shown at Montreux, and later in Darmstadt, showed third and fourth generation copies that were air-worthy. Video performance specs on the European standards, with a 5 MHz bandpass were just slightly lower than quad specs. Audio specs for the two high quality channels using Dolby A correction were at broadcast levels.

The BCN unit has not yet been demonstrated on the NTSC standard, however their engineering staff have studied the differences and are confident that the NTSC version of the BCN will meet domestic broadcast requirements.

### Arvin/Echo Pilot I

This VTR is not exactly a newcomer to television, having been shown in NTSC versions at some pre-75 NAB shows. Echo Science (formerly Westel) has been building segmented helical recorders for instrumentation and military applications for many years. Recently Arvin acquired this company and a new emphasis was put on developing a new broadcast version of their wideband airborne VTRs.

Echo also chose to introduce their Pilot I recorder at Montreux as a contender for the European LIVE journalism market.

This recorder is a two-head, segmented-scan machine using one inch tape, however with a longitudinal tape speed of 38.1 cm/sec (15 ips) and a head-write rate at 37.3 m/sec (1470 ips), its tape geometry is quite different from the BCN. There is, therefore, no interchangeability between these two one inch machines.

The Pilot I also comes in portable and studio versions. The



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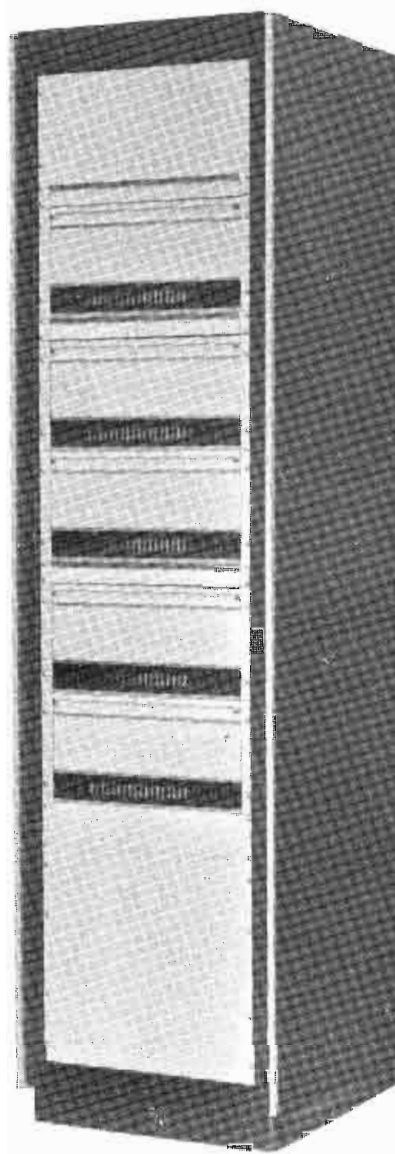
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Another competitor boasts of video switching at less than \$30 per crosspoint. The TVS-1000 sells for as little as \$23 a crosspoint, and this price includes professional quality vertical interval switching, on-board electronic latching, and 100% computerized testing of all parameters through all crosspoints.



40 x 50 AFV Switcher

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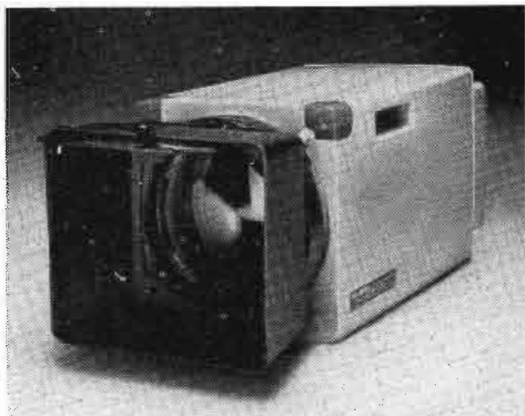
The TVS/TAS-1000 is more reliable because its simple design requires fewer active components in the signal path. This reliability has been proven at installations throughout the world in configurations ranging from 10 x 10 to 80 x 50. To find out more about the one switcher offering compact, cost-effective signal distribution with true broadcast quality and reliability, contact the nearest TeleMation sales office.

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| <b>2. Wide Angle Lens</b><br>Compact and shortest<br>M.O.D. with built-in 2x<br>extender.                                    | 10x15<br>f:2.8           | 10x11<br>f:2.1   |
| <b>3. Studio Standard</b><br>High transmission,<br>aberration free, short<br>M.O.D. multi-range<br>lens.                     | 16x17<br>f:2.1           | 16x13<br>f:1.6   |
| <b>4. Low Cost Field Zoom</b><br>Available with 1.5x and<br>2.5x add-on extenders.   | 14x37.5<br>f:2.2         | 14x29.5<br>f:1.8   |
| <b>5. Low Cost Studio<br/>Standard</b><br>High quality, compact<br>lens with normal range.                                   |                          | K10x16<br>f:2.0  |
| <b>6. ENG Lenses</b><br>(Pictured below)<br>Extreme light gather-<br>ing power with ideal<br>ranges of zoom and<br>focusing. | 1"<br>K7x11<br>f:2.0     | 2/3"<br>A10x10<br>f:1.9<br>A7x9<br>f:1.4<br>A6x12.5<br>f:2.0 |
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**Bosch/Ferseh** exhibit at Montreux included VTR's in different configurations. This studio version includes picture and waveform monitor in an over-console bridge.

backpack unit weighs 17 kilos (37.4 lbs.) and permits 30 minutes of recording while the studio unit, which can have a full complement of waveform and picture monitoring equipment over the console version VTR, accommodates 60 minute tape reels.

Track geometry on the Pilot I is similar to the BCN, with a video track, two program audio channels, a cue/address code channel, and a control track. Special features claimed for the Pilot I signal system are: super highband mod/demod, pilot carrier color correction, color edit framing and dropout compensation. Video specs equal or superior to quad recorders are achieved with normal Gamma Ferric Oxide (Fe<sub>2</sub>O<sub>3</sub>) tape. Audio specs are also to broadcast quality levels. Multiple generation recordings produce good results.

#### The IVC 9000

As far as broadcast applications are concerned, the 9000 was the first segmented helical machine that attracted industry attention to this format. The 9000 was primarily designed as a program originating VTR. It was introduced in its PAL/

SECAM configuration in Europe at Montreux 73, and subsequently in an NTSC form at the Fall Conference of the SMPTE the same year.

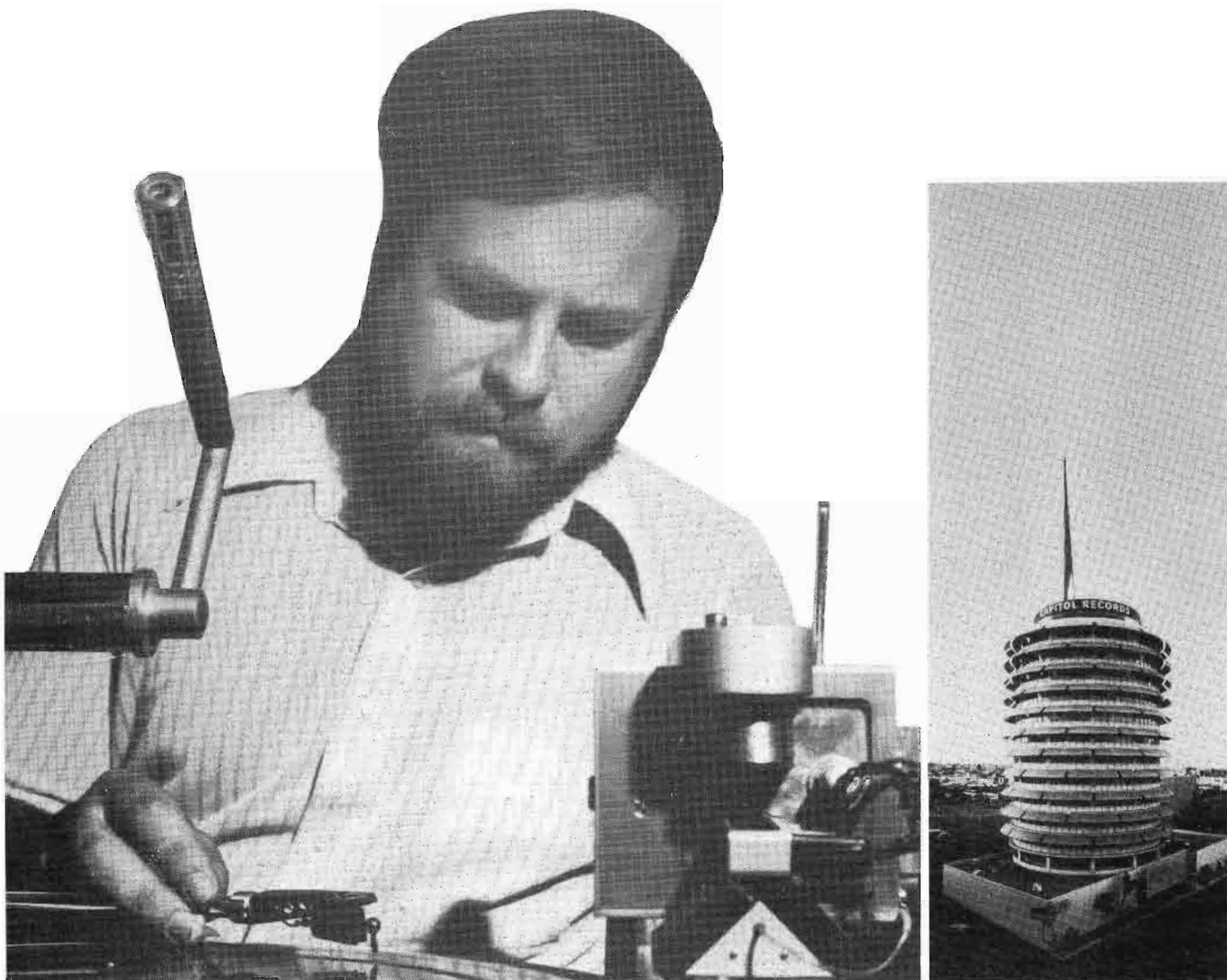
The 9000 is a segmented-scan, two head helical machine using two inch tape. Head writing speed is 38 m/sec (1500 ips), which allows the use of super highband (9-12 MHz) for the carrier and deviation frequencies. Tape longitudinal speed is 20.3 cm/sec (8 ips) giving over two hours of playing time on a 26.7 cm (10.5 in.) reel. Track geometry on the tape consists of one video track, and three audio tracks (2 program, one cue) along the top edge. A control track and separate address code track are along the bottom edge of the tape.

This VTR is also called the Rank Cintel 9000, or the Thomson-CSF TTV 3500.

The 9000 comes in a console configuration with a monitoring bridge on top that can hold picture monitors or associated equipment. Waveform monitoring and the editing system is integral with the control panel on the right hand side of the VTR.

The 9000 uses two long life, hot

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The D6872AMC — for tough nickel-plated "mothers".

The Stanton 681 Calibration Standard Series enjoys almost universal acceptance throughout the Recording Industry. After all, it

was created in order to satisfy the need for a cartridge of sufficient sophistication to be used as a primary Calibration Standard in system checkouts for linearity and equalization. Stanton Magnetics met this need by producing an "absolute" cartridge standard . . . stereo cartridges of such linearity and overall quality as to gain immediate acceptance within the Recording and Broadcasting Industries.

The fact that Capitol has selected the Stanton 681 Calibration Standard Series for use throughout the operation is a testament to its quality.

All Stanton Calibration Standard Cartridges are guaranteed to meet specifications within exacting limits. Their warranty comes packed with each unit. . . The calibration test results for that individual cartridge.

Whether your usage involves Recording, Broadcasting or Home Entertainment, you can enjoy professional audio quality with Stanton Products.



For further information, write: Stanton Magnetics, Inc. Terminal Drive, Plainview, N. Y. 11803.

**This new Stanton advertisement will appear in major consumer publications.**



The IVC 9000 recorders have been having some marketing successes. Here you see two machines in a Rank Cintel booth operating on the PAL standard.

pressed ferrite heads that can give 3000 hours of service before replacement. The head drum also carries the flying erase head.

Video and audio performance specs are equal or superior to current quad recorders, and this is achieved with normal (non CRO<sub>2</sub>) longitudinally oriented two inch tape. Tape longevity is also improved by constant tension spooling through the use of vacuum columns, and a vacuum collar keeps the tape away from the scanner during standby modes.

#### Summary

Segmented helical VTRs now offer a gamut of physical configurations and electrical characteristics which fit them for many specialized applications in television broadcasting. While it is unlikely that they will replace the quadruplex format in the near future, it is probable that a growing number of these VTRs will be acquired by production houses, TV studios or CCTV program originators to satisfy specific needs that are met by the segmented helical format. □

# noɹɔnbɹɔɹɔ

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will help make an impact on your listeners and your profits using proven multi-track production techniques. We guarantee you'll love GRANDSON'S new production results and unique versatility. Where else can you find an affordable, fully modular, professional recording/production console with 18 mixing positions—and on-air capability?

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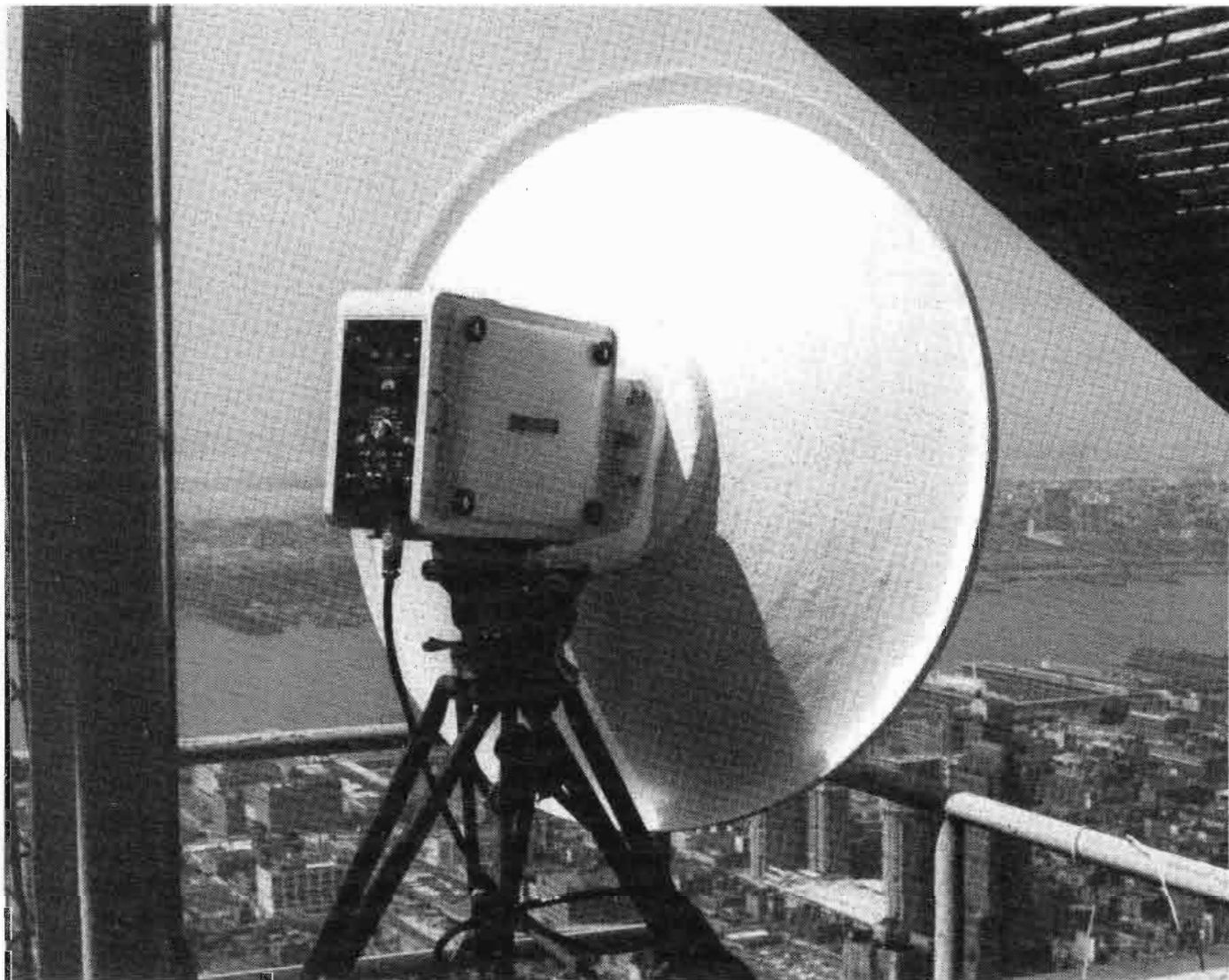


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The world leader in recording consoles at sensible prices.

# There's News Out There...



## and Farinon's Portable, Frequency-Agile Microwave Gets It On The Air!

The new FV Portable Microwave system is available for all bands from 1.99 to 13.25 GHz.

You dial-tune to your operating frequency on the spot. There's no need for bench-work before you set up a remote pick-up. No filter pre-selection. You don't even need a screw-driver.

You can plug in video monitors, or clampers, or up to three sub-carrier channels.

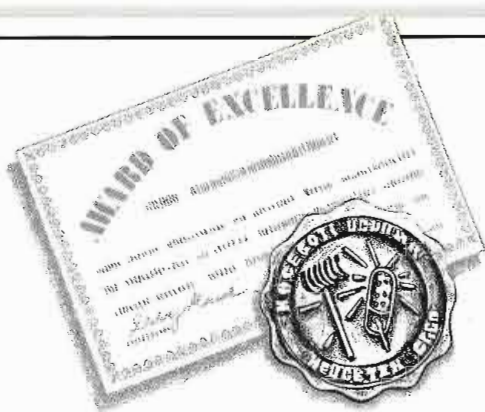
You can run 500 feet of cable between the RF head and the FMT or FMR remote unit without roll-off or equalization.

And you get 1-watt output level from 6.875 to 13.25 GHz, 5-watt output (optional 20-watt) from 1.99 to 2.11 GHz,  $\pm 0.002\%$  frequency stability; 60-dB signal-hum ratio from dc to 10 kHz, and 70-dB signal-noise ratio from 10 kHz to 5 MHz.

**Farinon Electric**, 1691 Bayport Ave., San Carlos, CA 94070, U.S.A. Tel. (415) 592-4120. Telex 34-8491.  
... in Canada: **Farinon Electric of Canada, Ltd.**, 657 Orly Ave., Dorval, P.Q. H9P 1G1, Canada.  
Tel. (514) 636-0974. Telex 05-82-1893.

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NAB Booth 110



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for outstanding and meritorious ability and intelligence demonstrated in the decision to install Aural Studio-Transmitter Link equipment and the high degree of knowledge exercised in making the equipment selection."

#### Why STL?

1. No "lost air" time due to cut, wet or electrically charged telephone lines.
2. Better Sound Quality Than a Class AAA telephone line.
3. EVENTUAL COST REDUCTION in operating expense.
4. Complete control of entire broadcast system.

#### Why Dual Channel?

1. A Dual-Channel costs less than a Composite.
2. Better Reliability than a Composite. "Built in Backup."
3. Greater Channel Separation than a Composite.
4. Less Signal Drive Required to Receivers means additional system Fade Margin.
5. Less Test Equipment Necessary and more Positive System Diagnosis.
6. Stereo Generator is away from Studio and Unauthorized Tampering.
7. Stereo Generator and Broadcast Transmitter Compatibility without Interface.
8. Having a Dual-Channel STL is like having a Spare Link.
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1. Channel Separation more than 65 db.
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3. Distortion less than 0.5%.
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5. A Simple, True Direct FM Plug-in Modulator.
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7. The Marti System Delivers Top Performance with Transmitter manufacturer's Stereo Generator.
8. Marti STL Systems Log over TWO MILLION (2,000,000) Broadcast Hours each Year.
9. AVAILABLE FROM STOCK.

#### The Stereo STL with "Built-in Backup."

Dual Channel System (Stereo) \$4160.00  
Single Channel System (Mono) \$2290.00

(Does not include cost of Antennas or Transmission lines).

**MARTI Electronics, Inc.**  
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For More Details Circle (69) on Reply Card

# Do You Really Know When To Beep?

An investigation of the regulations and where they're found turns up some interesting answers.

By Harold Dorschug, WTIC, Hartford, Cn.

Your newsman has just given you a tape of a telephone interview to check. While it's running the boss sticks his head in the door, listens a minute, then asks, "Where's the beep?" Your mouth gets a bit dry as you answer, "We don't need to use it." His reply chills you a little. "That's funny—I just read a news-wire story that says we can lose our telephone service if we fail to beep."

Are you sure you're right?

One state broadcasters association has just advised its members:

The FCC has ruled against eliminating the mandatory beep tone that warns when a phone conversation is being recorded. Communications Certification Laboratory had argued that the

rule is unenforceable and costly. The FCC commented, "We believe that the privacy of communication is of paramount importance."

Chances are that what you are doing is OK, but let's see what the regulations really say. After all, telephone recordings make up an important segment of programs today, particularly with the emphasis on electronic news gathering and it certainly is a subject of much confusion.

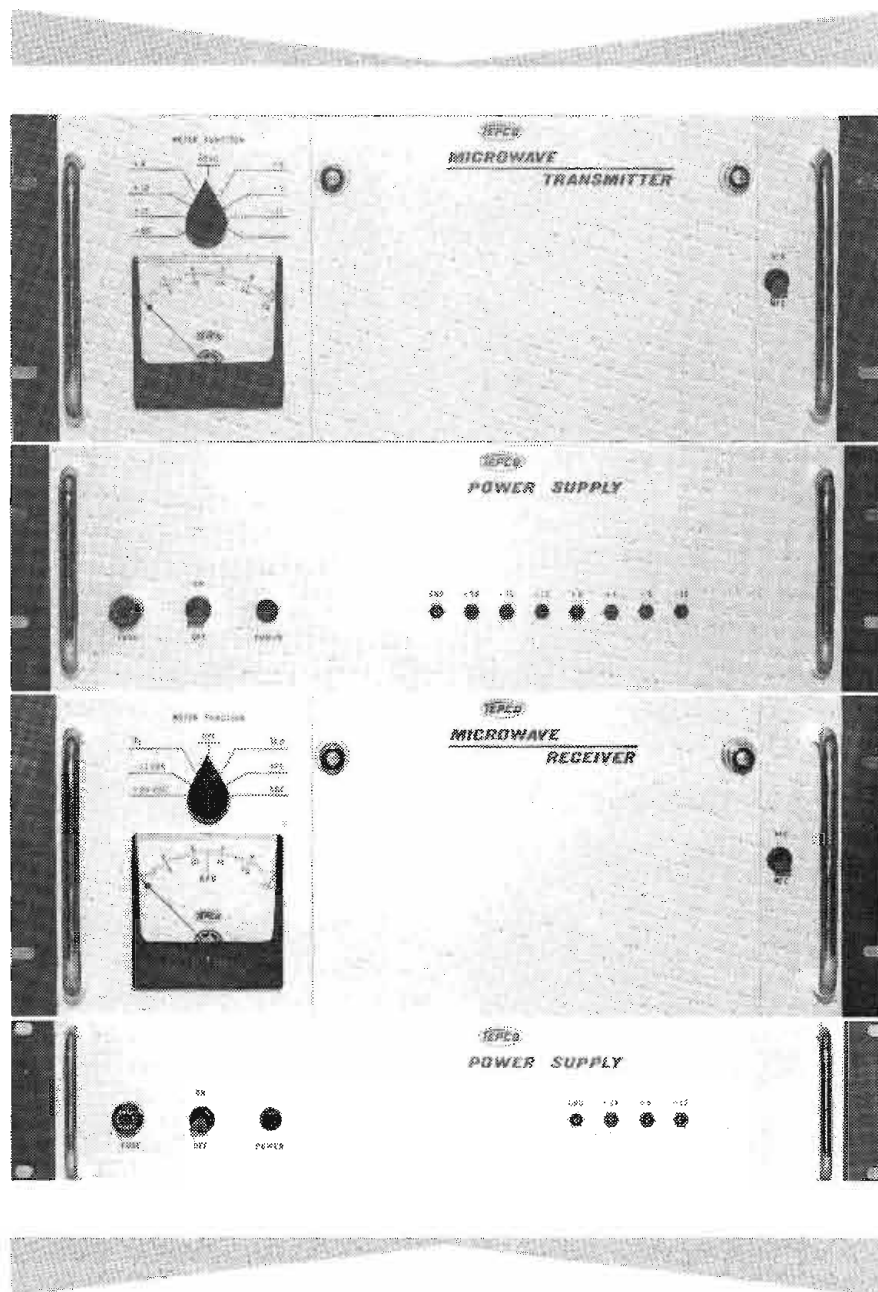
Probably you have already searched Part 73 of the FCC Rules and Regulations from end to end and couldn't find the word beep. Only in Sec. 73.1206 is there any mention of recording a telephone

"I take it, then, that you don't want to be on TV?"





# Announcing the TEM-7 AND TEM-13 TRANSMITTERS



**A New  
All Solid State  
Microwave  
For The Television  
Broadcast Industry  
7GHZ and 13 GHZ**

- ALL SOLID STATE DIGITAL FREQUENCY CONTROL ON TRANSMITTERS
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This new microwave equipment was designed with the broadcaster in mind and is based on manufacturing and field experience since 1961. Applications are STL, Inter-City Relay for fixed installations, Portable for electronic news gathering, and Remote Pickup for temporary installations.

For Complete Free Information on Specifications, Features, Reliability and Performance, write:

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FREE microwave profiling service at Tepeco Booth 934 at the NAB Show March 21-24 at McCormick Place, Chicago. Write for details in advance of the show.

# New from Cooke

## SMPTE

### Video Taping/Editing Accessories

OUR NEW SMPTE TIME CODE SYSTEMS PROVIDE UNIQUE FEATURES AND THE LATEST STATE-OF-THE-ART DESIGNS.

#### SMPTE TIME CODE GENERATOR



Fully compatible with any SMPTE time code editing system, and meets or exceeds all SMPTE specs. Operates on sync or composite video input. Drop frame mode keeps generator on time when used with NTSC color video sources. Timing is unaffected by momentary power drop outs. Easy time set and large LED display readable at 30 feet. Two isolated outputs at +11 dBm into 600 ohms. Options include 10 outputs and 32 user bits per frame.

#### SMPTE TIME CODE READER/CHARACTER GENERATOR

Reads SMPTE code, generates 36 line high resolution digital characters, and adds time code characters to video. Valuable quad recorder time can be reduced by making editing decisions off-line on inexpensive helical or cassette machines. Allows time code display on studio or mobile unit monitors during production or VTR playback.



#### TAPE TIMER



Replaces mechanical counter and motion sensor on RCA and Ampex VTR's. Optical system provides greater accuracy than mechanical counter with the added feature of large easy to read LED digital display. Optional remote readouts and thumbwheel time set switches.

#### BE SURE WITH COOKE BROADCAST PRODUCTS

MASTER CLOCK SYSTEMS • VIDEO/AUDIO PATCHING EQUIPMENT • VIDEO/AUDIO/PULSE DISTRIBUTION MODULES • VIDEO TAPING/EDITING ACCESSORIES

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conversation and that without any reference or requirement for using a beep signal.

Well then, it must be in the Communications Act of 1934, that sacred manifesto of Congress upon which all American broadcasting exists. No, save time looking, for even that doesn't mention the beep.

What else is there? Brace yourself—you'll never guess. The tariff of your local telephone company. Regulations governing telephone recordings have the weight of law only insofar as tariffs are approved by the appropriate regulatory body which is the FCC, in the case of interstate traffic. No wonder we broadcasters are confused.

#### After The Shooting

After World War II the ready availability of practical recorders caused the business world to consider their efficiency in documenting telephone discussions. Much faster than a secretary's transcript and incapable of typographic error, their attractiveness soon put them to work. Concerned about privacy, the telephone industry discussed with the FCC adequate means of advising parties to a conversation that it was being recorded. The requirement of the beep signal in the tariff was the result.

The original concept applied only to recording conversations and did not permit broadcasting the conversation directly. However, once the tape was made it could be played into a station's facilities like any other recording. Even the beep tone could be edited out since it had served its purpose during recording.

#### The One-way Beep

The next logical step was to delete the beep from the recording while at the same time sending it to the person being recorded. By the early 1960's telephone companies were offering recorder connectors which did that. They were, unfortunately, somewhat clumsy in that they disabled the local telephone during the actual recording process to prevent two-way discussions.

Finally, after the famous Carterfone decision making it possible to tie the telephone network to recorders via a simple approved coupler, the regulations for broadcast recording work were relaxed.

For More Details Circle (70) on Reply Card

# DFS-3000 Digital Framestore Synchronizer

It would take a wall full of equipment to handle the job that DFS-3000 does in just 8.75 inches of rack space. In fact, every synchronous treatment needed for the full spectrum of NTSC compatible broadcast activities is literally at your fingertips in this light, rugged, fully portable system that goes anywhere.

Just check this list of available features:

- Two complete fields of store for full broadcast versatility.
- Infinite window TBC corrects time base errors on any VTR including ENG.
- Look Ahead Velocity Compensator cleans up color vectors on direct color VTR's for truer color presentation across entire picture.
- Video Compressor enables producer to insert second live image in any quadrant of screen.
- Joystick Control allows compressed picture to be positioned *anywhere* on screen.
- Broadcast Quality SPG permits synchronizer to be used as station reference.
- Memory Analyzer ensures system integrity.

- Frame or Field Freeze for special effects.
- Remote Control Panel for production flexibility.
- Synchronous clean-up of non-synchronous switches eliminates picture tearing and rolling.

All these features, and broadcast quality too, are packaged complete with power supply and analog circuitry in this fully modular system that weighs less than 60 lbs. Even more significant, power consumption is a mere 250 VA, keeping heat problems to a minimum.

For information on our demonstration program, call or write George Grasso, MCI, P.O. Box 10057, Palo Alto, CA. 94303. Phone: (415) 321-0832.

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## so you do less out there

For More Details Circle (71) on Reply Card

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contact ALLIED before you buy or trade

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IF YOU ARE NOT RECEIVING OUR MONTHLY CATALOG CALL OR WRITE

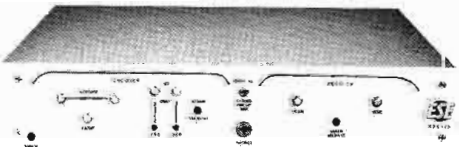
**ALLIED BROADCAST EQUIPMENT**

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## EBS Encoder/Decoder SYSTEM



# \$250

# ESE

THE ESE EBS-76 WITH AUTOMATIC GAIN CONTROL, efficiency, economy and specifications that meet or exceed all basic FCC requirements.

### ENCODER FEATURES

- Output level to +18dBm balanced into 600 ohms.
- Automatic 22.5 second timing. (Adjustable)
- Switching of both sides of program line.
- Crystal controlled tones.
- Remote control capability.
- Reliable C-Mos circuitry.
- Stereo line switching available.
- Valid closed circuit testing with single switch.

### DECODER FEATURES

- Automatic Gain Control makes tone levels equal from all sources — accepts any input from 100mv to 5v without adjustment.
- Built to work with existing EBS radio.
- Derives tones from speaker or tuner output.
- Adjustable delay.
- LED's on PCB indicate each tone received for easy adjustment.
- PLL-linear and C-Mos IC's for reliability.

FCC type-approval pending. Kit version may require certification of performance by station engineer. **WRITE, WIRE OR CALL TODAY.**

505½ CENTINELA AVENUE • INGLEWOOD, CALIFORNIA 90302 • (213) 674-3021

130

For More Details Circle (72) on Reply Card

Even now steps are being taken to modify interconnect rules more as the result of the proliferation of automatic answering devices. Undoubtedly they will affect broadcasting and ENG.

Stations in Connecticut, for example, are served by The Southern New England Telephone Company (SNETCO), a Bell System affiliate. The applicable part of their General Exchange Tariff is found in Tariffs Part II, Section 25, Sheet 8. Section B of Subscriber-Provided Terminal Equipment in subparagraph 4 describes equipment for the recording of two-way telephone conversations. It makes interesting reading, but the most important part to the broadcaster is this (condensed by the author and with emphasis added):

Connection of subscriber-provided voice recorder equipment with local exchange and toll facilities is permitted only by means of direct connection through SNETCO furnished connecting equipment which inserts the specified beep, **provided, however, that recorder connector equipment without the automatic tone device may be furnished when the recording equipment is used by an FCC licensed broadcast station subscriber for the recording of two-way telephone conversations solely for broadcast over the air.**

Your telephone company has a similar tariff. It must be made available for public inspection at a convenient location where you may examine this part. Or you may be able to prevail upon your service representative to make a copy of it.

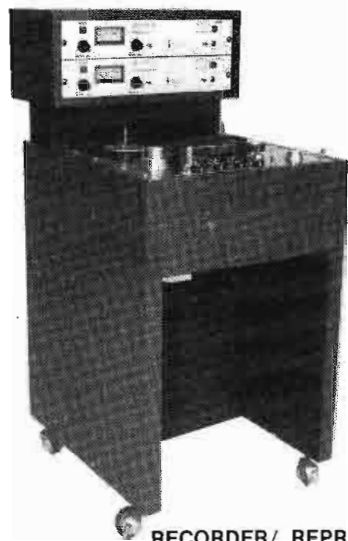
### Advance Notification

One more point that's very important. With the ease and freedom in using recordings of this type, the FCC took action to protect the caller's privacy by requiring advance notification before recording. This is set forth in Sec. 73.1206 and actually applies whether the call is to be broadcast either direct or by recording. **Recently, several stations have been fined for failure to comply.**

There it is. Did you give your boss the right answer?

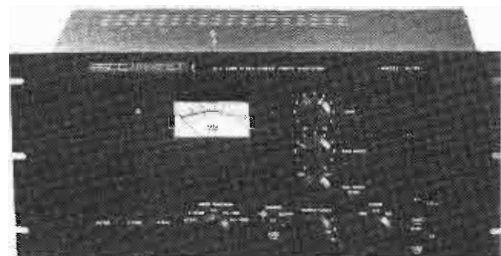
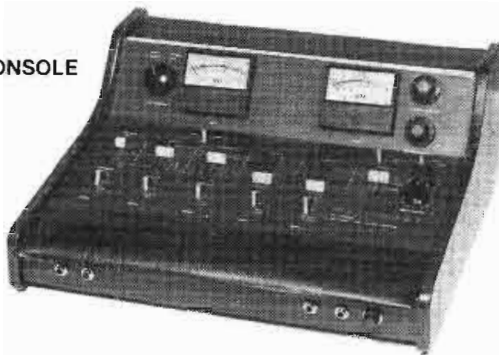
BROADCAST ENGINEERING

# NEW PRODUCTS FROM ACCURATE SOUND HELP SOLVE YOUR AUDIO PROBLEMS

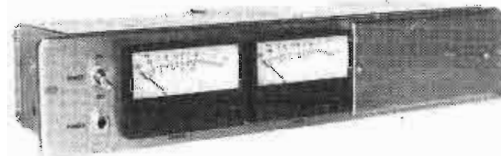


RECORDER/ REPRODUCE SYSTEMS

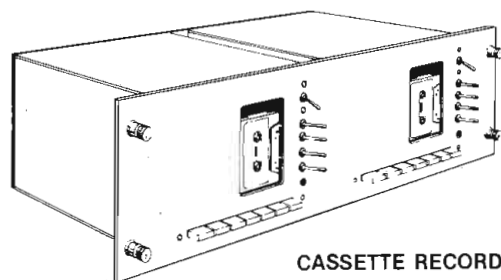
MIXING CONSOLE



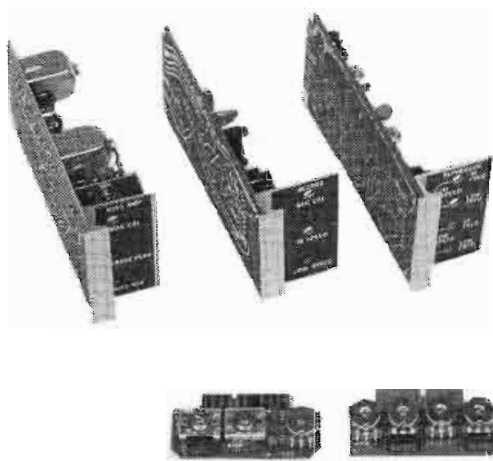
POWER AMPLIFIER



ASCO MODEL 445-M



CASSETTE RECORDER



440 STYLE PC CARDS



NUCLEUS SC100

...Whatever your problems: new equipment, rebuilt equipment, reconditioning or updating. ASCO's "Total Systems" capability can solve your problem.

## RECORDER/ REPRODUCE SYSTEMS

ASCO provides complete recording systems using Inovonics, three speed electronics, AG-440, Ampex 351, Scully or other electronics. The transport features our new tape motion control box that eliminates the tape handling deficiencies typical of most older tape transports. Contact us about your needs and the system components you would like to use. Price: System shown is an ASCO/Inovonics 375-2C, 3 speed—\$3,700.00.

## 440 STYLE PC CARDS

We have AG-440B style reproduce, record, bias and EQ cards. Also extender cards for the above.

Price:

Bias.....	\$120.00
Record.....	120.00
Reproduce.....	215.00
Reproduce EQ.....	35.00
Record EQ.....	35.00
Extender Cards.....	20.00 ea.
	(not shown)

## MIXING CONSOLE

The ASCO/ MIXFET DJ-11 Mixing Console is designed for advanced discotheque and broadcast production use. Unique low distortion and noise specification by use of field effect transistor technology. Features include: electronic pan from phono 1 to phono 2, talkback microphone tape ability, equalization on all channels, up to 4 mics and 4 line inputs in stereo or mono and VU meters with + 4 dBm output front panel headphone jack.

## CASSETTE RECORDER

This ASCO CRP-4T cassette recorder is designed primarily as an on-line logging recorder for broadcast use. It is a four channel recorder/

reproducer with many transport functions including: skip-forward, skip-back (i.e. automatic fast motion to play mode)—automatic play with either continuous run or BOT/ EOT sense—optional bi-directional play—optional capstan engage for search and cue—digital readout tape position indicator—any speed available between .5 and 20 ips with variable speed option—all functions remote controllable.

The system is packaged in a two module bay with provision for module to module dub function. The package size is 7" high x 19" wide x 12" deep.

Currently ASCO is developing a version of this unit to replace the cartridge format machines already widely used.

## POWER AMPLIFIER

The ASCO/ MIXFET .M150 is an all-tube single channel professional power amplifier. 150 watts rms, 19" rack mount. Frequency response at 1 watt. 9 Hz to 70 kHz +1 dB. Bass boost continuously from 0 to +12 dB at 50 Hz. Subsonic filter—1 dB at 30 Hz: -25 dB at 10 Hz. Price: \$750.00

## ASCO MODEL 445-M

Two channel reproduce only electronics, using standard 440 style cards. Available with or without front panel meters, in a 3 1/2" rack mount chassis. Features a built-in power supply and two speed/ EQ settings. Provision is made for remote EQ selection. Transport power is derived from a rear panel jack. Output level +4 or +8 dBm balanced. Price: \$595.00 without meters/ \$695.00 with meters.

## NUCLEUS SC 100

Solid state, single channel record/ reproduce electronics designed to replace Ampex 350/ 351

tube type electronics. Includes a built-in power supply and provides transport power via a rear panel jack. Two speed/ EQ choices. Output level +4 or +8 dBm balanced. Input impedance 100k ohms. Price: \$550.00.

## TRANSPORT CONTROL BOX

The ASCO 2000 Control Box is a solid state, retrofit modification for older 351 style transports. Features include: fast motion dynamic braking (i.e. braking is accomplished by reverse motor torque until reel stoppage, then normal brakes are engaged)—tape motion sensing that eliminates tape breakage by locking out the play function until tape has stopped—edit function—constant tension holdback with optional constant tension takeup—optional constant torque holdback and takeup—access is provided for search and cue equipment interface—provision for tape lift function—delayed stop for "pop free" bias turn off—torque boost to accommodate high speed fast start—logic design provides access from any transport mode to any other transport mode—provision is made for logic lever control of all function—optional slow start capstan—capable of three speed operation—switch selectable tension settings to accommodate different tape sizes.

## TRANSPORT RECONDITION

ASCO reconditions tape transports, motors and head assemblies. Our transport service includes replacing all necessary bearings, guides, rollers, springs, brakes, solenoids, switches, guards and pads.

We completely strip your transport and refinish the top plate, then rebuild the transport like new. Head service includes complete tear-down, clean and rebuild with new springs, guides and recapped heads. Price: \$295.00.

Send for our illustrated catalog with new and used equipment listings.



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For More Details Circle (73) on Reply Card

# yes it's TRUE... the PRICE of Cross-Pulse & Color monitors HAS DROPPED

Now you can convert any monitor to a cross-pulse monitor with VACC's new \$345\* model CPG-1 Cross Pulse Generator. Your monitor requires no modification. Fill out the coupon below for more information. At the same time, ask for a free copy of VACC's Troubleshooting Chart. This handy wall chart has actual photos showing typical video conditions such as normal sync with and without burst, time-base errors, overshoot, clipped sync, and many more. VACC's chart is a valuable aid when adjusting and troubleshooting video problems using a cross-pulse monitor.

If a video monitor is needed, install a VACC Electro-optical Isolator in a Sony receiver. A engineer or electronic technician can install a model A-1 in a 12", 15" and 17" Sony receiver in less than an hour. Model A1-A should be installed in a KV1711, KV1722 and all 19 inch Sony receivers. You add only one-half pound to your receiver and your Sony can be used as a high quality monitor or retained as a receiver by merely flipping a switch. Isolation is far superior to heavy transformer isolated monitors and you can connect up to 20 monitors without troublesome ground loops if all monitors have VACC isolators.

by popular request

## NEW DEMODULATOR KIT

NEED AUDIO/VIDEO-OUT TO RECORD OFF-THE-AIR? Order VACC's new model D1 or D1A Optical Demodulator. Similar to, but smaller in size than the widely used VACC A1 or A1-A Optical Isolator, VACC's new optical demodulator kit is easy to install and has the same outstanding isolation and weight advantages. Use model D1 for Sony's KV1201, 1203, 1212, 1214, 1500, 1511, 1710 and CKV 171 and the D1-A for KV1711, 1722, 1910, 1922 receivers. Yes, you can install the A1 and D1 or A1-A and D1-A in the same Sony receiver to have a receiver monitor demodulator. Add VACC's Cross Pulse Generator and you can have all four functions using one CRT.

See us at NAB Booth #142



**VIDEO AIDS corporation of colorado**  
112 West 4th Street, Loveland, Colorado 80537  
phone (303) 667-3301

## Globecasting

### Paris Show Dates Set

When Paris reawakens in April, it will become the focal point of electronics for six days, from April 5 to 10, 1976. A crossroads of technology, the Salon International des Composants Electronics epitomizes a world in transition due to the electronic components industry.

Every year, over 60,000 visitors attend the Show and exchange their invitations for a permanent entrance card. Fifteen percent of these visitors are from 90 different countries other than France.

The show is divided into four sections: components, measuring devices, materials and equipment, products and methods. Everywhere, over the more than 3 miles of passageways which criss-cross the Show, 1000 firms from 30 countries welcome visitors in attractive reception centers and lounges. International participation is considerable, with more than 50% of the exhibitors from foreign firms (including over 100 exhibitors from Germany and 250 from the U.S.).

The Show also covers symposia, technical conferences and communications. Such meetings provide useful exchanges of views between manufacturers and users. There is a large setup for reviews and international technical publications. A press room welcomes over 500 French and foreign journalists. At their disposal is a fully documented file on the Show, background studies, etc.

French Trade Shows and Air France have joined forces in order to offer prospective visitors to the Show a low-cost travel package, which will include round-trip economy airfare, six nights accommodations at either the Sofitel de Paris or the Paris-Sheraton, continental breakfast each day, arrival and departure transfers, a bateau-mouche sightseeing tour, and all services and taxes. Total cost of the trip (which will leave New York on April 2 and return on April 9) is \$510, with a single supplement of \$70. Deadline for all reservations is March 16, so don't delay.

For additional information on the International Electronic Components Show or on special travel arrangements, please contact: French Trade Shows, 1350 Avenue of the Americas, New York, NY 10019. The telephone number is: (212) 582-4960.

### *International Video Disc Conference*

Organizers of the first-ever international video disc conference have announced more top-line speakers. This three-day event will be opened officially at London's Royal Lancaster Hotel on

April 13 by **Lord Harris**, Minister of State at the Home Office with special responsibility for Broadcasting.

Much has already been written about the technology of video disc hardware systems. Emphasis at this conference—called Video Disc '76—is being put on programmes their finance and their marketing.

International publisher **Robert Maxwell** will be putting the publisher's viewpoint in one of the afternoon sessions. He will be joined by a number of speakers in the session titled 'Impact on Industry and Commerce', which will be chaired by **Robert Heller**, editor of "Management Today". One aspect of advertising will be represented by **Harold Lind**, Director of Research at the Advertising Association. He will talk on "The application of media planning to the Video Disc as an advertising vehicle". Television documentary producer **Roger Graef**, recently responsible for the controversial ITV series "Decision", will speak in the session "Broadcasting, Cinema and the Arts".

Speakers from overseas include: **John Findlater**, President of MCA/Discovision, USA; **Gerald Raucamp**, who heads the multi-media Carillon Audio Visual group, Amsterdam; **Rolf Schiering** of AEG Telefunken, responsible for marketing the TeD video disc system; **Bengt-Arne Vedin**, from a leading Scandinavian publishing group; and **Charles Arden**, vice president of the Visiondisc Corp., USA.

Among speakers from England will be: **Professor Asa Briggs**, historian, Vice Chancellor of Sussex University, authority on broadcasting and audio-visual communication; **Alan Watson**, one-time economics expert at the BBC and now head of Audio Visual Services at the EEC in Brussels; **Dr. Boris Townsend**, of the Independent Broadcasting Authority, well-known lecturer and TV engineering specialist; **Leslie Ryder**, senior official for Learning Resources at the Inner London Education Authority; **Bernard Happe**, technical expert and author in the field of film and video processing, and Technical Editor, "Screen Digest"; **Roland Chase**, chairman of Colour Film Services, leading authority on film-to-video and video-to-film techniques; **Ian McAlley** from McAlley Associates, management consultant with particular experience in video marketing; **Robert Abrahams**, copyright adviser to EMI; and **Tony Griffith** and **R. W. Bayliff** from Decca.

The entire programme will be under the chairmanship of **John Chittock**, film and video columnist of the Financial Times, editorial chairman of "Screen Digest" and an international authority on the video industry.

For all details, organization and bookings of this unique conference, please contact Pia Gross on 01-629-9381.

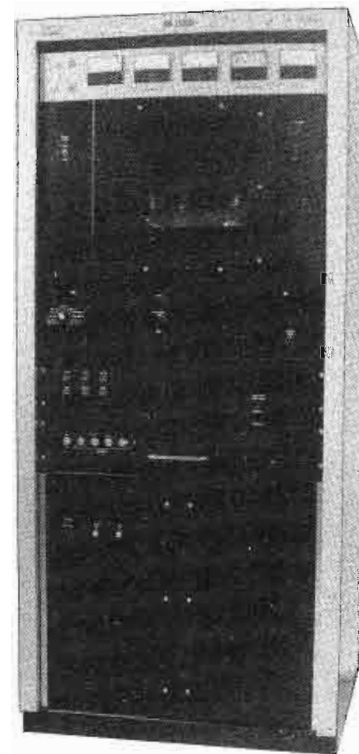
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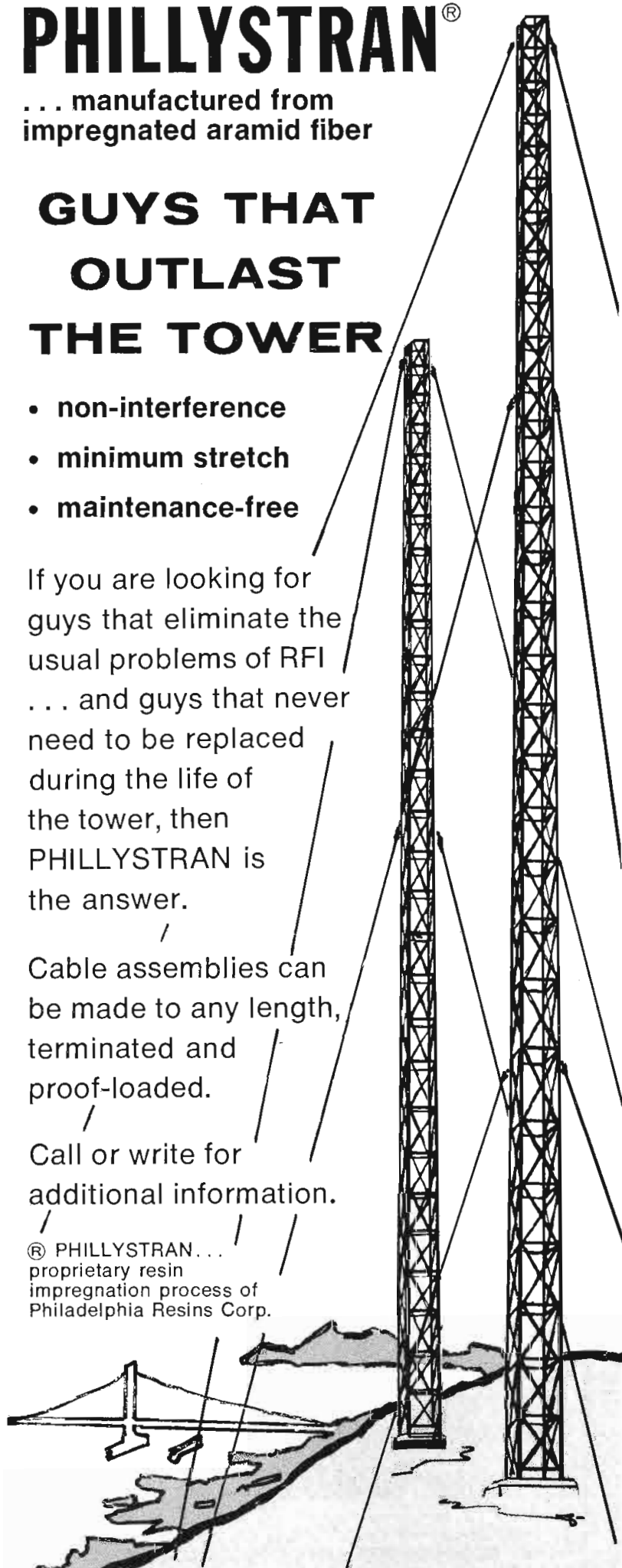
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of professional broadcasting and communications equipment.

This exhibition, which honors the U.S. Bicentennial, marks the second exhibition of this successful theme at the Mexico City Trade Center. The first telecommunications exhibition in June 1974, closed with projected sales of almost \$20 million.

In the very dynamic market for radio and TV broadcast equipment the U.S. share alone rose from approximately \$21 million in 1972 to \$33.3 million in 1974. The U.S. faces major competition in the Mexican telephone and telegraph market due to former Swedish ownership of the facilities and continuing contractual arrangements with former suppliers. Even so, the U.S. supplies a significant portion of central office equipment, subscriber/user equipment and handsets to the Mexican telephone system. In all other areas of communication equipment, the U.S. dominates the market.

Best sales opportunities for communications and broadcasting equipment include but are not limited to: **Radio/TV Broadcast Equipment**—audio consoles; stereo audio consoles; AM, FM and TV transmitters, turntables and accessories; amplifiers; professional TV lenses and cameras; color cameras; movie cameras (8 mm., 35 mm.); link systems; video cassette recorders; video cassette recorder/players; TV color sets (non-household) and TV monitors; magnetic video tape; professional recorders (1/4", 1/2", 1"); studio lighting equipment; antennas; optical and magnetic sound equipment; video cartridge machines; loudspeaker systems and microphones; studio production switchers; and video mobile units.

Participants in this exhibition will benefit from a professional market promotion campaign beginning three months prior to show date. Other benefits include design and construction of exhibit booth, utilities, shipping instructions and coordination, hospitality services; and search for representatives or potential licensees.

Participation in this exhibition is limited to U.S. manufacturers of communications and broadcast equipment. Interest in this exhibition is already running high and space is limited. Companies interested in participating should contact the project officer as follows: Mary R. Wienen—(202) 967-4463 DIBA/OIM—Room 4031, U.S. Department of Commerce, Washington, D.C. 20230.

## Small Market FCC Waiver

The FCC has acted in response to three requests for waivers or modifications of its small-market policy, which limits each network company to a single station in a market with four or fewer AM stations, and to two affiliations in a five-station market.

The licensees of AM stations KNIE, Cheyenne, Wyo. and KEYY, Provo, Utah, requested waivers to permit them to affiliate with ABC despite one other



# ANY OF THESE YOU?



**A broadcast station** that wants smooth, multi-speed slide dissolves while committing only one film chain to slides?

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**A broadcast station** that wants 3-second random access availability of up to 32 slides?

**A production company** that would like to completely pre-program slide com-

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If even one of these descriptions matches your needs, then you need to see the incredible, new Selectroslide Producer 32 film chain slide projector. There's never been anything like it before.

Direct descendant of the respected Spectrum 32, with its interchangeable slide drums and time proven mechanism, the new Producer 32 is the first slide projector to incorporate a micro-processor. It controls the servo maga-

zines for high speed random access operation; provides eight different dissolve rates, ranging from cut to 300 frames (10 seconds); controls special effects such as flash, fade-out and fade-in, alternate, and superimposition, at all dissolve rates; creates left and right crawls; and makes possible memory programming of dissolves and special effects. The Producer 32 may be operated in real time, from its electronic memory, or from pulses encoded onto an audio track.

And there's more. Much more. Producer 32—probably more than you ever dared hope for in a professional film chain slide projector!

During the NAB Convention, see a demonstration of the Producer 32 at the Cohu Exhibit Booth #302. The Producer 32 will also be in use at the NAB booths of Harris Gates Division, I.V.C., and Telemation.



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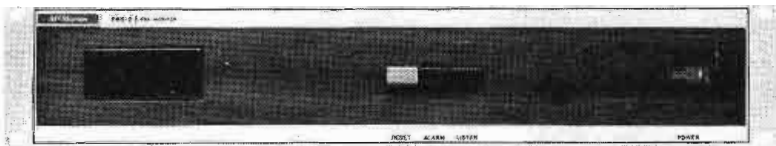
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## AM FCC Waiver

(Continued from page 134)

ABC AM affiliation in the market.

The third request was from Texas State Network (TSN), which sought relief from the application of the small market policy to its TSN and new Continental News Service (CNS) operations. In a July 1975 order, the Commission imposed this condition on TSN when it granted a waiver of the "dual network" or "simultaneity" rules to accommodate a limited amount of simultaneous broadcasting by the two TSN operations.

The FCC granted permission for one additional AM in Provo and Cheyenne to be affiliated with one of the ABC radio networks, in addition to the one AM station in those cities already so affiliated.

The Commission also modified its July 1975 order that imposed a condition on multiple AM affiliations by TSN with AM stations in the same market. TSN now may have, with its TSN and CNS networks, affiliation with more than one AM and FM station in a market, provided that in any market where TSN is affiliated with more than one AM station, at least one AM or FM station must remain that does not present TSN or CNS programming.

If it affiliates with an AM station that has an associated FM station, or vice versa, TSN must ensure that its programming is not presented by the other station of the combination, the FCC said.

<b>Scully</b> FLUTTER BAR RECONDITIONING	<b>AMPEX</b> NON-POPPING GATE SPRING MODIFICATION	<b>Magnecord</b> FOR OLDER MODELS: POLE PIECES CAPS W/GUIDES REPLACEMENT HEADS
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## NRBA puts priority On license renewal

The Board of Directors of the National Radio Broadcasters Association at its January 12th meeting in New York City decided to give top priority to the Association's efforts to effect passage of a radio license renewal bill in the current session of Congress. "There appears to be great sympathy and support in the Congress for radio-only license renewal legislation," said Robert Herpe, NRBA Board Chairman, "and we are hopeful that the latest draft version of our bill will satisfy all interested parties and go on to early acceptance by the Congress."

The NRBA Board also voted to mobilize radio broadcaster opposition to the pending legislation providing additional performance fees and to work toward meaningful de-regulation of radio. "These are two areas of great importance to radio broadcasters," Mr Herpe said, "which seem to us to be receiving less attention than they deserve."

Chairman Herpe also reiterated that NRBA's major thrust is a campaign to convince Congress, the FCC, and the public interest groups that radio and television are very different from each other and should be regulated and legislated for separately and differently.

The NRBA Board also voted to increase the number of its regions from nine to perhaps fifteen; to expand and mobilize its State Directors organizations; to conduct eight regional and about twenty local workshops for sales, promotion and management; to make available special membership dues for radio station groups and to expand the NRBA membership solicitation campaign which begins this month.

The NRBA Board confirmed the Palmer House, Chicago, as the site of its 1977 National Radio Broadcasters Conference & Exposition and chose Boston as the host city for 1978.

## Two suits are filed On family viewing hours

Broadcasters say family viewing hours were adopted voluntarily and do not violate the right of free speech of those who produce television programs.

Their position was outlined in a joint motion urging a U.S. District Court in California to dismiss two suits alleging that the family viewing concept was dictated by government, abridges the First Amendment rights of screen writers and others, and violates the anti-trust laws.

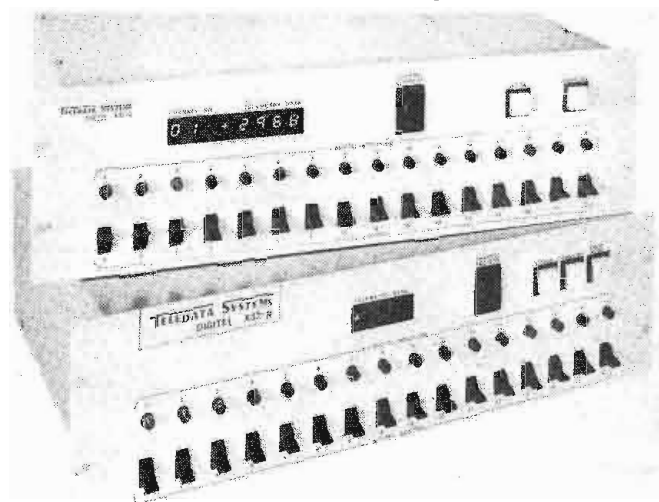
The motion denied the existence of any state action that would constitute a First Amendment violation and contended that the plaintiffs failed to exhaust administrative remedies provided by law.

It was filed jointly by the National Association of

## TELEDATA SYSTEMS

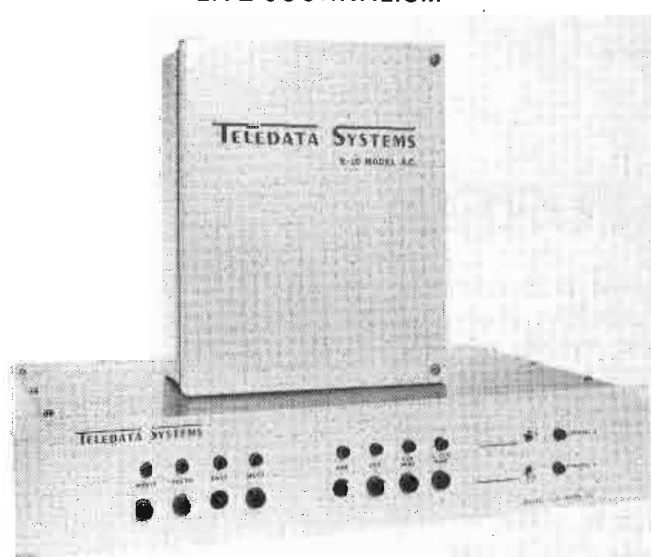
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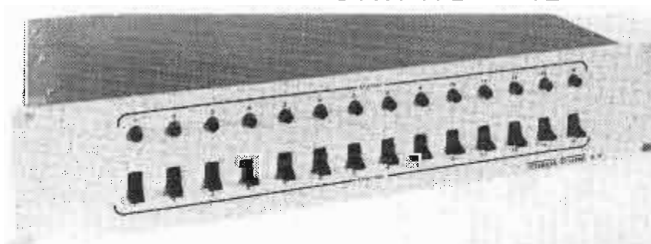
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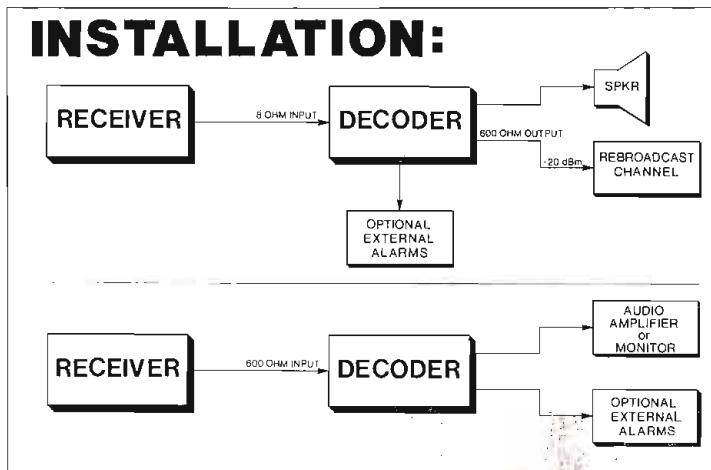
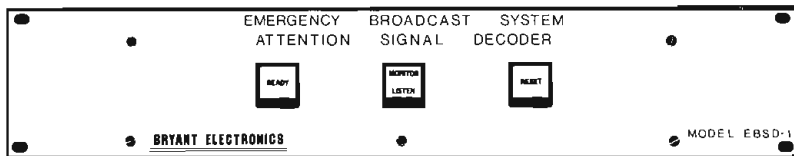
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Booth 937, for complete details.

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## Family Viewing

(Continued from page 137)

Broadcasters and the three television networks—ABC, CBS and NBC.

The two cases, pending before the U.S. District Court for the Central District of California, were brought by the Writers Guild of America and others and by Tandem Productions. The Writers Guild is demanding injunctive relief charging that setting certain hours aside for family viewing thwarts creativity. Tandem Productions is asking for both injunctive relief and monetary damages.

The broadcasters' motion pointed out that the concept of family viewing was adopted voluntarily by broadcasters and was not directed, dictated or compelled by the Federal Communications Commission.

"In the absence of any FCC compulsion, broadcaster action is not a state action, and...plaintiffs have no First Amendment rights to be free from the selection and editorial process undertaken by private broadcasters."

Responding to plaintiffs' claim that broadcasters are licensed and therefore perform "a government function," the joint motion said:

"In two recent cases, the Supreme Court has specifically held that the existence of licensing or general government regulation does not convert private action into state action...Plaintiffs are clearly mistaken (in their) claim that broadcaster action is

(Continued on page 140)

## TENTEL TENSION GAGE SOLVES YOUR VIDEO PROBLEMS\*

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THE TENTEL TAPE TENSION GAGE *accurately* diagnoses your video tape transport problems. Whether your machine is a 1/2" EIAJ, U-matic, 1" Ampex, 1" IVC or even a 2" quad, the Tentel Tension Gage will help you solve problems vital to:



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BROADCAST ENGINEERING

## Foreign Language Station's Warnings

All licensees broadcasting primarily in a foreign language shall transmit emergency information both aurally and visually in both English and the foreign language, the FCC added.

The Commission said television licensees could use any method of visual presentation which results in a message easily being readable on the receiver's television screen, and which conveys the essential information contained in the aural bulletin.

It said stations participating in the Emergency Broadcast System would be responsible for visually transmitting any EBS programming.

The Commission noted that the Public Broadcast Service (PBS) has filed a petition for rulemaking to establish transmission standards governing closed captioning for the deaf that would require a special decoder on home television receivers. It said the PBS proposal goes well beyond emergency communications uses, and would include abbreviated narrative captioning for programming generally.

The Commission said it was aware of possible problems of incompatibility arising from the simultaneous use of open and closed captioning systems during a single emergency, and proposed to take this into account in connection with any further action on the PBS petition.

## NAB Prepares For Radio Month

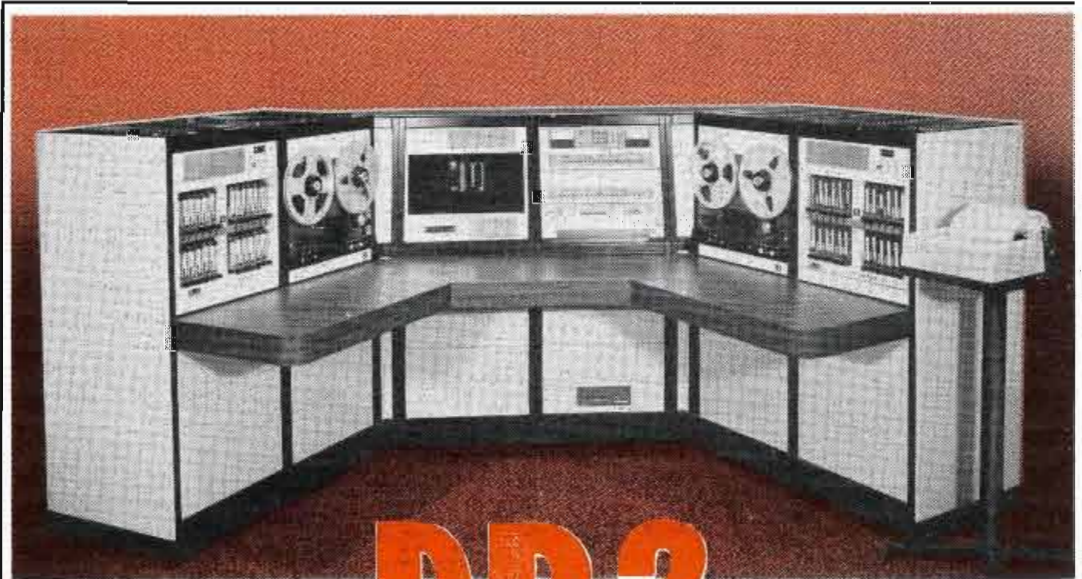
Fourteen radio broadcasters from every market size recently met to expand ideas for 1976 Radio Month (May 1-31) put forth by the Radio Information Office Committee of the National Association of Broadcasters. The group of general managers, program directors and promotion managers, recommended that NAB supply copy, one-line statements and taped testimonials of people's memories of radio highlights.

The material may be used in

various ways by stations to develop their own radio month campaigns, a concept endorsed by the RIO Committee. The theme for this year's campaign is "Thanks for the Radio".

The participants, representing formats from classical and religious to disco and progressive rock, further recommended that this year's material be geared to fit individual station sounds and that the majority of the spots be ten and thirty seconds in length.

Participating in the conference were: Allyson Artist (WGMS AM/FM), Sandi Barclay (WRC/WKYS), Gene Davis (WTOP AM/FM), Arch Harrison (WJMA AM/FM), Bruce Houston (WEAM), Bob Hughes (WASH AM/FM), Ross Hunter (WJMA AM/FM), Terry Kleger (WBOC AM/FM), Ellen Manowitz (WMAL AM/FM), Roy Martin (WFAX), Greg Pearson (WEEL), Bill Spencer (WAGE), Bert Thornton (WTRI), and Chuck Thornton (WTRI).



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## Family Viewing

(Continued from page 138)

government action because broadcasters perform a 'government function'...

"The courts, conscious of the special problems which arise in applying the First Amendment to broadcasting, have consistently and correctly held that, in the context of the statutory scheme covering broadcasters, the First Amendment rights of providers of broadcast material are not violated by the exercise of editorial judgments by broadcasters..."

"The Supreme Court (has) pointed out that Congress has chosen to leave the decision of what will be said over the airways to the broad discretion of broadcasters."

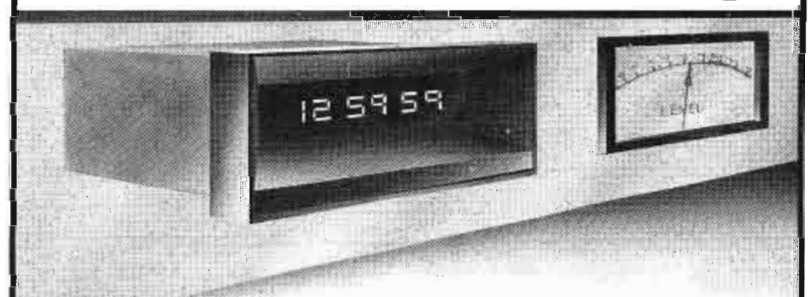
The joint broadcaster motion said plaintiffs' incorrect argument that their First Amendment rights were violated "does not obviate the duty to exhaust available administrative remedies" by requesting a hearing by the FCC.

"Plaintiffs are attempting to circumvent the statutory procedures," the motion said. "...FCC's deliberative and enforcement powers are readily accessible to interested parties..."

"For this Court to entertain those actions would thwart the policy embodied in the Communication Act's requirement that parties aggrieved by FCC reports or actions challenge those reports or actions by a petition for rehearing..."

"It is well settled 'that no one is entitled to judicial relief for a supposed or threatened injury until the prescribed administrative remedy has been exhausted'..."

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(Continued on page 148)

## Exhibitors

(Continued from page 68)

(Begins on page 48)

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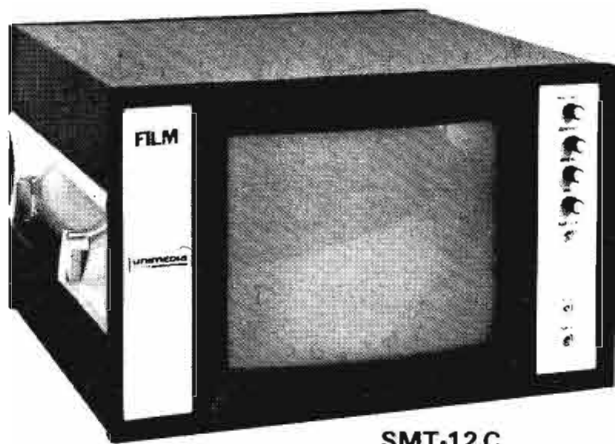
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## **NAB Selects Goodman For Distinguished Service**

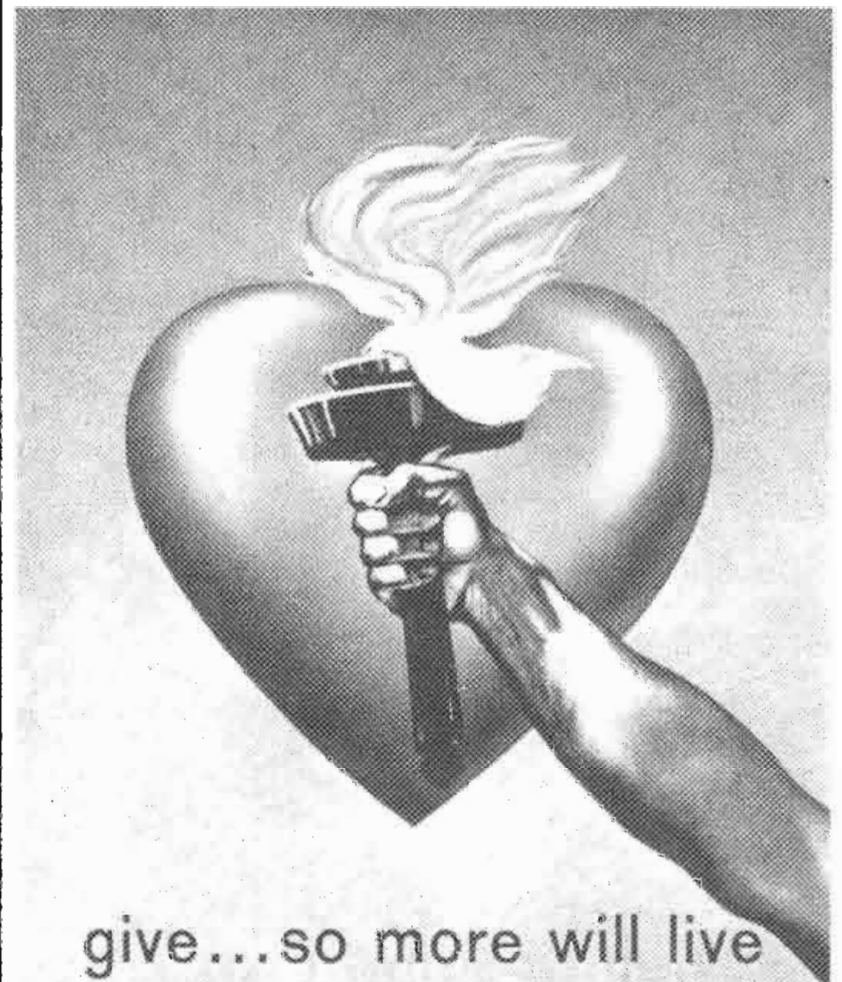
Julian Goodman, NBC Board Chairman and Chief Executive Officer, has been selected by the National Association of Broadcasters to receive the industry's highest honor—the Distinguished Service Award for 1976.

The presentation will be made during NAB's 54th annual convention in Chicago at the opening General Assembly on Monday, March 22.

The NAB award, established in 1953, is presented to individuals who make "significant and lasting contributions to the American system of broadcasting by virtue of singular achievement or continuing services for or in behalf of the industry in any or all phases."

Over the years Mr. Goodman has received many prestigious awards for his contributions to the broadcasting industry and in the preservation of First Amendment rights.

He is one of 10 living journalists elected to the Hall of Fame of Sigma Delta Chi's New York



give...so more will live  
**HEART FUND**



Chapter for his "unique and lasting contributions to the profession of journalism." He also has received the 1974 George Foster Peabody Award, the International Radio and Television Society Gold Medal and the Southern Baptist Radio and Television Commission's Distinguished Communications Medal.

Goodman began his NBC career in 1945 as a news writer for WRC Radio in Washington, D.C. Several years later, he oversaw the combining of the NBC Radio and TV News and Special Events.

Goodman pioneered the use of tape for radio broadcasts of news events, participated in the development of "instant news specials" initiated by NBC News and managed a full-time worldwide staff which at the time totaled 900 writers, editors, camera operators and technicians.

One of the highlights of his career came in 1955 when he paved the way for the first filming of a Presidential news conference. He also supervised such widely acclaimed specials as "Journey to Understanding" based on the travels of President Eisenhower and Soviet Premier Khrushchev.

Goodman has been responsible for many policy changes within NBC. His interest in improving children's programming led to a new office at NBC—Vice President, Children's Programs. NBC-TV was the first network with such an office.

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For More Details Circle (91) on Reply Card

March, 1976

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look at  
tomorrow

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Microtime

NAB-Booth 709

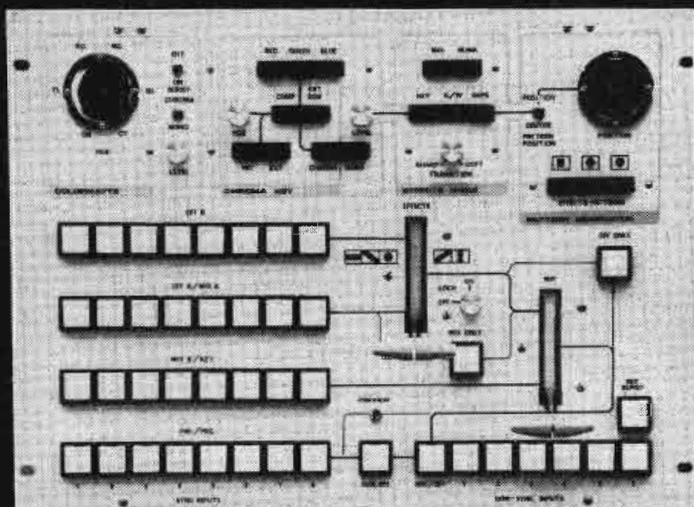
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## Early Bird CCTV Video Seminar

Tektronix will present a daily Tektronix theater on Closed Circuit TV each morning of the convention in the Hilton, Palmer House, and Hyatt Regency hotels from 7:00 to 8:30 am.

The tape will be piped into all rooms. Its content should be of special interest to video engineers. The tape is based on video circuit and transmission measurements. And it's a continuation of their booth theme where they will have a continuing theater-type seminar on how to make measurements in AM, FM and TV.

## Zapping Consumer Fraud

With more than thirty years experience in exposing consumer fraud between them, three professionals have banded together with producer/syndicator Donald Herrick to form the National Broadcaster's Group to release a radio series called "Have You Been Taken Lately?". Information relating to the series has already been made available to more than 6,000 radio stations.

The three: Joseph Cartwright, attorney, with ten years accumulated experience with the Better Business Bureau, Minnesota State Attorney General's Office and the Ramsey County Attorney's Office; Jerry Patterson, writer, author of two books and various magazine articles on consumer fraud; and Allen Gray, broadcaster, whose thirteen years experience with CBS' Housewives Protective League predates "Truth in Advertising" et. al.

The program series has been subjected to a critical appraisal in the nation's largest market—as well as several smaller ones. Reaction has been favorable with several stations already impatient over necessary procedural delays.

Sixty-five programs have been recorded and are ready for immediate distribution. 260 programs have been scripted, and the firm plans to script two full years of programming, all of which will be updated as new information becomes available.

Each program of the "Have You Been Taken Lately?" series has two and one-half minutes of program content with flexibility. The series can be added to news breaks, or regularly scheduled five days a week as a sponsored feature.

**SBE Convention Plans  
Are Detailed  
On Page 12**

## NAB Products

(Continued from page 46)

(Begins on page 40)

### Cartridge Tape Machine

The introduction of a completely new line of broadcast audio cartridge tape reproducers and recorders has been announced by Charles E. Collett, Beaucart Division Sales and Marketing Manager, **UMC Electronics Co.**

Each Beaucart features the patented pancake hysteresis synchronous direct drive motor developed by UMC's Beau Motor Division. This motor represents a new breakthrough in the areas of size, weight, temperature rise, and power consumption. It provides substantial assistance in reducing Beaucart's flutter and wow. The Beaucart line of cart machines meet the newly adopted NAB standards for this type of equipment.

Two basic Beaucart models are available, each in mono or stereo, record or playback, for either desk or rack mounting. The Type 10 for A-size cartridges, measures a trim 3½" high x 5¾" wide x 15" deep and may be mounted three units across in a standard 19" rack. Record/playback combinations are mounted side-by-side for either desk or rack use. However, this model may be stacked one above another in various combinations to meet demanding customer applications. For processing A, B, and C-size cartridges, a Beaucart Type 20 is available with dimensions of 3½" high x 10-1/8" wide x 12¼" deep. Units may be stacked one above another in different configurations.

For More Details Circle (185) on Reply Card

### Digital Recording System

**Ampex Corporation** and **CBS Inc.** have announced the development of a new digital recording system capable of storing thousands of color slides and still pictures magnetically on computer disc packs for use in television broadcasting.

The Electronic Still Store System (ESS) was a joint development of Ampex and CBS, and is the first broadcast product to use digital recording techniques for video images.

March, 1976

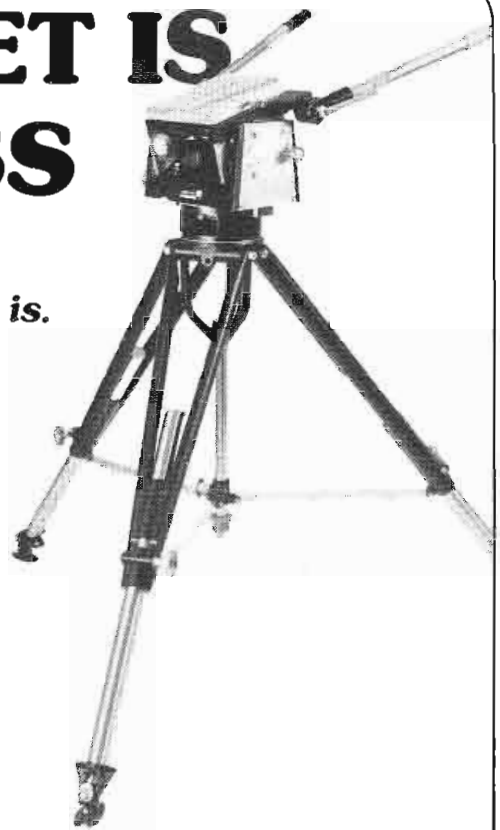
# QUICK-SET IS FEARLESS

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- Folds Down Flat on Roof of Mobile Van
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• 301-462-1700

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145

Under development for the past 18 months, the ESS electronically converts the analog television signal into digital form and stores the information on magnetic disc packs. Slides and stills can be randomly selected from bulk memory with an access time of less than 100 milliseconds.

The basic ESS system can store up to 1,500 video frames on-line for immediate random access and is expandable. Disc pack shelf storage is virtually unlimited.

In addition to the record and reproduce modes of operation, ESS can rearrange selected stills in any sequence for inclusion in a program; and two independent video outputs permit preview, dissolve, mixed and special effects to be performed in the normal way at the studio switcher.

For More Details Circle (186) on Reply Card

### Intercom System

RTS Systems of North Hollywood, California has announced the

introduction of the "TW" Intercom System. A two-wire, closed circuit headset system, the RTS "TW" can be used in the field for all phases of T.V., film, music concert, theatre and A/V production.

In its standard configuration, up to 50 "belt-pack" user stations can be connected on line to two independent channels. Each rugged user station features noise-free, high-fidelity performance with these new additional features: built-in mic limiter, carbon or dynamic mic input, flashing call light with variable frequency adjustment for selective paging, two-watt headphone power amp with low distortion and extended response (150Hz to 10 kHz) and individual aux audio input, as well as common on line at power supply.

With #22 gauge cable, the RTS "TW" will operate on 2,000 feet of line. Two individual power supplies (Models PS-10 and PS-50) are available, which will operate up to 10 or up to 50 user stations. The supplies and the user stations are all available in rack mounting packages for permanent installation. The rack mount models feature standard three channel operation.

For More Details Circle (187) on Reply Card

### EBS

#### Encoder-Decoder

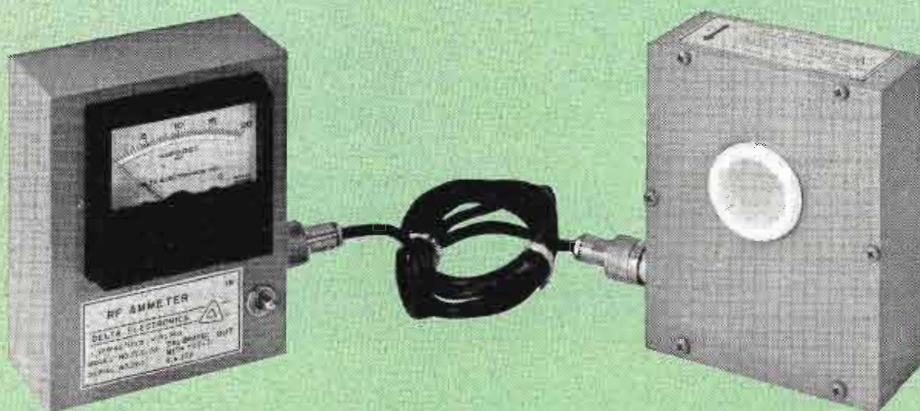
The **Rivers Associates** FCC Type-Accepted DU-ALERT 2 EBS ENCODER has been designed to provide a reliable, inexpensive method of meeting the new requirements for EBS Alerting to be effective April 15, 1976.

The required 853 and 960 Hertz tones are crystal-controlled for high accuracy and stability, and the high audio output level is sufficient to feed multiple transmitters, if necessary.

The DU-ALERT 2 is available as a separate encoder or can be combined with the 7506 Decoder in a single 3½ inch rack-mount assembly for a complete EBS PACKAGE. A one or two-channel crystal-controlled AM receiver option can be included in the same package.

The Model 7506 EBS TWO-TONE DECODER has been Certified by the Federal Communications Commission as providing a reliable method of meeting the new EBS alerting requirements.

## New Antenna Current Measuring System Increases Accuracy



- MEETS FCC REQUIREMENTS OF 2% ACCURACY
- SEPARATE METER WITH LIGHTNING PROTECTION SWITCH PROVIDES CONVENIENCE AND SAFETY
- TCA-XM MODEL AVAILABLE FOR PANEL MOUNTING
- DUAL RANGE SCALES AVAILABLE FOR DAY-NIGHT POWER CHANGES

The new Model TCA broadcast antenna current measuring systems replace conventional thermocouple meters to provide a substantial increase in accuracy under all operating conditions. Antenna current samples are taken from the current carrying conductor by a toroidal current transformer. Voltage developed across a terminating resistor is rectified by a patented temperature compensated circuit and displayed on a mirror scale taut band meter. The rectifier, with lightning protection switch, and meter are housed in a shielded enclosure away from the sampling transformer. No in-line meter switch is required. A separate rectifier and meter are available to allow panel mounting of the meter. Standard ranges to 80 amperes.

### NAB BOOTH 613

**DELTA ELECTRONICS**



5534 PORT ROYAL ROAD  
P.O. BOX 1508  
SPRINGFIELD, VIRGINIA 22151  
TELEPHONE: 703/321-9845 TWX: 710-831-0620

For More Details Circle (96) on Reply Card

Unlike most other EBS Tone Decoders, the design of the Model 7506 will allow operation with the existing 1 kHz/carrier break EBS procedure.

The high stability and narrow bandwidths required by the new FCC certification procedures are easily met in the 7506 by referencing to a quartz crystal base and not depending on much less reliable phase locked loop techniques.

The Model 7506 is 3½ inches high, rack mounted, and contains its own power supply. In addition, Option 01 provides an audio amplifier and front-panel mounted loudspeaker. Option 02, in addition to the features of Option 01, includes a highly selective and sensitive crystal-controlled AM receiver board, for installation in the same Model 7506 cabinet.

For More Details Circle (188) on Reply Card

### **Tower Intensity Lights**

The Flash Technology Corporation of America has announced a new FAA Type L-856 High Intensity Warning Lighting System. The new system, designated the FTB-205 ElectroFlash Beacon System, is believed to be the first designated to meet the specific needs of the skeletal tower application, offering features such as an optional remote monitor/control system for "hot" AM towers and other low frequency radiators.

The new system reduces the windage of the required tower mounted enclosures by as much as forty percent yet offers the same long life components and light output characteristics as previous FTCA ElectroFlash Systems. Experience gained in over sixty systems installations have led to significant mechanical and electrical improvements in this second-generation system.

All power and optical components are located within the same NEMA Type 4 Stainless Steel standard enclosure. Required field connections at each Beacon have been reduced to two AC line plus system ground and two low voltage control/monitor. The mechanical and electrical arrangement has been designed for easy access and maintenance.

For More Details Circle (189) on Reply Card

### **High-Speed Teleprinter**

A new high-speed, 30 character per second teleprinter—the GE TermiNet\* 30 Keyboard Send/Receive ASR Printer with Mag Tape—is now available for low cost leasing from RCA Service Company. This printer provides terminal facilities for the exchange of communications in attended or unattended mode.

Designed to meet a variety of printer uses, this matrix impact

printer assures no more wasted computer or communication line time, waiting to receive data. Operating at transmission speeds up to 1200 Baud, this TermiNet printer saves time and money in the office, on the computer and on transmission lines.

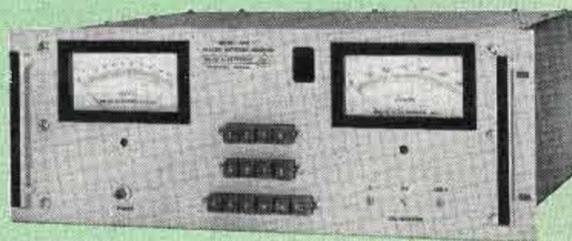
The TermiNet 30 ASR printer features include: a single cassette magnetic tape unit which stores 100,000 characters, answerback, vertical format unit (for form out

(Continued on page 158)

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### **Our New AAM-1 Analog Antenna Monitor**

- FCC TYPE APPROVAL NUMBER 3-235.
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### **or Our DAM-1 Digital Antenna Monitor**

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### **NAB BOOTH 613**

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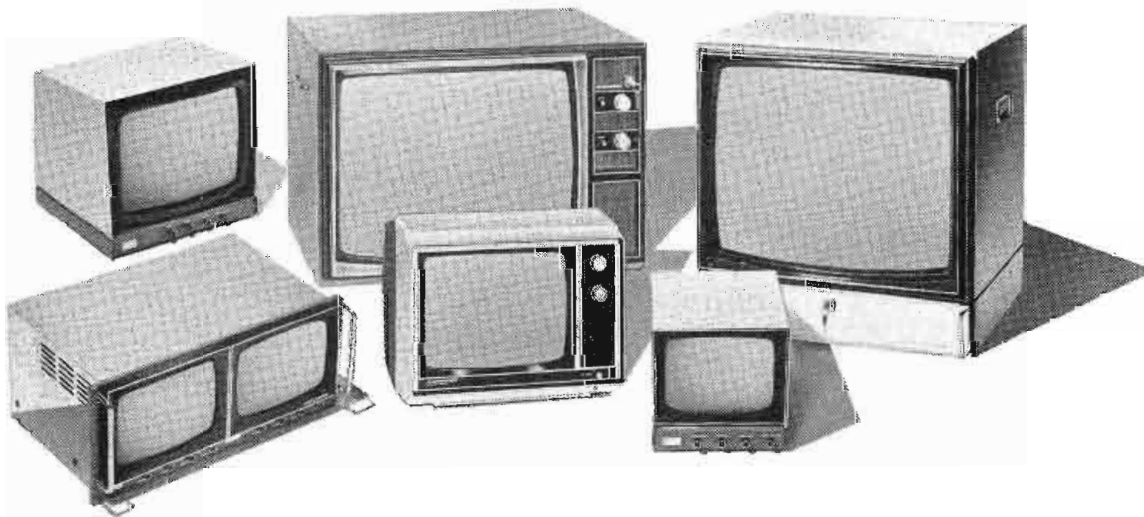
The reason for such wide-spread acceptance is two-fold: a standard of quality and a record of service to our customers that have earned our products top rating around the world.

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### Exhibitors

*(Continued from page 141)*

#### **Strand Century Inc.** Booth 401

Lighting units for TV studios. MMS modular memory system. Quartz color laniro units.

**NEW:** MMS modular memory system.

#### **Studio Tape Exchange** Booth 810

High quality reprocessed and evaluated 2" video tape. Also new and used 3/4" video cassettes.

#### **Systems Marketing Corp.- Sono Mag** Booth 709A

Radio automation.

**NEW:** DP-2, RAS-PRO, automation systems.

#### **Tandberg Of America, Inc.** Booth

Tandberg 10XD - 10 1/2 reel recorder; Tandberg 3-head cassette model TCD-330; Tandberg cassette TCR-5500.

#### **UMC Electronics Co.** Booth 712

Beucart audio cartridge tape recorders and reproducers, Beucart splice finders, Beau hysteresis synchronous motors.

**NEW:** Beucart audio cartridge tape recorders and reproducers.

**Suite:** McCormick Inn

#### **Unarco-Rohn, Division of Unarco Industries, Inc.** Booth 905

Structural steel tower samples related to CATV, TV broadcast, AM & FM broadcast, two-way/mobile and home TV.

#### **Utility Tower Company** Booth 531

Steel tower sections, base insulators and FAA (A/2) lighting kit.

#### **Video Aids Corp. of Colorado** Booth 142

New H-phase and burst phase meter;

*(Continued on page 156)*

## NCTA Convention Is Ready

CBS news correspondent Mike Wallace, legislators Sen. Vance Hartke, Cong. Torbert Macdonald, Cong. John Moss, and FCC Chairman Richard Wiley head the list of featured speakers at the National Cable Television Association's annual convention in Dallas, Texas, April 4-7, 1976.

Among the major topics expected to receive most attention at NCTA's silver anniversary convention, "CATV '76," are pay cable TV, CATV deregulation, cable financing and marketing, future services and system operations. In addition to three major "forum" sessions featuring prominent industry and government figures, the management program includes 17 morning eye-opener panels and a special afternoon "Firing Line" session on system operations.

Three time Emmy Award Winner Mike Wallace will be the convention keynote speaker on Sunday, April 3. Wallace is co-editor of the CBS news program "60 Minutes".

The Monday, April 4 major session, "Cable Regulation: A Government Forum," will feature Cong. John Moss (D-Calif.), Chairman of the House Subcommittee on Investigations and Oversight; John Eger, Acting Director of the Office of Telecommunications Policy; John Rose, Deputy Assistant Attorney General, U.S. Department of Justice; and Mary Anne Krupsak, Lt. Governor of New York. Dean Bruch, former FCC chairman now with the law firm of Pierson, Ball and Dowd will moderate the session.

FCC Chairman Richard Wiley will be Monday's featured luncheon speaker.

Tuesday's main management session, "Forum: Perspectives on Cable Television," will include Sen. Vance Hartke (D-Ind.) ranking member of the Senate Communications Subcommittee; Torbert Macdonald (D-Mass.), Chairman of the House Communications Subcommittee; James Shepley, President, Time, Inc.; Russell Karp, President of TelePrompTer Corp., will be session moderator.

Robert L. Schmidt, President of NCTA, will be luncheon speaker on Tuesday.

### Pay Cable Overview

"Pay Cable: An Overview" the featured Wednesday topic will include presentations by CATV, motion picture industry and sports representatives.

Following is a list of convention "eye-opener" (8-9:30 AM) panels.

### Monday, April 5

Pole Attachment Negotiations  
Tax Accounting/Property and Sales  
Federal Legislation  
Pay Cable: Hardware/Software  
Future Cable Services

### Tuesday, April 6

Franchising (New and Renewals)  
Financing (Banks and other  
Lenders)  
Future of Pay Cable  
Regulation: How to Cope  
Program Services

### Wednesday, April 7

Rate Increases  
Privacy: Understanding the Issues  
System Marketing and Pay  
Marketing  
Financial Controls: Management  
Information and EDP

Labor Relations: EEO, OSHA,  
Education & Training

### The Firing Line

A special Tuesday afternoon session "Firing Line: Problems of Systems Operations" will focus on the following subjects:

- Rate Increases: Implementation
- Pay Cable: Implementation
- EDP: What do you really need
- Local Origination: How to improve on losses
- Systems Operation: Installations and disconnects
- Service calls and preventive maintenance
- Statistics and Probabilities in evaluating system operation and equipment

Additional program and speaker announcements will be made in the near future. Advance registration for the convention is \$135 for members and \$185 for non-members. Further registration information is available from NCTA.

### Technical Programs

Satellite Cable Interconnection, Designing Reliable Systems, Two-Way and Auxiliary Services, and an Engineering Forum are among the topics for main technical sessions at the National Cable Television Association Convention, April 4-7, 1976 at the Dallas Convention Center, Dallas, Texas.

Dr. Richard Marsten, Dean of Engineering at City University of New York and formerly of NASA, will chair a discussion entitled Satellite Cable Interconnection at the main technical session Monday, April 5. Panelists will look ahead to

## Convention

satellite applications which the cable TV industry should consider for the future.

The Advanced Techniques panel on Tuesday, April 6, will feature a demonstration of fiber optics applications.

A second main technical session on Tuesday, Two-Way and Auxiliary Services, will emphasize data transmission services via CATV. The panel features a case study in banking by cable, by Bankers Trust

Co., New York. Nationally recognized researcher, G. O. Shelton of GTE, will deliver a paper entitled "Transmission of High-Speed PCM Signals on CATV Systems" during the panel discussion.

A special Engineering Forum—a roundtable discussion of cable engineering problems and solutions—will be the main focus on Wednesday, April 7. NCTA's Engineering Advisory Committee chairman James Lahey, Muskegon Cable TV, will head the panel comprised of

Engineering Advisory Committee members.

According to Delmer Ports, NCTA vice president—engineering, this year's convention technical program will concentrate on day-to-day problems, but is also looking to experts from allied industries and technologies for their ideas and recommendations. "This year we are looking harder at ourselves—and harder at the outside world," Ports commented.

As in past years, selection of the convention technical papers, solicited throughout the cable industry, was made by a special subcommittee of the NCTA Engineering Advisory Committee.

Following is a list of topics for the technical program's Eye-Opener and Sunrise Sessions:

### Monday, April 5:

Quality Improvements and Zero Defects (sponsored by the Society of Cable Television Engineers)

### Tuesday, April 6:

Alpha-Numerics in Cable (sponsored by SCTE)  
Designing Reliable Systems

### Wednesday, April 7:

Practical Considerations for Terrestrial Reception and Distribution (sponsored by SCTE)  
Pay Cable

The social highlight of the technical program comes on Monday, April 5 with the presentation of the annual awards for technical achievements. Awards will be presented during the Engineers Reception. Award winners will be announced next month.

A complete list of technical program panelists and papers is available from NCTA. Advance registration for the convention is \$135 for NCTA members and \$185 for others. Additional registration information is available from NCTA.

### Social Activities

Pre-convention golf and tennis tournaments, a gala Texas barbecue, the annual banquet with entertainment by the Nashville Brass, a post convention trip to Mexico, and a full women's program featuring a Neiman-Marcus fashion show are



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## **KSN's NEW, INTELLIGENT CHARACTER GENERATOR LETS YOU PROGRAM MOVING INFORMATION**

KSN's new CG-500 Marquee Series of character generators is the breakthrough that will revolutionize electronic communication.

Controlled by a micro-processor, this exciting concept actually lets the user manipulate the moving informational scheme. The multitude of potential communication applications is almost mind-boggling. But for the Cable TV/Closed Circuit industries, the benefits are here, now.

### **Channel Billboarding**

For TV Guide Channels and Home Box Office billboarding, the KSN CG-500 is just what the doctor ordered. Imagine the time you will save, the glorious messages you can program, the fun you will have with a character generator that

... is 128 lines long with 32 characters per line

- ... continually rotates your message
- ... automatically updates and advances to the next day whenever you want it to
- ... preserves and programs one part of the memory while a totally different message is running on the air
- ... can massage the wire, actually capture, hold and play it back at different speeds
- ... can take out segments you don't want
- ... can be fed out on a phone line (remote keyboard)
- ... can billboard several channels for very little extra cost
- ... is so intelligent, the format and information display is strictly up to you.

Find out more. Call or write. Ask us about THE BRAIN. Sensibly priced to maintain the KSN performance/price balance.



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**Kansas State Network / P.O. Box 333 / Wichita, Kansas 67201**

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## Convention

among the many social activities planned for NCTA's silver anniversary convention “CATV 76”, April 4-7 in Dallas, Texas.

Beginning with golf, tennis and horseback riding on April 3, and ending with an optional reduced rate trip to Mexico City April 7 through 11, “CATV 76” convention week is chock full of fun and excitement.

On April 3 NCTA and the Texas CATV Association will sponsor a Cable TV Pro-Am golf tournament at beautiful Spring Park Country Club in the rolling Texas countryside. Golf pros Billy Martindale and Don January will host the event and will invite other tour players and local pros to join in the tournament fun. Registration is \$30 per person which includes greens fees, golf carts, clubhouse and locker privileges, transportation and prizes.

Also on Saturday, April 3 Australian tennis pro Warren Jacques will host a tennis clinic and round robin tournament for convention attendees. The tennis package, at \$25 per person, includes transportation, use of facilities and prizes.

For family members not playing golf or tennis, beautiful bridle trails and saddle horses are available at \$4 per hour.

On Saturday evening the Texas Assn. and NCTA have planned an authentic Texas barbecue featuring Texas style beef and beer, a Mariachi band, championship riders and a hay ride. Cost for the barbecue is \$10 per person.

Among the features of the “CATV 76” women's program are a Monday morning brunch and fashion show in the famous Zodiac Room at Neiman-Marcus. On Tuesday, April 6 a special tour of European Crossroads, the novel Dallas activity center with over 40 unique shops and five restaurants is planned. Throughout the convention a special Women's Hospitality Suite will be in operation at the Statler Hilton. This year women's program participants may attend all exhibits and technical and management sessions.

A major highlight of this year's convention is a special 4 day optional post-convention excursion to Mexico City.

# PEOPLE IN THE NEWS

Looking at movement within the industry we find that **Jerry M. Astor** has been named director of marketing for the video products division of Akai America, Ltd....International Video Corporation, Sunnyvale, California, has made some changes in assignments by naming **Hans Kofler** as marketing manager, Central Europe and general manager, IVC GmbH, and **Robert W. Kuhl** as manager of national accounts.

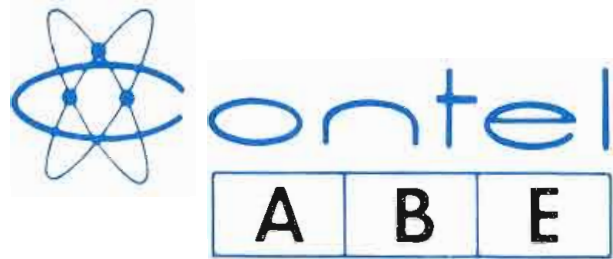
Upon resignation of George Grasso, **Donald F. Smith** has been appointed national sales manager for Commercial Electronics Inc. (CEI)....In Key Biscayne, Florida, **LaRue M. (Bud) Courson**, a 24-year veteran of the National Association of Broadcasters' staff, is their new vice president for administrative services....The appointment of **Joseph R. Schubert** to the position of director of NAEB Personnel Service which is the only personnel placement service designed especially for educational telecommunications....**Myles Adler** is now responsible for all Agfa-Gevaert advertising and promotion activities in the United States.

**Charles F. Riley**, President of Tele-Color Production, Alexandria, Virginia, has been elected as the first chairman of the Society of Broadcast Engineers chapter that was founded for the Washington, Baltimore, and Northern Virginia areas....Joining the staff of Video Concepts as director of marketing is **Fred P. Wilske**....Filling the new position of product marketing manager of the Watertown, Conn. Metal Stamping Plant of the Parts Division of GTE Sylvania Inc. is **Thomas M. Hart**....Designated as manager, marketing analysis, for GTE Lenkurt Inc. is **R. Don Webster**.

McMartin Industries, Inc., Omaha, Nebraska, announces the appointment of **C. Harrison Associates**, Suite 107, 6695 Peachtree Industrial Blvd., Atlanta, Georgia, as broadcast sales representative in the Southeast....The National Association of Broadcasters' Code Authority, announces the death of **Frank J. Morris** who was their west coast manager.

Phelps Dodge Communications Company, New York, N.Y., has established **Henry M. Edwards** as western manager....While on the west coast, **Wallace D. Miller** has been appointed general manager of Theta Cable in Los Angeles, and will be responsible for the overall operation of one of the country's largest cable television systems.

CCA is coming back strong with **Bill Trueman** as their new marketing Director and **Samuel Colodny** as Director of Engineering. Trueman moved from engineering with CCA into his new position, while Colodny joins CCA after a stint with AEL. Both are PE's with a deep engineering background.



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at a price you can afford**



**CONTEL model CT101R-B  
cartridge tape  
recorder-reproducer**



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For More Details Circle (114) on Reply Card

## Exhibitors

color sync generators, cross-pulse generators; party lines—editor programmer.

**NEW:** H-Phase/burst phase meter.

### Videomax Corporation Booth 606

Expanded capability for rebuilding and refurbishing Ampex (Mark XV/X/III) and RCA video head assemblies (high band/low band).

**NEW:** Mark XV video head refurbishing/rebuilding.

### The Video-Tape Company Booth 404

VTC 1000 quadruplex video tape; VTC U-matic videocassettes; videotape cleaning and testing services; quadruplex and videocassette tape duplication services.

**NEW:** VTC U-matic videocassettes, tape duplication services.

### Wilkinson Electronics, Inc. Booth 617

Full line of audio equipment and a 20,000 watt transmitter.

**NEW:** All solid state 500 watt FM transmitter and a 2.5 kW AM transmitter.

### Willi Studer America, Inc. Booth 833

The Studer A-67 recorder/reproducer.

### World Video, Inc. Booth 214

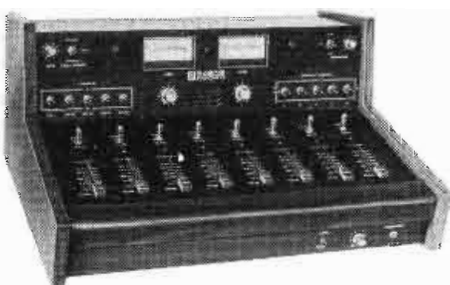
A full line of professional color monitors including the 6210 Series 12" rack mount color monitor with computer type plug-in circuitry.

**NEW:** CDR Series 9-inch single and dual rack mount color monitors which require only 8-3/4 inches of vertical rack space.

### Telecommunications Industries Ltd. Booth 205

PORTA-PATTERN© test chart systems, test slide systems; super 8mm and 16mm b&w and color

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## Studio Tape Exchange Inc.

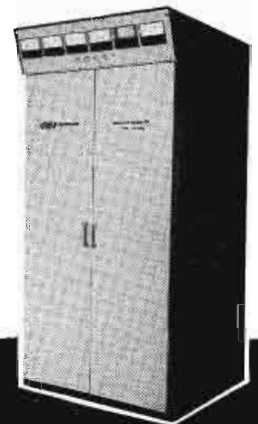


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For More Details Circle (220) on Reply Card

reference films; 8x10 light box transparencies; transparency illuminator.

**NEW:** Spherical transparency illuminator for 8x10 test transparencies.

**Teledyne Camera Systems**  
Booth 210

CTR-3 Tri-Optical color telefilm recorder.

**TeleMation, Inc.**  
Booth 316

TVS/TAS-1000 video/audio distribution switcher, TCF-3000 color film camera, TVP-1000 video processor, 525 series broadcast and precision terminal equipment, TSG-3000 NTSC broadcast sync generator.

**NEW:** TCG-3000 multifont character generator.

Suite: Conrad Hilton

**Television Equipment Associates**  
Booth 203

Amplivox headsets for disk jockeys, sportscasters applications; Magnetek tape cleaner and evaluator; Matthey video delays, pulse delays, video filters; the Matthey automatic video equalizer, the I.R.T. color monitor comparator; the Link camera tube conditioner; the Link lag meter.

**NEW:** Matthey automatic video equalizer for NTSC to be operated upon VIR incorrect burst phase, set up, sync level, burst gain, overall gain, 2T gain, 2T pulse, bar tilt, chroma gain and chroma delay.

**Telex Communications, Inc.**  
Booth 512

Telex/Magnecord open-reel recorder/reproducers, CS-90 sportscaster headset, TMS-100 and TMM-150 programmed music products.

**NEW:** Model TMM-150.

**Tepco Corp.**  
Microwave transmitters.

**Thomson-CSF Laboratories, Inc.**  
Booth 520

FM Volumax automatic peak

controller; the AM Volumax; dual audio distribution amplifier; Audimax automatic level controller; and the Dynamic Presence equalizer. Also, a lightweight broadcast-quality, hand-held color TV camera, TTV-1515 triax color camera, the TTV-1516P portable camera, telecine equipment, Vidifont character generator systems with changeable fonts and font compose, sync and pulse equipment, image enhancer, the chroma/insert keyer, and the color correction system.

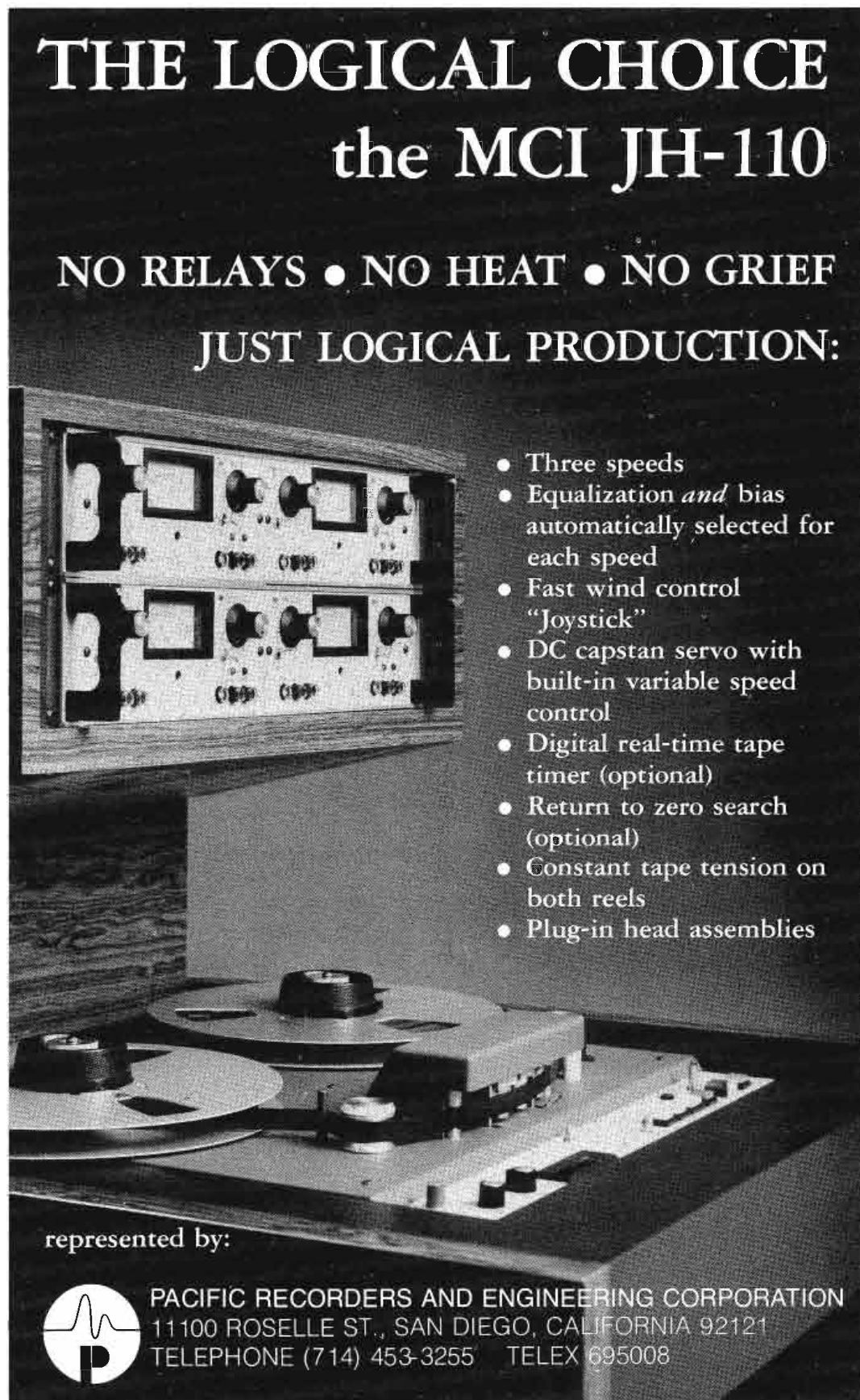
**NEW:** Vidifont Mark IV with font-compose camera interface; Microcam, miniature, portable, color TV camera; TTV-1516P triax portable color camera; high-performance FM Volumax, Model 4101/4111

Suite: Conrad Hilton

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**Exhibitors List  
Begins On  
Page 48**

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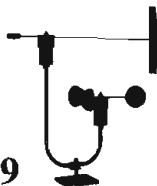


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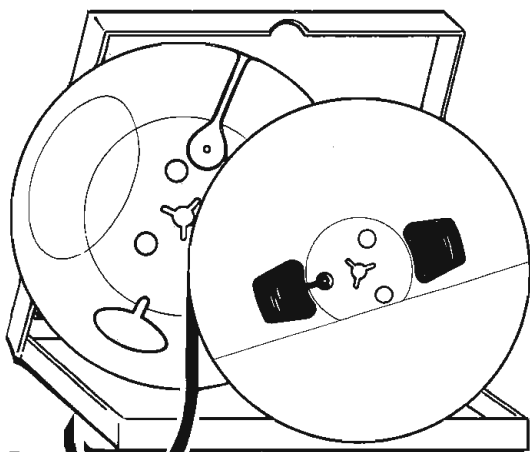
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## Products

(Continued from page 147)

and vertical tabulation), adjustable pin-feed—4" to 9 1/2", Data-Phone+ (dial-up) capabilities, ribbon cartridge and 300-Baud originate-only integral modem.

Operating on the eight-level ASCII code, the TermiNet 30's print font has 64 upper case ASCII characters. The terminal prints 10 characters to the inch on an 80 character line with six vertical lines per inch. Printing at selectable 10, 20 or 30 cps, this impact printer is capable of handling up to a four-part form set of fan-fold or roll, sprocket-feed paper. The unique ribbon cartridge employs a Mobius loop ribbon to extend ribbon life four to five times over conventional spool-type ribbons.

\*Registered trademark of General Electric Company, U.S.A.

+Registered servicemark of AT&T.

For More Details Circle (194) on Reply Card

### Test Generators

Tektronix announces the new 1410 Series of NTSC Sync Pulse

and Test Signal Generators offering all the advantages of modularity at prices generally associated with units of single-piece construction. To suit your specific needs, you may choose from a wide selection of sync pulse and test signal generator functions to be combined with the mainframe providing the color standard of your choice.

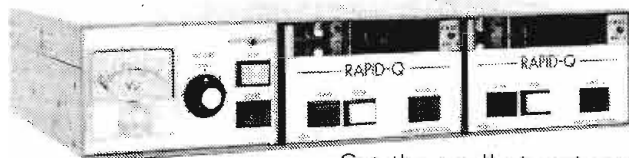
Should you develop additional test signal requirements in the future plug-in card construction insures a quick and easy retrofit for you. Any combination of five test signal generator modules driven by one sync pulse generator is feasible.

The Sync Pulse Modules and the Test Signal Modules plug vertically onto the 1410 Mainframe interface board. Front-panel controls and switches are mounted on the module with easily removable extenders projecting through the front panels.

Available modules include three sync pulse generators, a color bars generator, a convergence pattern generator, a linearity signal generator, and a VIRS/Black burst generator.

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### Third Generation Volumax

Earlier in this issue we covered this unit in detail, because it was tested by our audio editor. As a reminder, the new Volumax 4111 by Thomson CSF did show improvements over their older model 4111 (manufactured when the company was CBS Labs). The new unit provided the same over-modulation protection, but since a higher input level could be used for the same subjective spectral balance, a higher average modulation level was obtained in our tests.

The 4111's release and attack time is designed to provide less than 1 percent distortion at 50 Hz, with faster peaks being passed along to the following stages.

For More Details Circle (216) on Reply Card

### Film Chain Light Controls

Beston Electronics, manufacturers of automatic light controls for large and small film chains, will show systems that are compatible with any camera-multiplexer-projector system. They will feature fast response times to changes in film density without changes in colorimetry or annoying bounce and overshoot.

For More Details Circle (217) on Reply Card

### Transparency Illuminator

A new, radically-designed spherical transparency illuminator will be shown for the first time by Telecommunications Industries Limited, in booth 205 at the National Association of Broadcasters convention in Chicago, March 21-24.

According to TIL president Ed Ries, the PORTA-PATTERN Transparency Illuminator will provide completely even illumination over the entire area of an 8 x 10 transparency.

The PORTA-PATTERN Transparency Illuminator is composed of a 20" diameter sphere, the inside of which is painted with Eastman Kodak's white reflectance coating 6080 achromatic calibration standard paint, giving it totally flat illumination qualities without the use of reflectors.

The light source is a 12-volt quartz iodine lamp connected to a regulated DC power supply. This

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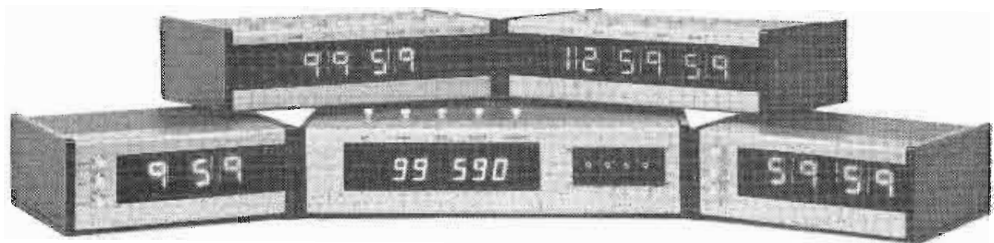
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- ES-510: Four digit sixty minute timer (59:59) with Start, Stop, Reset. **\$125.00**
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**STANDARD OPTIONS AVAILABLE:** Kit; Slave; BCD Output; Remote Connector; 6' Remote Cable and Pushbutton Set; 220V A.C., 50Hz; 9" or 19" Front Panel 3½" high; 3 Wire Cord and Molded Plug. Tenths of seconds are available on all timers except the ES-500. Relay Contact Closure at Zero and/or Stop at Zero available on ES-300, 301, and 302. Crystal Timebase available for ES-500. Custom options and special orders available.



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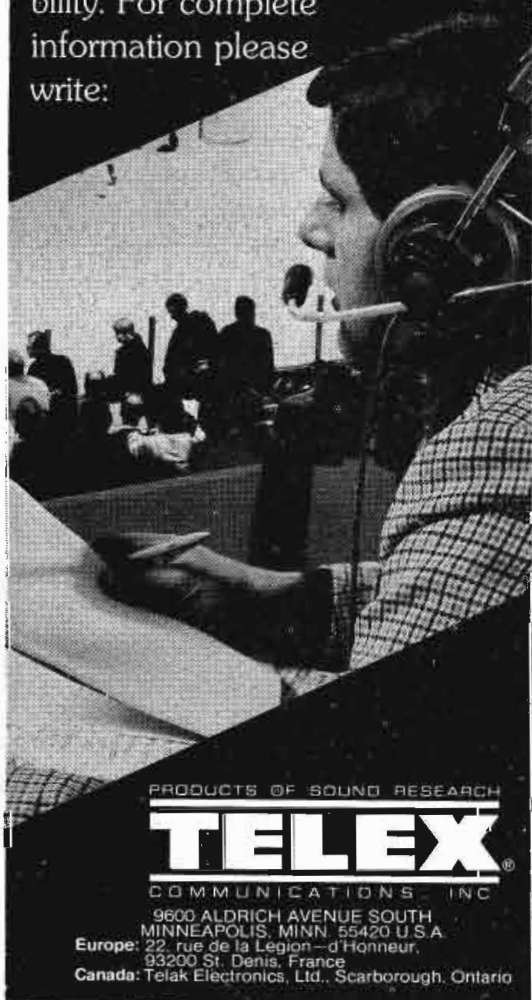
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159

# Sportscaster Headset... Color, Action, Hands-free Mobility

Combine the finest omnidirectional dynamic boom mike with an equally high performance binaural headphone and you have the superior Sportscaster headset...the Telex CS-90. For live broadcasts, from the station or on remotes, with cue and program monitoring and hands-free convenience. The audience hears every word, clearly, crisply, with crowd noise for background color and atmosphere. Circumaural ear cushions screen out noise in the immediate area so that special acoustic facilities are unnecessary. Supplied with convenient in-line, mike-muting "push-to-cough" switch. The Sportscaster headset. Color, action and hands-free mobility. For complete information please write:



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Canada: Telak Electronics, Ltd., Scarborough, Ontario

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allows the color temperature and illumination level to be set and kept constant, and virtually unaffected by voltage variations. A vernier-type calibrating knob is used to adjust the lamp position inside the sphere. Once set, the light condition is the same, day after day.

For More Details Circle (200) on Reply Card

## Portable Camera

A hand-held electronic camera smaller and lighter than the traditional film cameras used in television newsgathering was shown for the first time to the nation's motion picture and television engineers.

Developed by **Thomson-CSF Laboratories, Inc.**, in cooperation with the CBS Television Network, the portable camera—called Microcam because of its micro-miniature electronics—weighs eight pounds. A companion three-pound electronic hip pack, which can be worn around the waist, makes it possible to operate the camera in any situation, such as fast-breaking news events.

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- 75Ω Passive Delay
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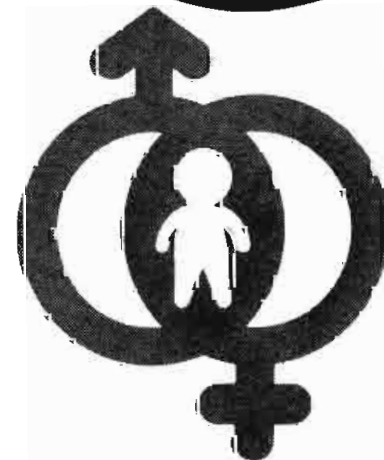
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500T20 / 64	19.40	11.25	10.67	10.09
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FDN	16.75	9.72	9.21	8.71
FOF	17.50	10.15	9.63	9.10
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FBX	14.20	8.24	7.81	7.38
FCX	20.80	12.06	11.44	10.82
FEL	31.00	17.98	17.05	16.12
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FCV	33.50	19.43	18.42	17.42
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## MARCH OF DIMES

THIS SPACE CONTRIBUTED BY THE PUBLISHER

BROADCAST ENGINEERING



The camera's low power consumption of 20 watts enables it to operate on standard flashlight batteries in an emergency. Because of the solid-state electronic camera's size and unusually light weight, it is expected to broaden opportunities for women in broadcast journalism.

For More Details Circle (201) on Reply card

### B&W Switcher

**SHINTRON ANNOUNCES THE Model 361 Basic Four Switcher**, a high-performance/modest-cost switcher for monochrome studios. It is a four input, black and white switcher with an A/B-C bus structure and a built-in RS-330 Genlock Sync Generator in one rack mount package. Shintron designed the Model 361 specifically for those monochrome studios unsatisfied with the limited performance of inexpensive conventional CCTV switchers.

The Model 361 Basic Four Switcher features a 4-input, 3-bus organization with total vertical interval switching by momentary-contact lighted push buttons. Possible effects are: 4 corner wipes, horizontal and vertical wipes, fade

and dissolve to effects. The effects bus is controlled by vertical interval momentary-contact lighted push button switches and gear reduction levers. The four inputs are equipped with interface for Sony, Panasonic, and BNC connectors. There are two program outputs and one preview output.

The Sync Generator genlocks to any of the four inputs or generates RS-330 sync from its internal crystal oscillator. The convenient genlock meter on the front panel indicates the sync source: genlock or internal. In addition the Model 361 automatically switches to internal sync if the genlock source fails.

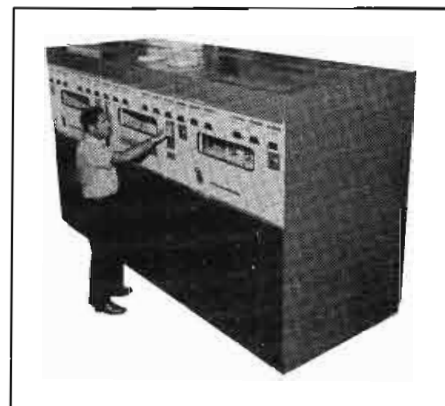
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### Time Lapse Video Tape Recorder

**Hitachi Shibaden Corporation of America**, announces the introduction of a new time lapse video tape recorder, the Hitachi SV512-S1. The new recorder includes all features needed for high quality VTR performance in a 1/2" EIAJ Format—designed for industrial

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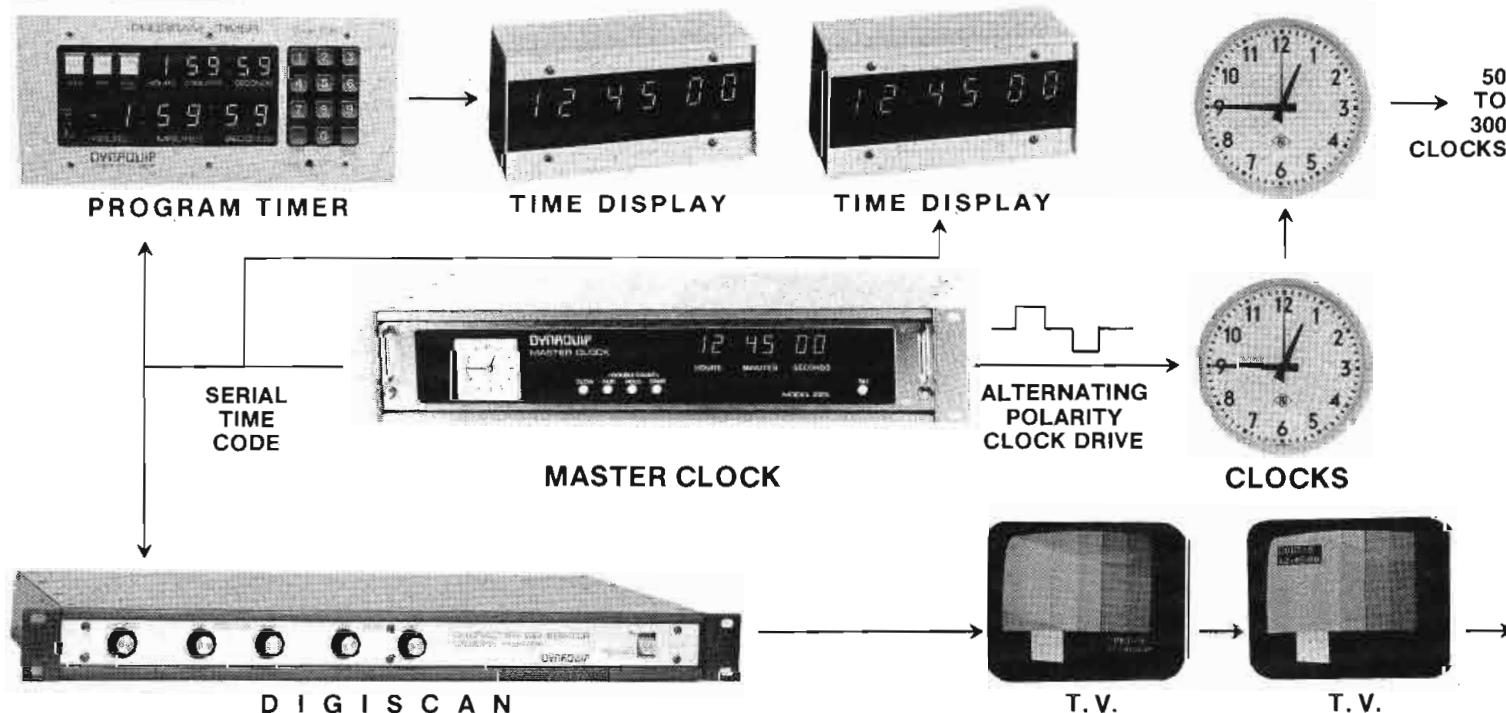
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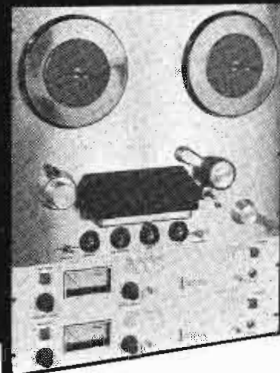
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dynamics, inc.**

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For More Details Circle (195) on Reply Card

and commercial surveillance and scientific time study.

The SV512-S1 replaces the existing Hitachi SV512 with a new increased recording capacity of up to 96 hours. The recorder offers a choice of five models for different durations of recording time: 1, 12, 24, 48 and 96 hours. You can mix and match recording and playback times to suit your own requirements.

A built-in Automatic Time Switch-Over automatically converts the recorder to the 1-hour mode for continuous recording when an external triggering device is activated.

Other features of the SV512-S1 include: Pulse signal output to trigger sequential switcher; Ferrite video "T" Bar head and rotary transformer to insure stable, excellent recordings and reproduction performance; Automatic Gain Control (AGC) on both video, and audio.

For More Details Circle (203) on Reply Card

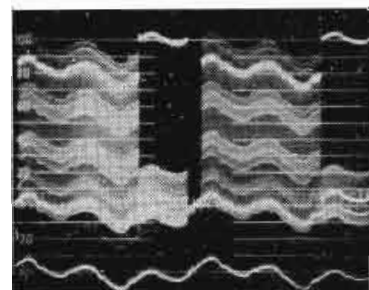
**Audio Control  
Center**

**Micro-Trak Corporation** of Holyoke, Massachusetts has announced

the addition of the "D Compact" to its product line. This totally professional unit is the first in a series of System D Audio Control Centers. The D Compact is a complete audio control package incorporating a "64" Series Broadcast Audio Control Console with two Micro-Trak 740 Turntables and a professional microphone in a portable design.

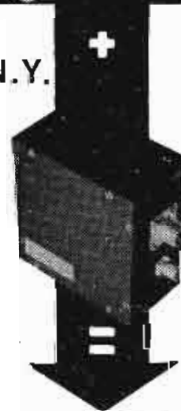
With a very stable fold up leg structure, the D Compact is arranged so that it can be used by

## STOP GROUND-LOOP HUM!

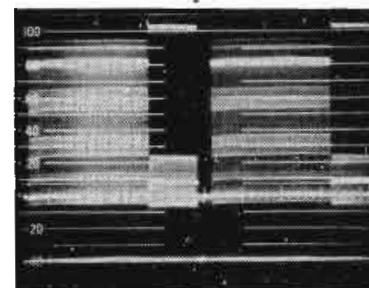


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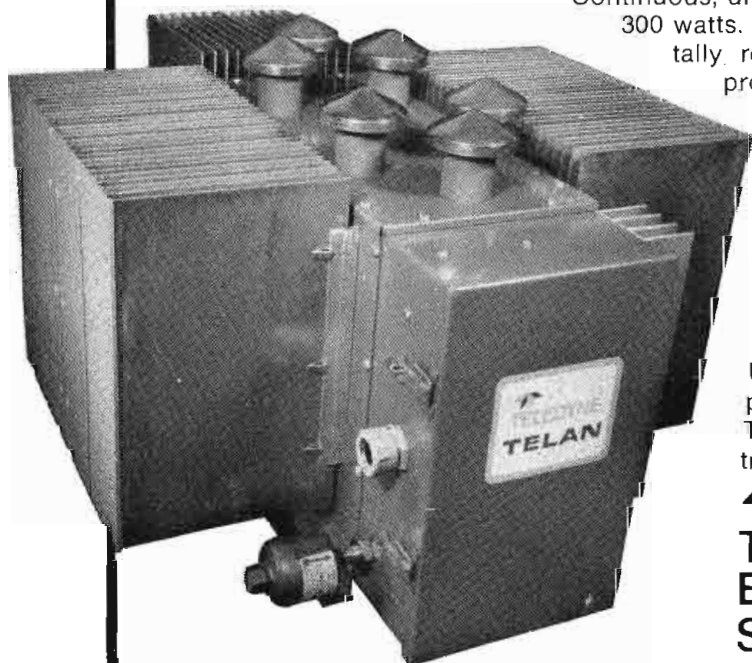
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itself, stand alone, or if desired, it can be set up on any available table top. When folded, it fits very nicely in the back of virtually any station wagon. With The D compact your man can be on site set up and ready to go in minutes.

All audio terminations are XLR type connectors for fast reliable hookup. The D Compact accepts inputs from three auxiliary units such as tape machines, and an additional microphone right along with its own turntables and primary microphone. You have the choice of any of Micro-Trak's "64" series audio consoles, the 6444, Broadcast Stereo, the 6454, Broadcast Mono, or the 6440 series of discotheque consoles.

For More Details Circle (204) on Reply Card

### Touch Tone Detector

Frequency Devices, Inc. has announced the release of the 550 Series Touch Tone\* Detectors. This new product is a P.C. mountable component which in and of itself performs all of the functions required for tone detection. There is one module for the low group and one for the high group.

The adjustment-free 550 has eliminated the need to coordinate large numbers of filtering, AGC, and level detection building blocks. It also circumvents many of the mechanical problems encountered in using larger and often inconveniently configured printed circuit card tone detector assemblies.

Rather than constraining the system mechanical design to accommodate an alien P.C. board the designer may now incorporate the detector into his own P.C. layout. The result is a significant savings in design time, assembly time, and system volume.

For More Details Circle (205) on Reply Card

### Image Enhancer And Noise Reducer

Yves Faroudja Inc., a Los Altos, California based electronics firm announces the introduction of a new video product, the CRISP-MATIC Model 01-A Image Enhancer and Noise Reducer.

The CRISP-MATIC is designed to significantly improve the subjective quality and signal characteristics of television images coming

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This rugged, heavy duty bulk tape eraser wipes sound from all magnetic tapes, cartridges, cassettes and magnetic film stock; handling up to 2".

It erases with minimum residual noise because the field automatically diminishes at the end of each 30-second cycle. A thermal control and blower keeps the unit below 71° C.

Available for 60Hz or 50Hz operation.

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2081 Edison Ave. • San Leandro, Ca. 94577 • (415) 635-3831

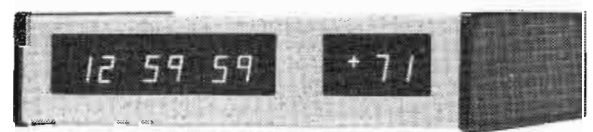
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**THE ES 112 and ES 124** twelve and twenty-four hour, solid state, six digit clocks. Silent seven segment incandescent displays. Three easy to operate controls: Fast Advance, Slow Advance, and Hold. Built to deliver a lifetime of service. Available with the following options to provide an even wider range of applications. BCD Output; Crystal Timebase; Remote Connector with or without Six Foot Cable and Pushbutton set; 220V AC, 50Hz; Nine or Nineteen inch Anodized Aluminum Front Panel; Slave; Three Wire Cord with Molded Plug. Also available in Kit form. **Price \$130.00**



**THE ES 142 and ES 144** twelve and twenty-four hour, MOS, solid state digital clock/thermometers. Display simultaneously: 6 digits of time (hours, minutes, seconds) and 3 digits of temperature (-50°F to +150°F) in planar, gas discharge displays .55" high. Units come equipped with Temperature Probe and six foot cord. With the exception of the Nine inch Front Panel the ES 142 and ES 144 are available with the same options as the ES 112 and ES 124. **Price \$225.00**



**THE ES 132 and ES 134** twelve and twenty-four hour 12V D.C., MOS, solid state six digit clocks. LED display. Black anodized aluminum case. Available with same options as ES 112/124 plus A.C. operation with Crystal or Line Frequency Timebase. **\$200.00**

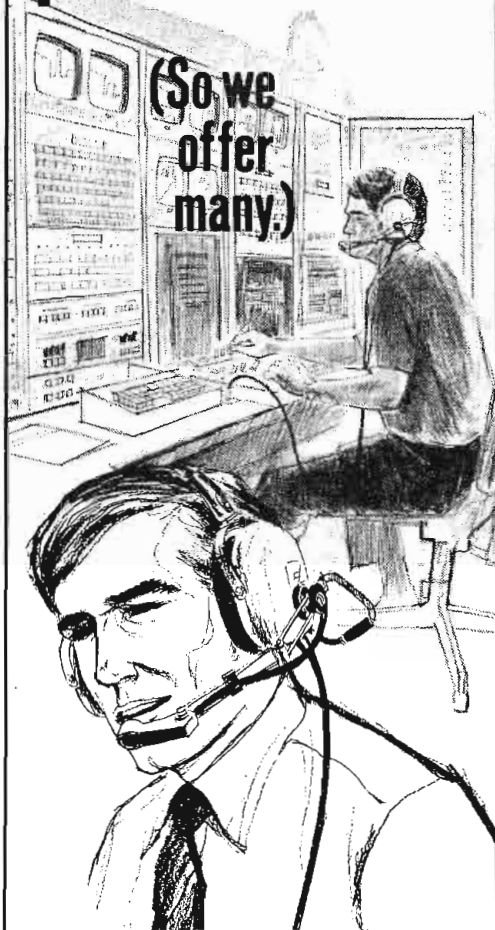


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from low and median priced video-tape recorders that use the "color under" principle.

The CRISP-MATIC is intended for applications such as Electronic News Gathering, tape dubbing and duplication, enhancement of large screen displays or any VTR playback where superior quality images are desired.

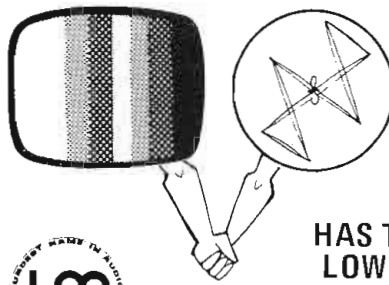
The CRISP-MATIC is housed in a portable case which is 43.5 cm. (17 in.) by 9 cm. (3 1/4 in.) and can be used as a stand-alone unit or rack mounted in a standard 19-inch rack.

Operation is very simple, involving only an on/off power switch and a single knob to control the degree of picture enhancement. The unit is an "add on" device used in the playback mode of any normal (unmodified) VTR. Standard BNC connectors and a bypass switch are mounted on the rear panel.

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- ★ R/GB8 Standalone Encoded COLORBARS GENERATOR
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- ★ All units are portable and rack-mountable, and include self-contained power supply.

**Ultra Audio Products**  
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(213) 276-2726

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their DML-2 portable, dual mic mixers with individual limiting/compression. The DML-2M has been designed to provide a virtually error free method of mic amplification and mixing.

From the quietest whisper to the loudest shout, the simple set and

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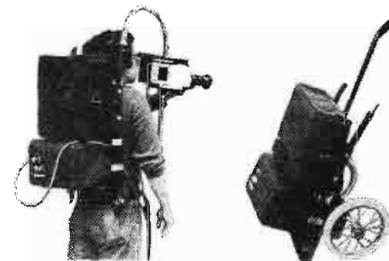
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### VCR CARRYING SYSTEM

The PB-3800 is a special Porta-Brace designed to accommodate the new portable color VCR units (Sony VO-3800, TEAC VT-1000). Incorporating the patented Porta-Brace cantilevered camera arm, the PB-3800 features two Cordura nylon padded cases for both the cassette deck and DXC-1600 CCU, and a heavy-duty padded waistbelt. The WB-2 is a lightweight, collapsible, two-wheeled cart designed to carry the Porta-Brace with video equipment mounted. Twelve inch semi-pneumatic wheels insure stable movement over any surface. **K AND H PRODUCTS, LTD.**, Box 246, North Bennington, VT 05257 (802) 442-9118.

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forget controls give the operator complete freedom from meter watching and knob twisting. Features virtually distortionless amplification, mixing and compression, internal tone generator for line level set, internal battery and/or optional AC supply operation, phone monitor/talkback function and XLR type mic and output connectors.

Specifications include: response from 20 Hz -20kHz  $\pm 1$ dB; distortion 0.1% max; 90dB gain max; balanced inputs and 600 ohm balanced outputs; 10dBm output level; 1.5 microsecond attack time; and signal to noise ratio of -65dB.

Also available is the DML-1S for stereo operation.

For More Details Circle (207) on Reply Card

### Time Code Reader-Display

**CMX Systems**, an Orrox Company, announces a new precision reader/display designed for frame accurate editing of video tape. It reads standard SMPTE time code from any source and displays it as a digital readout visible from 40 feet in a normally lighted room. The standard SMPTE 80 bit edit code in drop or non-drop modes is displayed in hours, minutes, seconds and frames.

Real time operating speed ranges from 1/5X to 50 X. Editors working with either quadruplex or helical tape can search and pinpoint specific frames of selected scenes with ease and precision. The unit is plug compatible with any editing system.

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March, 1976

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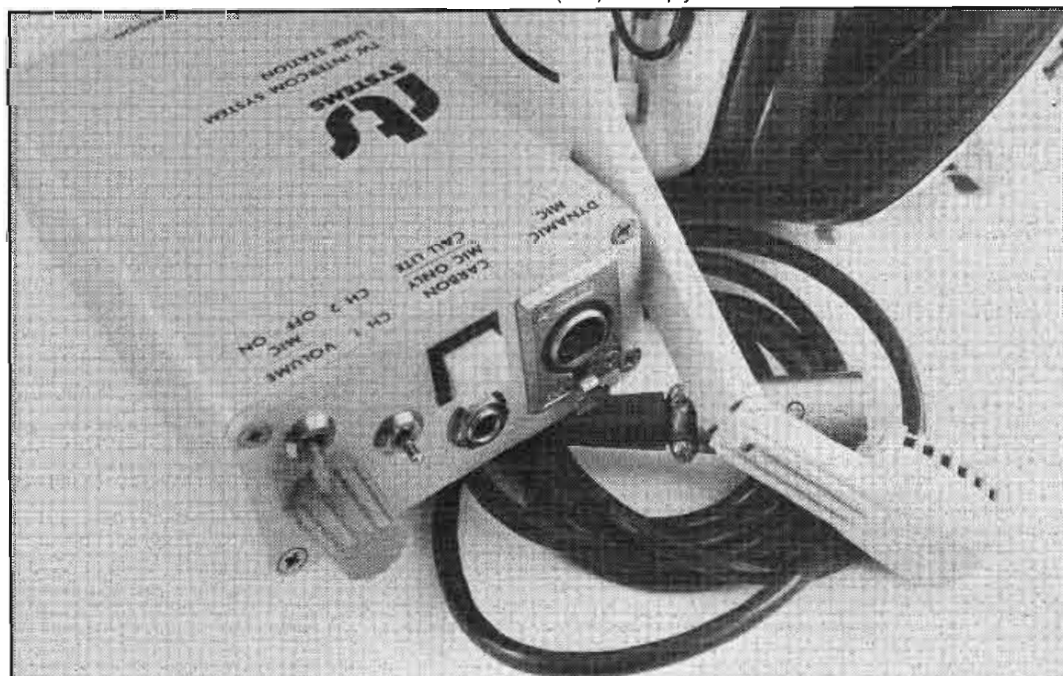
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**The Super System.** A refined, high-quality and ultra reliable intercom system for the demanding professional. Employing only two wires for operation, up to fifty units may be connected on line without loading or serious performance degradation. Features include: mic level limiter, flashing signal light, auxiliary audio input, adjustable side tone, and powerful two watt headphone amp.

Portable system standard with two channels; rack mount standard with three or more channels. The RTS "TW" Intercom System is comparable with carbon or dynamic mic headsets. It is completely field serviceable and packaged to provide super reliability under the toughest conditions. For more information please call or write:

**rts systems** 4167 Fair Ave., No. Hollywood, Ca. 91602  
213/980-0511

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**Modular  
Tape Cart Units**

The new CENTURY II tape cartridge equipment line by Sparta Division of Cetec Corporation will be unveiled at the 1976 NAB Convention in Chicago. The modular system of mono and stereo same-size record-playback and playback units will be available in single, dual, and triple table top mounts, and triple rack mount.

Standard features of the CENTURY II include both secondary

(End of Message) and tertiary cue tones...primary (Stop) cue tone defeat...audio mute on playbacks... logging signal in- and out-put...and BUILT-IN SPLICE FINDER. In conjunction with the splice finder a HIGH SPEED option is available.

It meets all proposed new NAB standards...uses peak reading record level meters with LED overload indicators in the meter face... and digital tone detect system.

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**Modular  
Console**

The new series of MAP 8422 Console Control Modules provide comprehensive switching and control facilities for multi-track recording, quad-stereo-mono mix-down, and monitoring required in today's recording and production consoles. They are available from Modular Audio Products, a unit of Modular Devices, Inc.

System features of the 8422 Series include: selectable Mic/High

Level inputs with programmable LED peak level indication; an internal power network for condenser mic's; switchable 70 Hz Hi Pass Filters; Channel Mute and Solo on all inputs; Quad Panning and Quad/4 Track/Stereo mode selection; Direct Track Feed; two independent Echo channels with pre-post fader selection, delay, echo and monitor send and return functions; two independent Cue channels; and self-contained Multi-track mixing amplifiers with full range rotary Submaster level controls.

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New TERMALINE® series 8890-510 are of course not "rejects", but are designed for service as Reject Loads in dual transmitter operation. 3 gal/min of water permits 7500W dissipation, and flows only when needed. Price: \$975 incl. controls.

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(214) 352-3811

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### **FM Transmitting Antenna**

CCA Electronics will introduce a new FM transmitting antenna at NAB. This new antenna comes in a low power and a high power version.

The low power version will handle up to 10 kW, while the high power model will take up to 50 kW (single bay). These antennas feature a 700 kHz bandwidth with the SWR under 1.1:1. All elements are 50 ohm to assure lowest Q. Large gap form factor of the antenna eliminates feed point straps and insulators.

Its integral radome is designed to offer no increase in wind load.

For More Details Circle (211) on Reply Card

### **FM Educational Antennas**

Phelps Dodge Communications Company will exhibit representative models of its line of FM broadcast antennas at the Convention.

In the FM educational series, Phelps Dodge offers six types. Because of the normally lower powers required in educational service, the new antennas are fabricated of 7/8 inch stainless steel tubing. The circularly polarized antenna is a 1½ turn helix and the strictly horizontal element has a "U" configuration. These antennas are complete with matching harness of RG type cables and are designed to mount on tower legs or support pipes 1¼ inch to 2¾ inch diameters. The multi-element arrays are designed for an element spacing of 10 feet.

Six models, designated Catalog Nos. ECFM-1, -2, -3, -4, -5 and -6 are available. Power rating in kilowatts varies from 0.2 to 0.5. Power gain ratings range from 0.43 to 2.99; field gain from 0.65 to 1.73; and, gain in dB from -3.66 to 4.76. FS at one mile, 1 kw, MV/M is from 90 to 239.

Incorporating the general design concepts of other Phelps Dodge Communications circularly polarized antennas, the new FM educational series is less susceptible to corona and assure phase coincidence in the centers of both vertical and horizontal components.

Also to be displayed will be two new 1,000 watt per bay circularly and horizontally polarized FM broadcast antennas designed to fill the void which currently exists between an educational series rated at 200 watts per bay and the standard antenna series rated at 5,000 watts per bay. Designated Catalog Nos. CP-1000 and HP-1000 the two new antennas are parallel fed so that a 2-bay antenna is rated at 2 kw, 3 bay at 3 kw, etc.

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## **NAB Exhibits Floor Plan Starts on Page 33**

## **CHARACTER GENERATORS ?**

# **SIMPLY COMPARE**

## **FEATURES...**

No other CHARACTER GENERATOR matches the MODEL 3600 when it comes to operational features. Because television transmission standards limit the amount of information which can be displayed, you will appreciate our choice of a practical character size, legible font and full horizontal edging. For the same reason, we feel strongly about the need to move, control and emphasize message information. That is why the 3600 permits roll, crawl or sequence on any line of the display. That is also the reason for our window format feature and numerous flag functions.

Ease of operation is important in any equipment—especially if you are the operator. The 3600 provides a set of auxiliary keys for those control functions most often used. This eliminates many of the multiple-key operations so often employed by other generators. The elastic memory of the 3600 also adds greatly to its ease of operation.

## **EXPANDABILITY...**

Most character generators tend to limit the size and features of the system to the size of the "box"; not so with the 3600. We not only left plenty of room, but we designed a system which is compatible with a host of extra features. Additional memories and independent output channels will increase the flexibility and versatility of your system. For unlimited, non-volatile information storage you may want to consider data cassette storage.

The data sources of the 3600, such as Up-Down Counter and Time/Date Generator, cannot be ignored as valuable additions to any television system. Also, don't overlook the possible need for lower case and foreign language characters—or maybe math and chemistry symbols.

To top it all off, consider the Color Background, Color Billboard and Color Flag Function. These features will greatly enhance any message display, whether it be full-screen or a simple title.

## **VALUE...**

Many character generators have been sold on the basis of price; conversely, some on the basis of features. We welcome your comparison of our product with any other on the market because we are sure that you want to buy on the basis of value!

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On Page  
12

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Accurate Sound Company . . . . .131  
Aderhold Construction  
Company . . . . .159,164  
Allied Broadcast Equipment . . . . .130  
American Data Corporation . . . . .7,49  
Amperex Electro Optical Div. . . . .41  
Ampex Corporation . . . . .30-31  
Ampro Corporation . . . . .56  
Andrew Corporation . . . . .51  
Angenieux Corp. of America . . . . .89  
Anixter-Mark . . . . .67  
Audio Designs & Mfg., Inc. . . . .44  
Audio-Video Engineering . . . . .162  
Auditronics . . . . .124  
Belar Electronics Laboratory,  
Inc. . . . .120  
Beston Electronics, Inc. . . . .118  
Bird Electronics, Inc. . . . .166  
Broadcast Electronics, Inc. . . . .10,85  
Broadcast Engineering Techniques .69  
Broadcast Equipment & Supply . .166  
Bryant Electronics . . . . .138  
CCA Electronics Corporation . . . .143  
CMX Systems . . . . .11  
CSI Electronics, Inc. . . . .156  
Cablewave Systems . . . . .55  
Canon Video . . . . .28  
Capitol Magnetic Products . . . . .79  
Central Dynamics . . . . .19  
Chronotron Systems, Inc. . . . .62  
Chyron Telesystems . . . . .76  
David Clark Communications . . . .164  
Comark Industries, Inc. . . . .164  
Communications Technology . . . .60  
Comprehensive Service  
Corporation . . . . .CE-2  
Comquip, Inc. . . . .165  
Computer Magnetics Corporation . .57  
Continental Electronic  
Wholesale Corp. . . . .155  
Continental Electronics Mfg. Co. .161  
Control Design Corporation . . . .117  
Cooke Engineering . . . . .128  
Datavision, Inc. . . . .58-59  
Delta Electronics . . . . .146,147  
Ditch Witch Trenchers . . . . .CE-4  
Dolby Laboratories, Inc. . . . .47  
Dynair Electronics, Inc. . . . .63  
Dynasciences Corporation . . . . .66  
ES Enterprises . . . . .38,130,140,159,163  
Electrohome Ltd. . . . .148  
Electro-Voice, Inc. . . . .103  
English Electric Valve  
North America . . . . .1  
Farinon Electric . . . . .125  
Fidelipac . . . . .8  
Firan Electronics . . . . .161  
Flash Technology Corp. of  
America . . . . .112  
Fujinon Optical . . . . .122  
Garron Electronics . . . . .158  
The Grass Valley Group . . . . .3  
Harris Corporation . . . . .87  
Hitachi Shibaden . . . . .27  
Ikegami . . . . .52-53  
International Tapetronics  
Corp. . . . .42,54,115  
JVC Industries, Inc. . . . .73  
Jamieson Film Company . . . . .88  
Jampro Antenna Company . . . . .109  
Jensen Tools and Alloys . . . . .168  
K&H Products, Ltd. . . . .164  
Kansas State Network . . . . .CE-3  
Kings Electronics . . . . .21  
LPB Inc. . . . .98  
Laird Telemedia . . . . .167  
McCurdy Radio Industries, Inc. . . .15  
McMartin Industries, Inc. . . . .107,136  
Marconi Electronics, Inc. . . . .43

Marconi Instruments . . . . .105  
Marti Electronics . . . . .126  
Martin/Audio/Video . . . . .108  
Memorex Corporation . . . . .39  
MIC-MIX Audio Products . . . . .166  
Micro Consultants . . . . .129  
Micro-Trak Corporation . . . . .68  
Microtime, Inc. . . . .75,83,143  
Minneapolis Magnetics, Inc. . . . .136  
Moseley Associates, Inc. . . . .20  
Nagra Magnetic Recorders, Inc. . . .80  
Rupert Neve Incorporated . . . . .113  
Nova Industries, Inc. . . . .166  
Nurad Incorporated . . . . .145  
O'Connor Engineering . . . . .110  
Opamp Labs, Inc. . . . .168  
Otari . . . . .46  
Pacific Recorders . . . . .157  
Philadelphia Resins Corp. . . . .134  
Philips Audio Video Systems . . .22-23  
Potomac Instruments, Inc. . . . .141  
Pulse Techniques . . . . .166  
Quick-Set, Inc. . . . .145  
RCA Distributor and  
Special Products . . . . .111  
RCA Electro-Optical Div. . . . .65  
RTS Systems . . . . .165  
Ramko Research . . . . .61  
Recording Supply Corporation . . .158  
Recortec, Inc. . . . .101  
Revox Corporation . . . . .95  
Robins/Fairchild . . . . .156  
Rockwell International . . . . .Cover 2  
Roh Corporation . . . . .94  
Ross Broadcast Products . . . . .114  
Russco Electronics, Inc. . . . .140  
Scully/Metrotech . . . . .78  
Sennheiser Electric . . . . .97  
Shalco, Inc. . . . .158  
Shintron Company, Inc. . . . .96  
Sintronic Corporation . . . . .102  
Sitler's Supplies, Inc. . . . .160  
Sony Corporation of America . . .16-17  
Sound Dynamics . . . . .162  
Sound Technology . . . . .37  
Sparta Electronics Corporation . . . .5  
Spindler & Sauppe, Inc. . . . .135  
Spotmaster . . . . .10,85  
Stainless, Inc. . . . .64  
Stanton Magnetics . . . . .123  
Strand Century . . . . .18  
Studio Tape Exchange . . . . .156  
Systems Marketing Corporation . .139  
Taber Manufacturing . . . . .163  
Tandberg of America . . . . .93  
Tech Laboratories . . . . .156  
Tektronix . . . . .91  
Teledata Systems, Inc. . . . .137  
Teledyne Energy Systems . . . . .162  
Telemation, Inc. . . . .121  
Television Equipment  
Associates, Inc. . . . .12,160  
Telex Communications, Inc. . . . .160  
Tentel . . . . .138  
Tepco Corporation . . . . .127  
Texas Electronics, Inc. . . . .158  
Thomson-CSF Laboratories, Inc. . .119  
Time & Frequency Technology, Inc. 81  
UMC Electronics Company . . . . .13  
Ultra Audio Products . . . . .164  
Unimedia . . . . .142  
Vamco Engineering . . . . .62  
Varian, Eimac Division . . . . .77  
Video Aids Corp. of Colorado . . .14,132  
Videomax Corporation . . . . .9  
Viscount Industries . . . . .144  
Vital Industries, Inc. . . . .Cover 4  
Ward-Beck Systems Ltd. . . . .Cover 3  
Wilkinson Electronics, Inc. . . . .133  
World Video . . . . .92



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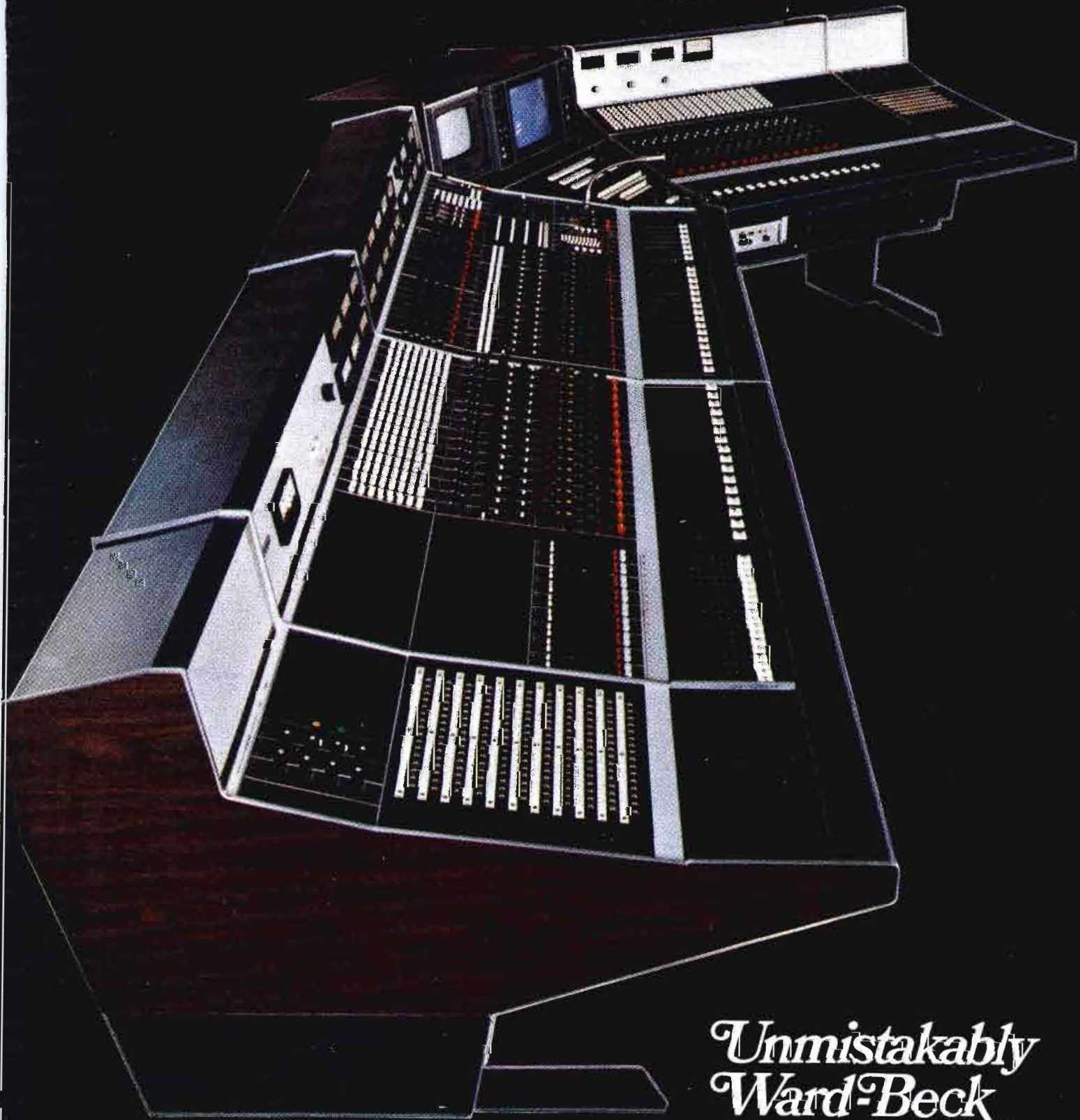
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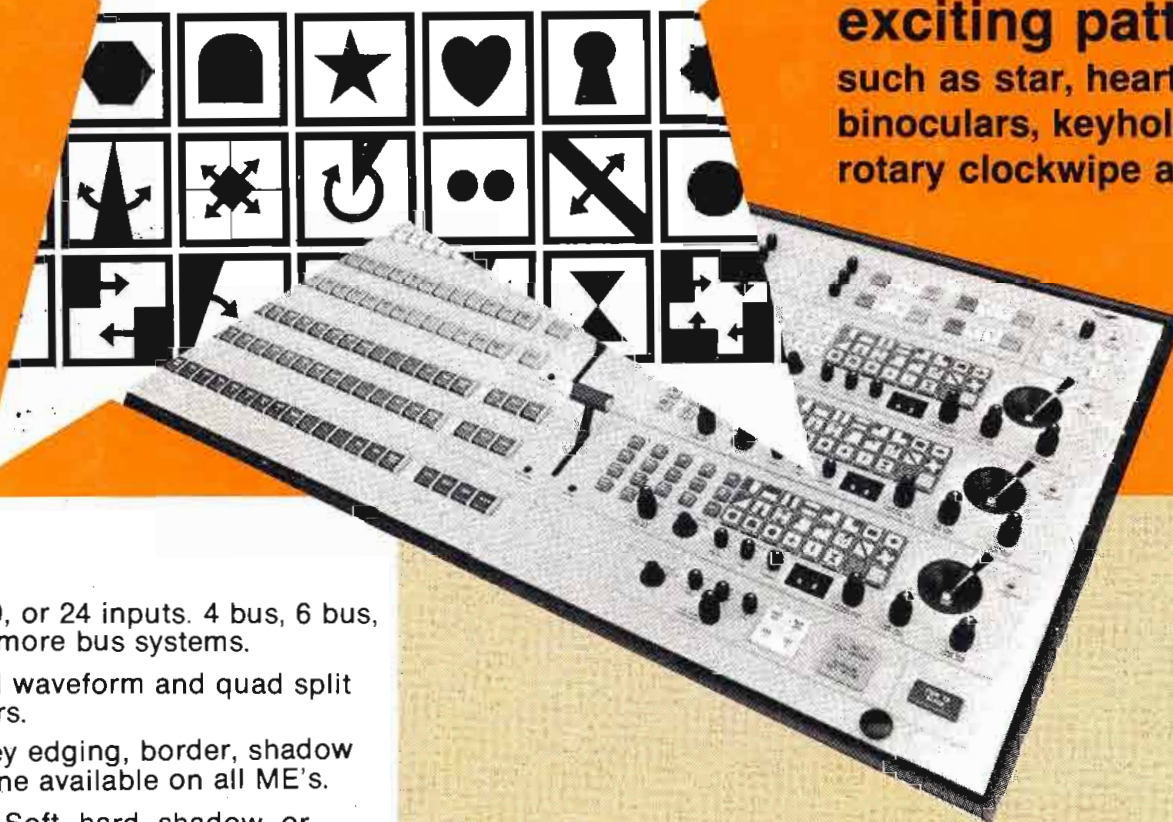
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