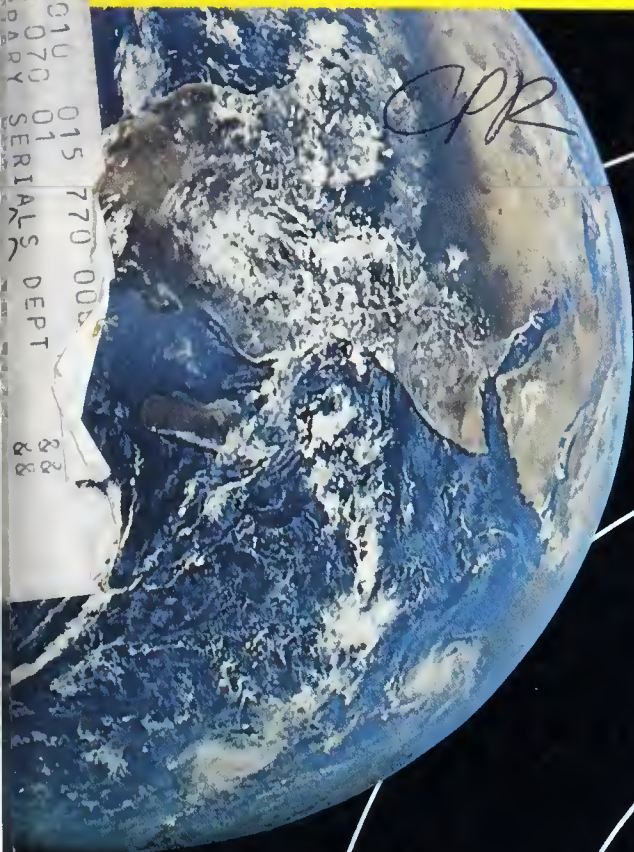


# BROADCAST<sup>®</sup> engineering

ch, 1979/\$2.00

474010  
113070  
SERIALS  
DEPT  
88  
88



nab

## NAB Convention Special

# Introducing The Frame Store TBC The DPS-1.



Over 3 million bits of random access memory, microcomputer control, digital comb filtering, and the basic DPS-1 Mainframe concept, all in one Frame Store TBC/Synchronizer, combine to create a truly significant advance in the state of the art.

A microcomputer provides 11 TV lines of hysteresis that eliminates motion discontinuities common in other systems whenever frames are deleted and added. It controls Freeze Frame or Field, periodically tests its own functions, and allows simple expansion for "optical effects".

Near perfect separation of luminance and chroma, for full bandwidth Freeze Frames and a picture that never shifts, are provided by the Picture Adaptive Digital Comb Filter.

Direct or heterodyne processing, a digital Vel Comp DOC, and internal Test Signal Generator are all available in the DPS-1.

Ask your local distributor for a demonstration, using any of your 3/4 or 1 Inch VTRs. Today!



digital  
video  
systems

Digital Video Systems, 519 McNicoll Avenue, Willowdale, Ontario, Canada M2H 2C9. Telephone (416) 499-4828

Circle (1) on Reply Card

Indiana University

MAR 20 1973

Library

# WHAT PRICE PERFORMANCE?

A lot less than you might think, when you consider the many advantages of the new Canon P12X18B\* studio lens. This lightweight, compact 12X offers a wide f/2.1 aperture, for high sensitivity throughout its 18-216mm zoom range. Superb image quality. And a short MOD, for maximum flexibility in close quarters.

Add built-in 1.5X and 2X range extenders. The same reliable servo modules and control systems used in other Canon lenses. Plus the availability of built-in pattern projector, designed for the new generation of computerized cameras. The result: an exceptionally versatile studio lens.

Now, factor in the price, and you'll probably want to try one on the business end of your camera. For more information, contact us directly, or specify the Canon P12X18B when ordering your new camera.

\*Specifications apply to 30mm format; 25mm format will be available.

## Canon®

Canon U.S.A. Inc. Head Office, 10 Nevada Drive, Lake Success, N.Y. 11040 (516) 488-6700 • 140 Industrial Drive, Elmhurst, Ill. 60126 (312) 833-3070 • 123 Paularino Avenue East, Costa Mesa, Ca. 92626 (714) 979-6000  
Canon Optics & Business Machines, Canada, Ltd., 3245 American Drive, Mississauga, Ontario L4V 1B8, Can.  
Canon Amsterdam N.V., Industrial Products Division De Boelelaan 8, Amsterdam, Netherlands

### See us at NAB Booth 493

Circle (4) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

# BROADCAST<sup>®</sup> engineering

*The journal of the broadcast-communications industry*

March, 1979 □ Volume 21 □ No. 3

|                  |                                |
|------------------|--------------------------------|
| 6 FCC update     | 38 NRBA                        |
|                  | 44 ASTVC                       |
| 10 Industry news |                                |
| Association news | 62 Meetings, events & seminars |
| 30 NAB           | 68 People in the news          |

## NAB CONVENTION EMPHASIS

- 95 NAB-Dallas'79: Texas hosts biggest & best show yet
- 97 NAB-Dallas'79: Exhibitor map & session agendas
- 106 NAB-Dallas'79: Product directory
- 122 NAB-Dallas'79: Exhibits roundup
- 176 NAB-Dallas'79: Innovative products

## ARTICLES

- 72 News feature: The 13th annual SMPTE television conference
- 82 Basics of color video, part 2  
By John Wentworth, manager, RCA Broadcast Technical Training
- 184G Automatic Transmission Systems (ATS): A survey  
By Donald L. Markley, BE facilities editor and consulting engineer
- 188 Microphone roundup, part 2
- 189 AM stereo's impact on the industry  
By Leonard R. Kahn, president, Kahn Communications
- 191 Case study: KTVY-TV, Oklahoma City
- 194 Broadcast quality may mean a new exciter  
By Brad Dick, director of engineering, KANU/KFKU, University of Kansas

## STATION-TO-STATION: Contributions by station personnel

- 202 Remote operation of turntables requiring contact closure  
By Ed Raabe, chief engineer, KWIZ, Santa Ana, CA
- 202 Using an analog multiplexer chip in an audio matrix  
By Donnie R. Dunbar, video engineer, John Deere Television
- 204 Automatic recording of EBS messages for rebroadcast  
By Paul Hurd, chief engineer, WHDH/WCOZ, Boston, MA

## DEPARTMENTS

|                          |     |
|--------------------------|-----|
| Feedback .....           | 198 |
| New literature .....     | 205 |
| New products .....       | 208 |
| Classified ads .....     | 212 |
| Advertiser's index ..... | 212 |

Copyright, 1979, by Intertec Publishing Corporation. All rights reserved. Material may not be reproduced or photocopied in any form without written permission of publisher.

# BROADCAST<sup>®</sup> engineering

March 1979/\$2.00



NAB Convention Special

## THE COVER

Continuing the theme of the NAB Convention to be held this month in Dallas, the cover is modeled after the NAB promotional brochure covering their 57th Annual Convention and International Exposition. The NAB artwork was copied and reproduced here with permission from the NAB. It was designed by Steve Quine, graphic designer for Sparkman & Bartholomew Associates of Washington, DC.

The earth photo inserted in the corner is reproduced with permission of and by courtesy of NASA.

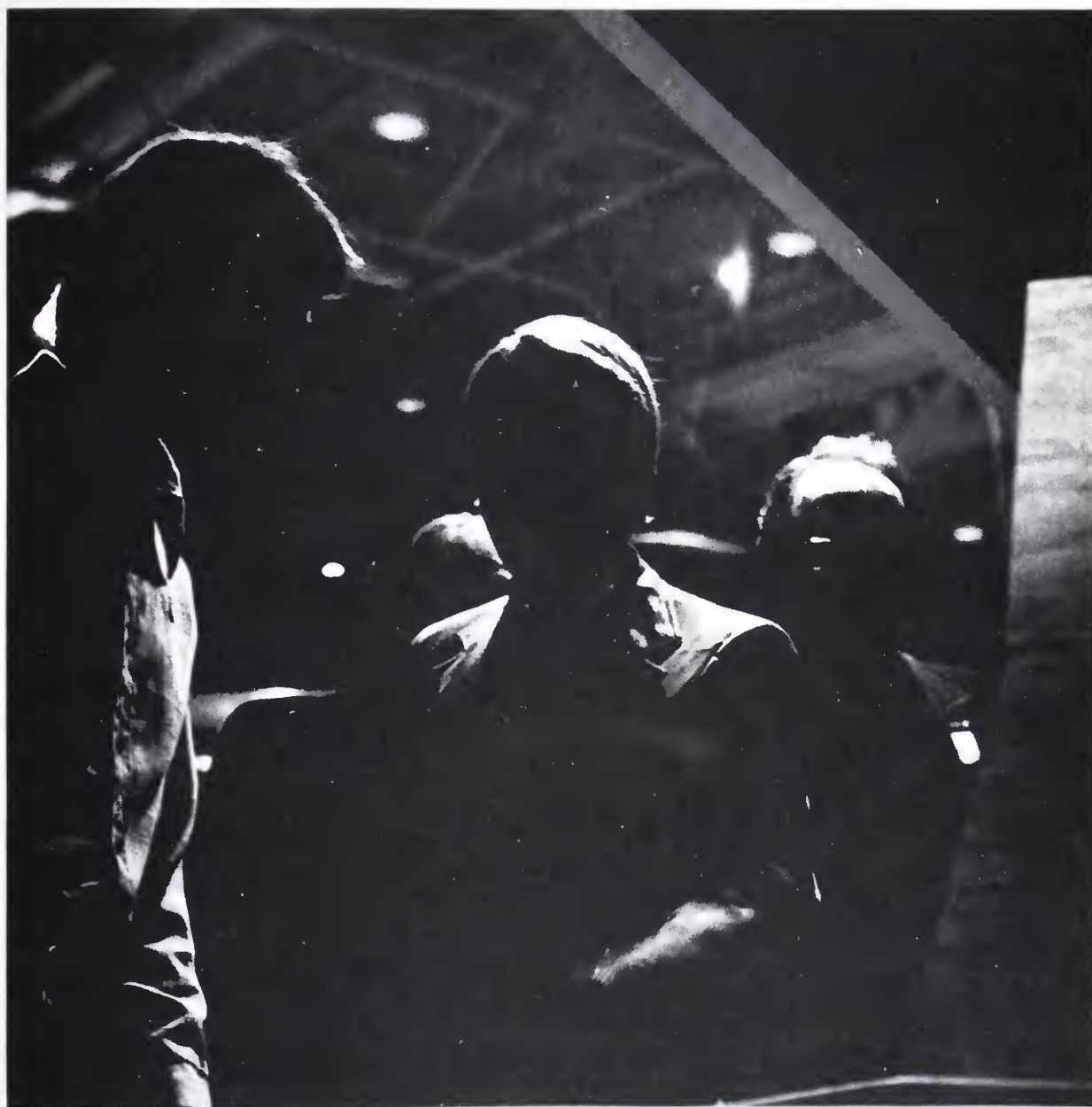
## NAB CONVENTION GUIDE

See page 95 for an introduction and overview of this year's big NAB Convention in Dallas. Our extensive pre-NAB coverage of this event is indexed on the left of this page.

## APRIL ISSUE

- Directional antenna review
- Vector analysis of directional arrays
- STL equipment roundup

*You are invited to a*  
**PREMIER**



*NAB '79 Booth 308*

**THE GRASS VALLEY GROUP, INC.**

A TEKTRONIX COMPANY



# THINKING VIDEO? THINK CAMERA MART.

Because at Camera Mart, we feature an entire line of video equipment including Ikegami, Hitachi, Panasonic, Sony, Micro-time and many others. The Ikegami ENG package shown here is just one of many we offer. It's got everything you need to cover the story, indoors or out.

**The camera:** Ikegami's HL-77, the completely self-contained, high sensitivity Plumbicon®\*\* color shoulder camera that's light weight and easy to handle. Its low-profile, with eye-level CRT monitor (on both take and playback, by the way), gives it the convenience and maneuverability you'll appreciate during those hectic, on-the-spot coverage sessions.

**The recorder:** Sony's easy-to-operate VO-3800

gives you up to 20 minutes of NTSC color on a single U-Matic® cassette which can be edited on the 2860.

This custom package and whatever you need in video, are all available for sale, rent or through convenient lease-purchase options which can be arranged to suit nearly any budget. And we're flexible, too. If there's a special package or custom purchase option you'd like to work out, let us know.

So when your thoughts turn to video, turn your attention to Camera Mart. Whether you're equipping a studio for the future, or producing a program for tomorrow, we've got what you need. The way you need it.

\*Plumbicon is a registered trademark of N.V. Philips.

## Camera Mart

40 years of excellence.

THE CAMERA MART, INC.

456 West 55th Street, New York 10019

(212) 757-6977/Telex 1-2078

Sales • Service • Rental

See us at NAB Booth 555



Circle (5) on Reply Card

## BROADCAST engineering

Editorial, advertising and circulation correspondence should be addressed to P.O. Box 12901, Overland Park, KS 66212 (a suburb of Kansas City, MO); (913) 888-4664.

### EDITORIAL

Bill Rhodes, *Editorial Director*  
John Willisowski, *Video Editor*  
Cindy Nelson, *Managing Editor*  
Beth Brugman, *Editorial Assistant*  
JoAnn Vella, *Editorial Assistant*  
Pat Fox, *Directory Editor*

### ART

Dudley Rose, *Art Director*  
Joy Viscek, *Graphic Designer*

### TECHNICAL CONSULTANTS

Howard T. Head, *FCC Rules*  
Harold L. Kassens, *FCC Rules*  
Carl Babcock, *Technical*  
Donald L. Markley, *Facilities*

### CORRESPONDING ASSOCIATIONS

American Society of Television  
Cameramen  
National Association of Broadcasters  
National Radio Broadcasters  
Association

### CIRCULATION

John C. Arnst, *Director*  
Evelyn Rogers, *Manager*

### ADMINISTRATION

George H. Seferovich, *President*  
George Laughead, *Publisher*

### ADVERTISING SALES

Jan Winters, *Production*

Regional advertising sales offices listed near the Advertiser's Index.



Member,  
American Business Press



Member,  
Business Publications  
Audit of Circulation

**BROADCAST ENGINEERING** (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212.

**BROADCAST ENGINEERING** is edited for corporate management, engineers/technicians and other station management personnel at commercial and educational radio and TV stations, teleproduction studios, recording studios, CATV and CCTV facilities, and government agencies. Qualified persons also include consulting engineers and dealer/distributors of broadcast equipment.

**SUBSCRIPTIONS: BROADCAST ENGINEERING** is mailed free to qualified persons in occupations described above. Non-qualified persons may subscribe at the following rates: U.S., one year, \$20; all other countries, one year, \$26. Back issue rates, \$3, except for the September Buyers' Guide issue, which is \$10. Rates include postage. Adjustments necessitated by subscription termination at single copy rate. Allow 8-8 weeks for new subscriptions or for change of address. Controlled circulation postage paid at Kansas City, MO.



INTERTEC PUBLISHING CORP.



*The new ADM® 1600 series  
broadcast production console*

## New! Audio for the '80's in a versatile package

Years-ahead design doesn't have to mean big in size. Audio Designs has created an entirely new generation of broadcast production consoles — engineered to anticipate the medium-market audio needs of the '80's.

The new ADM 1600 incorporates a wide range of features most requested by chief engineers around the country for medium-market broadcast and production facilities. It provides the same ease of operation and quality components found in our 3200 series and custom consoles. The ADM 1600 offers an array of capabilities for now and well into the next decade.

Our complete in-house design and manufacturing put so much quality into our audio consoles that we can confidently offer an exclusive 5-year warranty — the most comprehensive in the industry.

To learn more about how ADM can increase your audio capabilities, please contact Audio Designs and Manufacturing, Inc., 16005 Sturgeon, Roseville, Michigan 48066. Phone (313) 778-8400. TLX-23-1114. Southeastern Office: Phone (904) 694-4032.

**AMPEX** Distributed outside the U.S.A. by Ampex International Operations, Inc.

SEE US AT BOOTH 414

**ADM**  
*The Audio Company*

# **FCC update**



March, 1979/By Howard T. Head, A.D. Ring & Associates

Each year at NAB Convention time, we go into our annual trances and take both a backward and a forward look at the hot topics where either something good or bad may or may not happen. This year is no exception and so between gazes out of your window at beautiful downtown Dallas, welcome to our 1979

## POMPOUS PREDICTIONS.

### More AM and FM radio stations

Nowadays the big push at the FCC, as well as at many other federal agencies, is for diversity which in the case of radio and television stations means more opportunities for women and minorities. Of several approaches being pushed to increase the number of AM and FM radio stations is a reduction in spacings between carriers. The FCC will shortly ask for contract proposals to study the effect of frequency reductions from 10 kHz spacing to 9 kHz spacing in the AM band and from 200 kHz spacing to either 150 kHz spacing or 100 kHz spacing in the FM band. Reports of the results of both of these contracts will be delivered to the FCC and made public within the next year.

### And at VHF-TV, too

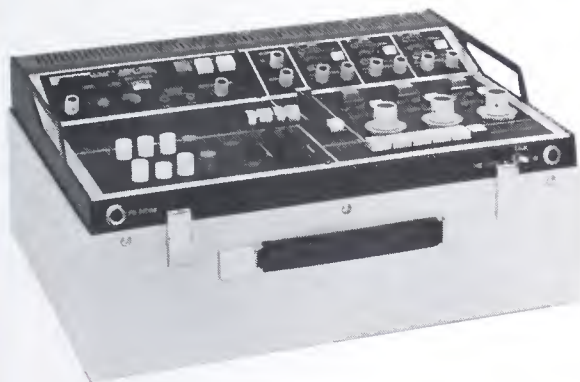
The now defunct White House Office of Telecommunications Policy (OTP) was responsible for a massive push to add additional VHF channel assignments, in this case by simply reducing co-channel and adjacent-channel mileage separation requirements since any tampering with the channel width would lead to complete chaos. An OTP official first said in a news conference that 100 short-spaced VHF drop-ins were technically feasible. A later report cut this number down to 88 (and subsequent corrections to many less) and finally the commission proposed making five short-spaced VHF-TV drop-ins. The commission's Broadcast Bureau recommended against all of these in December, but the proposal was sent back to the bureau for further study. Look for a further push by the commission to once again study a much larger number, perhaps near the original 100. If this is done during the next year it won't go past the proposal stage at this time, but with today's political climate, final action is really uncertain.

there must be 1,001 reasons to

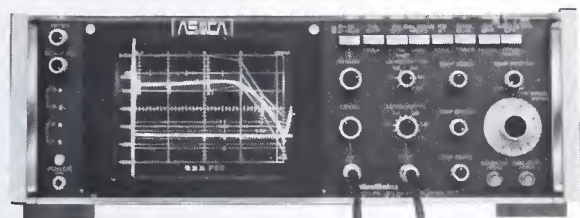
# VISIT ASACA BOOTH 2503. HERE ARE 11 REASONS WHY.



**ACC-2000 Portable Color Camera**—TV camera hand-held on remote or tri-pod held in studio. Center of gravity conforms to human head, shoulder, arm and hand. Fights fatigue.



**ASW-100 Portable Switcher**—See No. 1 at right.



**201-1 Envelope Delay Measuring Instrument**—Used by network stations in U.S.A. and Canada. Priced several thousand dollars below competition.



**925-C Video Noise Meter**—Measures radio noise voltage generated in TV transmission equipment, TV cameras, VTRs, video disc units, digital image processors and the like.

At the NAB Show, see products by Asaca so new the competition is still on the drawing board. See innovations that have captured the fancy of networks and manufacturers.

1. **ASW-100 Portable Switcher**—New! Designed for ENG and EFP cameras. Small. Light. Hand carry. Great for field production. 3 VBS switching, VBS mixing. Automatic phase control. Optional, built-in special effect control. Works off 12-volt car battery.
2. **1130 Camera Registration Meter**—New! Camera comparison made ultra-easy by digital read-outs. Discrepancies are nil. Readings in TV line percent or chroma level via micro-computer.
3. **875-B Jitter Meter**—New! Measures VTR jitter. Read tape speed as well as jitter. Permits long periods of VTR use because pen method of recording gives visible track.
4. **TG-7 Test Signal Generator**—New! Modular construction. Add-on modules for other functions as needed. Choice of 4 test signal generator modules. Gen-lock function.
5. **1100 Programmable Distortion Meter**—New! Can be computer-controlled. Easy-to-read automatic measuring via computer programming.
6. **ACC-2000 Portable Color Camera**—C-mount. Excellent sensitivity. Shoulder-holster for field use; tri-pod for studio. Favored by stations' news departments.
7. **201 Envelope Delay Measuring Set**—Compact. 1-piece. Measures group delay. Built-in sync and blanking circuit. Preferred by major networks. Point-by-point sweep measurement delay.
8. **925 Color Noise Meter**—Measures both luminance and chrominance noise plus AM and PM components of chroma noise. Used by networks and manufacturers' laboratories.
9. **205 Video Sweep Generator**—Adjusts and maintains frequency of U-matic VTR and 2-inch VTR. Built-in sync, color burst switch. Easy-read digital meter. Function generator enhances accuracy.
10. **588 Digital Pattern Generator**—No distortion. All-point quality control of TV receivers. Indispensible to manufacturers. Great for maintenance at TV stations.
11. **CMM-10 & CMM-20 Color Monitors**—Compact, broadcast quality monitors. Operate on DC also, making them ideal for on-location shooting as well as in studio. Popular with production houses.

For a free demonstration of any of our products, without obligation, write or phone our office nearest you.

## ASACA®

ASACA CORPORATION  
OF AMERICA  
1289 RAND ROAD,  
DES PLAINES, ILL. 60016  
(312) 298-4380

155-B SAN LAZARO AVE.,  
SUNNYVALE, CA. 94086  
(408) 735-7350

In the Far East, contact  
ShibaSoku, Ltd.  
19-13 CHOME, FUKUZAWA,  
SETAGAYA-KU,  
TOKYO, JAPAN  
PHONE: 703-5151

### 1979 World Administrative Radio Conference (WARC '79)

WARC 1979 will start on schedule in Geneva in September and the US will find itself locked in combat with delegates from 153 other nations. The US never comes out first in these conferences and this one will be no exception. Frequency allocations will be given up and the US will find itself unable to resist demands from other delegates for sharing. One probable outcome is the expansion of the AM broadcast band in Region 2 (the Americas) upward to 1700 kHz or 1800 kHz.

### Automatic transmission systems

Instead of writing something new on this subject, we could simply repeat our confident predictions from either of the past two years, that commission action on ATS for all broadcast transmitters is just around the corner. They said the same thing about prosperity in 1932, and so we are not going to back off an inch. ATS this year, as in past years, is just around the corner.

### Teletext services

In regular Teletext services, alphanumeric and graphic material is broadcast to special decoders, using digital transmission in the television vertical interval. In Europe, CEEFAX and ORACLE in Britain and ANTIOPE in France are readily available to viewers. A sudden push has developed in the US, sparked to a very considerable extent by pioneer work at KSL-TV, Salt Lake City. CBS and NBC have announced plans to commence experiments and demonstrations shortly. EIA has formed a high level committee to push forward with planning and testing. No standardizations at the government level will take place during the coming year but a lot of progress will be made. These services will become considerably closer to reality.

### UHF television improvements

There has been a big push to improve UHF television reception at both the transmitting and receiving ends of the system sparked largely by the Council for UHF Broadcasting (CUB), a loose coalition of several Broadcasting organizations having a stake in UHF success. CUB was responsible for the FCC ruling effective last August requiring affixed receiving antennas to include all-channel capability and a reduction in the receiver UHF noise figure from 18 dB to 14 dB effective this October. (The figure goes down to 12 dB three years later.) CUB has kept plugging away at the FCC and as a result of this and congressional pressure, the commission now has five separate proceedings pending--all aimed in one way or another at UHF improvements. Work in all of these areas is already under way and although there are unlikely to be any reports or orders from the commission in the year to come, considerable progress will be made.

### AM stereo/FM quad

Systems for both AM stereo and FM quadrasonic sound have been tested and retested, all of the information necessary to reach a decision on standardization essentially has been accumulated and the commission will shortly be in a position to act. Our best judgment is that action in both areas will occur sometime this year and that rules will be adopted in time for some stations to be on the air with AM stereo and FM quad by the end of the year.□

# THE SWITCHER



## DRC 4000 SERIES

Now Ampex provides a new dimension of video control with increasingly popular Duca-Richardson production switchers. The most advanced, most capable, most flexible big boards in the world of video creativity.

Think of an effect, and get it. A simple, calculator-type keyboard gives you access to 100 patterns. Key ahead of mix/effects from two buses simultaneously. Create each composite from as many as five sources, using just a single mix/effects.

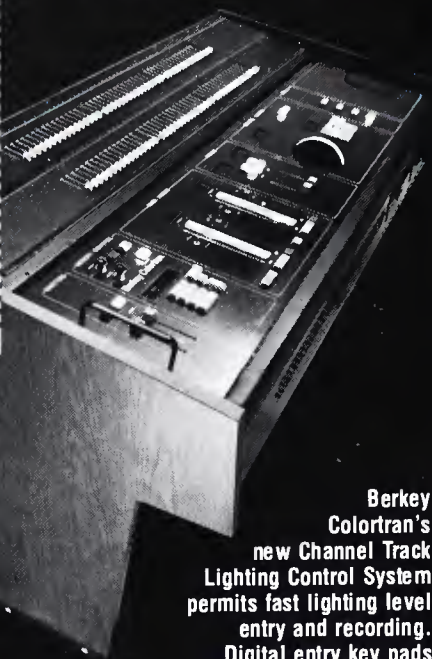
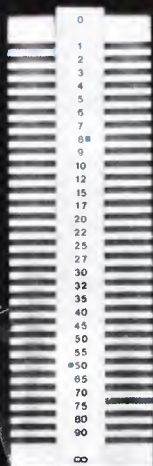
Ten different standard systems let you go for Duca-Richardson quality in a number of size/capability combinations. A perfect complement to Ampex color cameras and VTRs. Now the Ampex brand is on the big boards, too.

# AMPEX MAKES IT EXCITING.

Ampex Corporation, 401 Broadway, Redwood City, California 94063, 415/367-2011  
Circle (7) on Reply Card

## Berkey Colortran's Channel Track The Studio Lighting Control System That Saves Time And Money.

Cut your production costs  
with Channel Track  
See us at NAB Booth #370



Berkey  
Colortran's  
new Channel Track  
Lighting Control System  
permits fast lighting level  
entry and recording.  
Digital entry key pads  
provide instantaneous  
control of all functions.  
Up to 1000 cues for each channel  
may be stored and activated  
in any sequence.  
Unlimited submaster capability  
permits random assignment  
of channel groups  
for fast level control.

**Berkey  
Colortran**

Headquarters  
1015 CHESTNUT STREET  
BURBANK, CALIFORNIA 91502

International  
PO BOX 5, BURRELL WAY  
THETFORD, NORFOLK  
ENGLAND IP24 3RB

Berkey  
Photo Inc.

MAIL THIS COUPON TO: BERKEY COLORTRAN • 1015 CHESTNUT STREET • BURBANK, CA 91502  
Send me a Channel Track Brochure ☐ Have a salesman call ☐

Name \_\_\_\_\_  
Position \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_  
Zip \_\_\_\_\_

BE379

## industry news

### NTIA petitions to reduce AM spacing

The National Telecommunications and Information Administration (NTIA) filed a Petition for Rulemaking with the FCC on January 10 for reduction of the required spacing between AM radio channels from the present 10 kHz to 9 kHz. NTIA pointed out that the reduced spacing would allow for 12 to 14 more channels in the current AM band with a hopeful addition of several hundred more AM stations. NTIA also suggested that the reduction could be accompanied by a deregulation of AM radio, at least with respect to the public trustee concept.

Henry Geller, assistant secretary of commerce for communications and information, agrees with NTIA. In a recent address before the International Radio and Television Society, Geller said he feels it is time to deregulate broadcast radio and to make the regulation of broadcast television more objective. Geller did emphasize that his conception of radio deregulation would leave intact some regulatory provisions including multiple ownership rules, EEO requirements and bans on rigged quizzes and on obscene and indecent programming.

### Broadcast stations on increase

The FCC recently released figures for the total number of broadcast stations on the air as of December, 1978. AM radio stations increased from 4529 last July to 4547 (less than 1%) while the number of FM radio stations increased 1% since last July from 3049 to 3092. FM educational radio stations showed a 5% increase for the 6-month period, increasing its total from 933 to 982. Commercial UHF television increased its total to 212 compared to 207 last July, while commercial VHF television, educational UHF and VHF all remained the same with 516, 101 and 102 stations respectively.

### RCA engineer speaks at seminar

R. Neuhauser, broadcast camera tube engineer at RCA Electro Optics, was the featured speaker at Saticon Seminar II. The seminar, jointly conducted by RCA and State Labs, was held January 22 at 5:30 PM at NBC studio 8G in Rockefeller Center. Neuhauser discussed the various features of the Saticon camera tube such as higher resolution and high sensitivity. Guests included engineers of television stations and production studios from New York, New Jersey, Connecticut and Pennsylvania.

### FCC submits UHF/VHF report

The FCC has submitted a report to Congress on its proposals for reaching comparability between UHF and VHF TV. The action came in response to a congressional directive which directed the FCC to

# Harris Advanced Technology Creates The TC-80A....

...Delivering A  
Picture Better  
Than Network  
Quality Or Any  
Competitive  
Camera On The  
Market Today.

Due to Harris' continuing  
programs in camera  
technology, these advanced  
features maintain the TC-  
80A at the forefront of  
performance technology...

providing the finest resolution available, allowing production of superb pictures  
even in poor studio or remote lighting environments.

Harris technology now brings to the TV camera market the new Diode Gun  
Plumbicon®\* Pick-Up Tubes and Highlight Handling.

Harris is a leader in camera technology bringing to the industry the first  
American-built TV camera with Triax, and now the new Diode Gun Plumbicon®\*  
Pick-Up Tubes and Highlight Handling.

For more information: Contact Harris Corporation, Broadcast Products  
Division, Quincy, Ill. 62301.

Trademark of N.V. Philips of Holland

"See at '79 NAB  
Convention-Harris Booth #303"



**HARRIS**  
COMMUNICATION AND  
INFORMATION PROCESSING

Circle (8) on Reply Card

"devise a plan for UHF to reach comparability with VHF in as short a time as possible," and approved a \$750,000 appropriation for the improvement of UHF TV reception.

A UHF Comparability task force will initiate inquiries to consider:

- The many possibilities for improved UHF television service;
- The most economical way to improve television reception and increase the use of the radio spectrum; and
- The need for incorporating television receiver standards into FCC rules.

Improvements under consideration have the potential for providing better reception of existing UHF television signals and may permit reduction of UHF "taboos" (areas where UHF television assignments are restricted because of interference problems).

### ABC builds news bureau

ABC has begun construction on a new 10-story Washington DC news

bureau located at 1711 De Sales Street, with completion scheduled for the fall of 1980. George Watson, vice president and bureau chief, will be in charge of all facets of the bureau's operations including radio and TV production facilities for World News Tonight, Good Morning America, Issues and Answers and associated support facilities.

Besides the daily news origination, the bureau also routes ABC-TV network programming from New York to the southeast region of the country.

### Sun powers railroad microwave VHF system

The sun will power the microwave communication system for Australian National Railways' new Tarcoola-Alice Springs line. Solar Power Corporation has won the half-million dollar contract to provide solar cell modules for the integrated microwave-VHF radio system.

Australian National Railways'

(ANR) general manager, V.H. Dyason, said the solar cell modules would recharge batteries providing power for the line communications equipment. Each microwave repeater station will have its own solar power unit with an output of 1280 W. The total solar generating capacity will be more than 30 kW.

"We believe solar power will eliminate costly diesel fueling and maintenance procedures on the new lines," Dyason said.

Initially, the system will use only 25 of the available 75 channels. It will span 850 km and will include 24 solar-powered repeater stations at intervals of about 35 km. Terminal stations will be located at Tarcoola and Alice Springs, linking the system to the existing ANR open-wire communications network at Tarcoola, Port Augusta and Alice Springs. The control center will be located at Port Augusta.

Each site installation will comprise a weather-resistant building housing communications equipment, a 70 m tower for the microwave link (seven are completed), antennas for

*From Cinema Products*

## NEC's TTR-7 Ultra-Lightweight 1" VTR



***Weights less than 33 lbs!  
(Including tape and battery)***

Designed exclusively for portable *over-the-shoulder* operation and rugged reliability with utmost stability, the broadcast-quality 1" TTR-7 is ideally suited for the wear and tear of remote use.

For maximum operational and handling ease, the TTR-7 1" helical "D" format VTR utilizes NEC's advanced self-threading cartridge design, which eliminates the majority of field tape-handling problems.

### Outstanding Features:

- Internal battery will drive a minimum of two 22-minute self-threading tape cartridges on a single charge (continuous run).
- Despite its lightweight design, the TTR-7 has a built-in video confidence head, edit system, full status indicating system, and will play back in color (with the use of an optional AC/color adapter).
- Virtually foolproof servo-control system.
- Modular construction permits easy in-the-field replacement of video head cartridges.
- Can be ordered with optional second audio channel!

Also available is NEC's matching-system 1" cartridge VTR, the TTR-5. Weighing 55 lbs., the TTR-5 was designed for mobile van or fixed-location remotes, and light studio use, if desired.

For further information, please contact:

**Cinema E products**  
CORPORATION

*Technology in the Service of Creativity*

2037 Granville Avenue, Los Angeles, California 90025  
Telephone: (213) 478-0711 • (213) 477-1971 • Telex: 69-1339

For video service (7 day/24 hr.), call: 800-421-7486.

Manufactured by **NEC** exclusively for Cinema Products...

# MNC-71CP

## The multi-purpose portable video camera.

news, documentaries, sports, commercials, TV specials...no matter what you're shooting, the portable MNC-71CP is the ideal camera for all your video production needs. And the best value for your money.

Because, in design and performance, the MNC-71CP is the most advanced camera of its class. With built-in linear matrix, 2-line image sharpener, comb filter and coring, I/Q encoder and color bar generator, automatic iris, white balance, black balance, flare compensation. Delivering *studio-quality* picture resolution and outstanding colorimetry, with ENG/EFP reliability and versatility.

### ENG/EFP Design Excellence

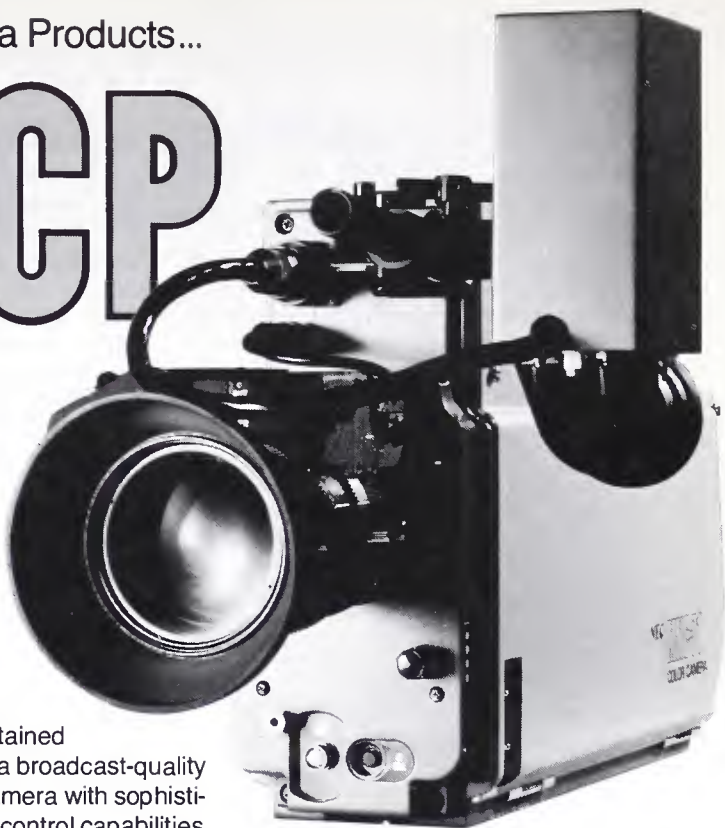
Manufactured by Japan's largest manufacturer of broadcast equipment — Nippon Electric Co., Ltd. (NEC) — the MNC-71CP incorporates design inputs from Cinema Products, and features many improvements over all first-generation

backpackless cameras.

It is a totally new video camera system, specifically designed from its inception to be used both as a compact, lightweight, fully self-contained ENG camera, as well as a broadcast-quality studio/field production camera with sophisticated remote production control capabilities.

### Studio-Type Applications

There's no need to repackage the camera in a bulky outer shell for studio operation. Just add the optional 5" viewfinder and the portable production CCU (with cable compensation up to 155 feet), or the rack-mounted teleproduction CCU (with cable compensation for more than 1000 feet)... and your MNC-71CP readily converts into an MNC-710CP studio/field configuration. Ideal for multi-camera shoots on location and in the studio.



### Around-The-Clock Service

The MNC-71CP was designed for utmost stability and reliability in performance as well as ease of maintenance.

What's more, it is backed by Cinema Products' outstanding after-sales service. With an unprecedented full one-year warranty, and replacement parts available anywhere in the United States within 24 hours! Plus an extensive network of MNC-71CP dealers with "stand-by" loaner/rental cameras...just in case.

And for around-the-clock seven-day video service, you can call Cinema Products' toll-free number: 800-421-7486.

### Less Than \$1000 Per Month!

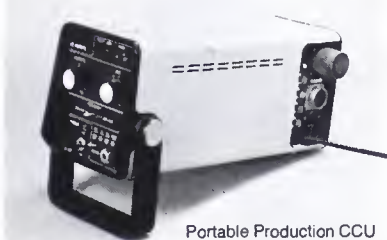
The MNC-71CP is probably the most reasonably priced broadcast-quality camera system available. And Cinema Products' easy-term lease/purchase program makes it easier than ever to "pay as you go" on your equipment purchases. For example, you can acquire a complete MNC-71CP outfit, ready-to-shoot, for less than \$1000 per month!

So be sure to call on us as you analyze your present and future equipment needs, and we will design a complete package deal specifically tailored to meet your production needs as well as your financial requirements.

### MNC-710CP Studio/Field Production System



Rack-mounted Teleproduction CCU



Portable Production CCU



("Paint Box")  
Remote Control Panel

For full details, call 800-421-7486.

**cinema E products**  
CORPORATION

*Technology In The Service Of Creativity*

2037 Granville Avenue, Los Angeles, California 90025  
Telephone: (213) 478-0711 • (213) 477-1971 • Telex: 69-1339

## Industry news

VHF 2-way radio system, and the solar power unit. Each solar array is being assembled at its site.

The system will provide VHF radio communication with a moving train at any point on the line. Train crews and track maintenance gangs will have continuous radio communication with train control and with each other.

Dyason said the microwave communication system was new to Australian National Railways. The integrated microwave VHF radio system would replace the previous railway practice of providing open-wire telephone lines for use on railways.

Total cost of the communication system for the new railway (slated for completion in early April) will be approximately \$5 million.

### FCC cracking down on blanking problem

Changes related to television transmitter characteristics to comply with horizontal and vertical

blanking standards could enhance or obviate improvement in TV sets. The commission will issue Advisory Notices up until July 1 when horizontal blanking is detected in excess of 11.44  $\mu$ s, up to 12  $\mu$ s, and when vertical blanking of 22 or 23 lines is detected. A Notice of Violation will be issued to stations with horizontal blanking in excess of 12  $\mu$ s, and vertical blanking of more than 23 lines.

Copies of the report to Congress are available for examination in the FCC Office of Information, Room 202, 1919 M St., NW, Washington, DC.

### Chief engineer is now chief scientist

The Office of Chief Engineer has been redesignated the Office of Science and Technology by the FCC. The title of chief engineer has been changed to chief scientist, effective May 1. The commission says it recognizes that present and future developments in communications require intensive study of applied and

basic science and technology and the new office will help promote supportive efforts in the fields of physical science, engineering and electronics.

The office will be responsible for planning and conducting the FCC's technical, engineering and scientific studies and programs aimed at improving telecommunications.

### Kansas rules on licensing payments

A ruling by the Kansas Department of Revenue states that payments made under licensing agreements give the licensee both the right to broadcast copyrighted material and the right to temporarily use the tangible personal property (the film, tape, record or transcription). A compensating tax is imposed upon the separate charge or value of the tangible personal property where the licensor has separated that portion of the licensing agreement from those charges which are for services rendered or the value



**FIDELIPAC**  
specializes in  
broadcast  
cartridges.

***Somebody else is still  
hoping for a hit single.***

You'll never hear a hit on the Fidelipac label. But you will hear all the hits on Fidelipac cartridges. We think music is important enough to spend all our time and talent perfecting ways to record and reproduce it. Which is why Broadcasters have used our standard length and extended play cartridges for everything from background music to the Hot 100 since 1954.

Look at it this way. We'd rather be on top of the **cars**.  
Than on top of the **charts**.

SEE US IN DALLAS, NAB BOOTH NO. 351



**FIDELIPAC®**

109 Gaither Drive • Mt. Laurel, NJ 08057 U.S.A. (609) 235-3511

© Trademark

Circle (9) on Reply Card

# "NEW" HIGH PERFORMANCE COAX TRANSMISSION LINE

## WANTED

**Supposed Outlaw** who has been supplying the Broadcasters with silver bullets in their transmission line.

**Alleged Crime - Robbery!** By selling silver plated **brass** bullets, this hombre has been creating hot spots & heat traps robbing you of longevity performance and reliability. We're not sure he wears a black mask or rides a white horse, but he has been causing millions of dollars in replacement costs and thousands of hours in down-time.

When medium or high power RF energy is transmitted through a coax line, the by-product is heat, and silver plated **brass** connectors conduct this heat poorly. As a result, these silver bullets are usually the point of failure.

| Mfg.      | Basic Connector Material | Thermal Conductivity                        |
|-----------|--------------------------|---------------------------------------------|
| All Other | Brass                    | 67 BTU / sq. ft. / ft. / hr. / °F. @ 68 F.  |
| SWR INC.  | TE Copper                | 212 BTU / sq. ft. / ft. / hr. / °F. @ 68 F. |

**Solution:** SWR's new **Cool "K" Line** transmission line has built-in to our present **TE copper** connector a **new thermo-coupler** device that out-performs every silver plated connector in the industry. The new **C-"K"** connector has a heat flow rate as high as **2 to 1** in some line sizes compared to the most popular silver plated wrist band connector.

**Reward-Money** in your pocket through longevity because of performance and reliability giving you peace of mind.

**TO COLLECT REWARD . . .** Visit booth 2702 and see this revolutionary thermo-connector (Pat. Pending) or circle reply card below. Don't feel bad; we thought the Masked Man was a good guy too.

Join the  
posse and  
get on the  
trail to  
reliability!



Circle (10) on Reply Card

## SWR INC.

*Systems with Reliability*

P. O. Box 215 — GOFFSTOWN, N. H.  
(603) 497-3000

# FOR BROADCAST AUDIO MEASUREMENTS, if you compare features . . .

|                                                      | Hewlett<br>Packard<br>339A | Sound<br>Technology<br>1710A | Potomac<br>Instruments<br>AT-51 |
|------------------------------------------------------|----------------------------|------------------------------|---------------------------------|
| AUDIO GENERATOR                                      | Combined<br>With Analyzer  | Combined<br>With Analyzer    | Separate<br>Unit                |
| Intermodulation test signal                          | No                         | Option                       | Yes                             |
| Wow & Flutter test signal                            | No                         | No                           | Yes                             |
| Simultaneous L&R Outputs                             | No                         | No                           | Yes                             |
| 600 ohms and 150 ohms Source                         | No                         | Yes                          | Yes                             |
| Stereo Matrix Switch (L,R, L+R, L-R)                 | No                         | No                           | Yes                             |
| Switch to remove signal and terminate line for S+N/N | No                         | Yes                          | Yes                             |
| 10 dB, 1.0 dB, 0.1 dB Step Attenuators               | No                         | Yes                          | Yes                             |

| AUDIO ANALYZER                  | Combined with<br>Generator | Combined with<br>Generator | Separate<br>Unit |
|---------------------------------|----------------------------|----------------------------|------------------|
| Harmonic Distortion Mode        | Yes                        | Yes                        | Yes              |
| Automatic Nulling               | Yes                        | Yes                        | Yes              |
| Automatic Set Level             | Yes*                       | Option*                    | Yes              |
| Intermodulation Distortion Mode | No                         | Option                     | Yes              |
| AC Voltmeter Mode               | Yes                        | Yes                        | Yes              |
| Stereo Phase Meter Mode         | No                         | No                         | Yes              |
| L/R Amplitude Ratio Mode        | No                         | No                         | Yes              |
| Wow & Flutter Meter Mode        | No                         | No                         | Yes              |

|       |            |                         |                         |
|-------|------------|-------------------------|-------------------------|
| PRICE | \$1,900.00 | \$3,695.00 <sup>1</sup> | \$2,295.00 <sup>2</sup> |
|-------|------------|-------------------------|-------------------------|

\* Limited to 10 dB capture range.

<sup>1</sup> Price includes options listed.

<sup>2</sup> Total price for Generator and Analyzer including protective covers and 4 test cables.



AT-51  
AUDIO TEST  
SYSTEM

**. . . there is only  
one logical choice!**

**POTOMAC INSTRUMENTS**

932 PHILADELPHIA AVE.  
SILVER SPRING, MD 20910  
(301) 589-2662

Circle (11) on Reply Card

## Industry news

of the intangible copyright. If the licensor has not done this, then the tangible personal property portion must be determined on a case by case basis.

## Public complaining less

The FCC reported that public complaints received in November numbered 9670, representing a decrease of 3242 from October. Other comments and inquiries for the month totaled 1906, a decrease of 168 from the previous month. The commission sent 1369 letters of response.

## Exams not required for some radio operations

A deregulatory move which became effective February 9 no longer requires individuals who want to perform technical operations at AM and FM broadcast stations to take FCC examinations.

The move is an amendment to Part 13 and states that anyone holding any class of commercial radio operator license, including the Restricted Radiotelephone Operator Permit, would be allowed to perform routine technical operations at a FM and virtually all AM stations.

## Replies to comments due on AM stereo proposal

Standards for AM stereophonic broadcasting have been proposed by the FCC following a June 22, 1978 notice of inquiry on the subject to determine the interest in and the need for such a service. The commission noted that comments included technical descriptions of five different systems which warranted further consideration, and proposed alternative rules governing each of the systems.

Responses expressed the view that FM stereophonic radio service was inadequate in automobiles and at fairly long distances from broadcast stations and that many small communities had only AM stations and thus were lacking local stereophonic radio service.

Replies to comments on the proposal are due March 30 which will consider, among other things, the

1964 WIRELESS MICROPHONE  
 1968 HANDHELD WIRELESS MIC  
 1969 TRANSISTORIZED SYSTEM  
 1971 CRYSTAL CONTROLLED RECEIVER  
 1972 PORTABLE RECEIVER  
 1974 HELICAL FRONT END RECEIVER  
 1976 DIVERSITY SYSTEM  
 1978 PORTABLE DIVERSITY RECEIVER

1979

# DYNEX

In 1964 Vega developed the first wireless microphone system that offered full-fidelity sound, the first real innovation in microphones in over 50 years. Now we are proud to introduce our latest innovation ... Dynex!

Dynex adds dynamic input range expansion to wireless microphone operation thereby eliminating the need for continuous mic gain adjustments. Set it and forget it ... it's that simple. Two years of extensive field use with the Dynex option enables us to guarantee the same proven reliability, quality and performance that you have come to



Model 77 Transmitter

expect from Vega.

We have continually improved our systems during the past 15 years, so you can be assured that

today's Vega systems are designed with the latest in high-technology electronics and sophisticated audio engineering. Besides offering you the finest systems available, Vega is constantly working with the industry to further the art of audio processing. One example is Vega's F.C.C. petition which resulted in obtaining clear wireless channels for broadcasters and filmmakers last year.

Vega offers a variety of systems that give you a new order of freedom and that foster new confidence in your performance. When new techniques are developed ... they're from Vega.



**Cetec Vega**

Division of Cetec Corporation

P.O. Box 5348 • El Monte, CA 91731 • (213) 442-0782 • TWX: 910-587-3539

Circle (12) on Reply Card

# Get two for the price of one. Or one,



Compare JVC's \$23,000 CY-8800U portable ENG camera to the most widely used competitive camera. There's a lot more of one thing: cost. About double, in fact.

But there, for all intents and purposes, the differences end.

Because, in any ENG/EFM assignment where you find normal lighting conditions, you'd be hard pressed to see any difference in results.

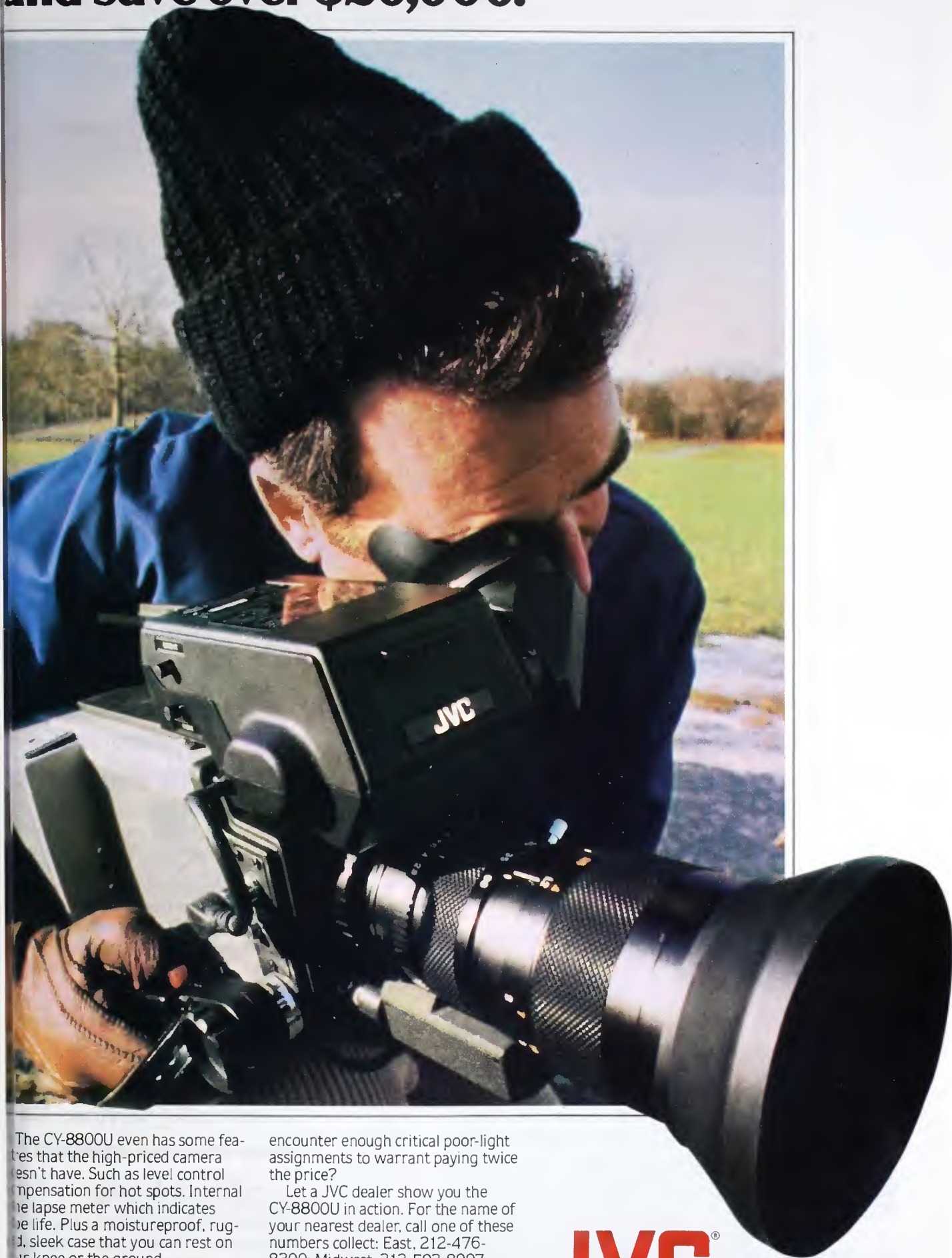
## Maximum performance per dollar

"Putting it simply, the results were excellent," says well-known Producer-Director/Cameraman Lon McQuillin in his review of the CY-8800U. "Color quality is marvelous...There are few ENG cameras at any price that can top the JVC's performance, and then only when pushed into very poor lighting conditions..."

It may well set the standard for the rest of the cameras in the category."

Behind that performance are high sensitivity and S/N ratio (50 dB), 500-line resolution. Sensitivity doubling (6 or 12dB). Auto white balance. And horizontal and vertical contour correction.

and save over \$20,000.



The CY-8800U even has some features that the high-priced camera doesn't have. Such as level control, compensation for hot spots. Internal time lapse meter which indicates time of life. Plus a moistureproof, rugged, sleek case that you can rest on your knee or the ground.

**What do you really need?**

Think about it. If you can get excellent results from JVC, do you really

encounter enough critical poor-light assignments to warrant paying twice the price?

Let a JVC dealer show you the CY-8800U in action. For the name of your nearest dealer, call one of these numbers collect: East, 212-476-8300; Midwest, 312-593-8997; South, 713-741-3741; West, 213-537-6020. US JVC Corp., 58-75 Queens Midtown Expressway, Maspeth, NY 11378.

**JVC**<sup>®</sup>  
PROFESSIONAL VIDEO DIVISION  
US JVC Corp.

Circle (13) on Reply Card

March 1979 *Broadcast Engineering* 19

effect of an AM stereo signal on adjacent channel protection ratios, skywave service, out-of-band emissions, directional antenna operation and the compatibility of AM stereo signals with existing monophonic receivers.

In regard to FM quadrasonic, further notice of inquiry on establishing standards for FM quadra-

phonic sound transmissions comments are due April 16 and replies May 16. Based on comments received thus far, the commission stated that quadrasonic systems could be accommodated within the present frequency assignment plan without objectionable degradation to monophonic and stereophonic radio service.

# The **it** Eraser-Splice Locator

The only machine to combine precise splice locating and cartridge erasing in a single, automatic operation. Just insert the cartridge, and press "START." The tape is bulk erased while cartridge is running. Then, the splice is located. 2 year warranty. Only \$540

CALL TOLL-FREE  
800-447-0414

Ask about our no-risk, 30-day trial order. Call collect from Illinois, Alaska, Hawaii: (309) 828-1381.

INTERNATIONAL TAPETRONICS CORPORATION  
2425 South Main Street, Bloomington, Illinois 61701

Marketed exclusively in Canada by McCurdy Radio Industries, Ltd., Toronto



Circle (14) on Reply Card

## NTIA publishes reports on satellite systems

The National Telecommunications and Information Administration (NTIA) has published two reports dealing with satellite communications. In *Current Activities in Small Earth Terminal Satellite Domestic Telecommunications*, Paul Wells, a NTIA engineer, discusses present and planned domestic satellite systems. A description of domestic satellite technical characteristics and channel capacity as well as multiple access in satellite communications is also considered.

The second publication, *Fixed-Satellite and Broadcasting-Satellite Service Considerations for 1979 GARC Planning*, discusses technical and economic aspects related to the fixed-satellite and broadcasting-satellite services. The issues associated with the spectrum-use and orbit-use planning for services in the 2500 and 2960 MHz band and in the bands between 11.7 and 14.5 GHz are examined.

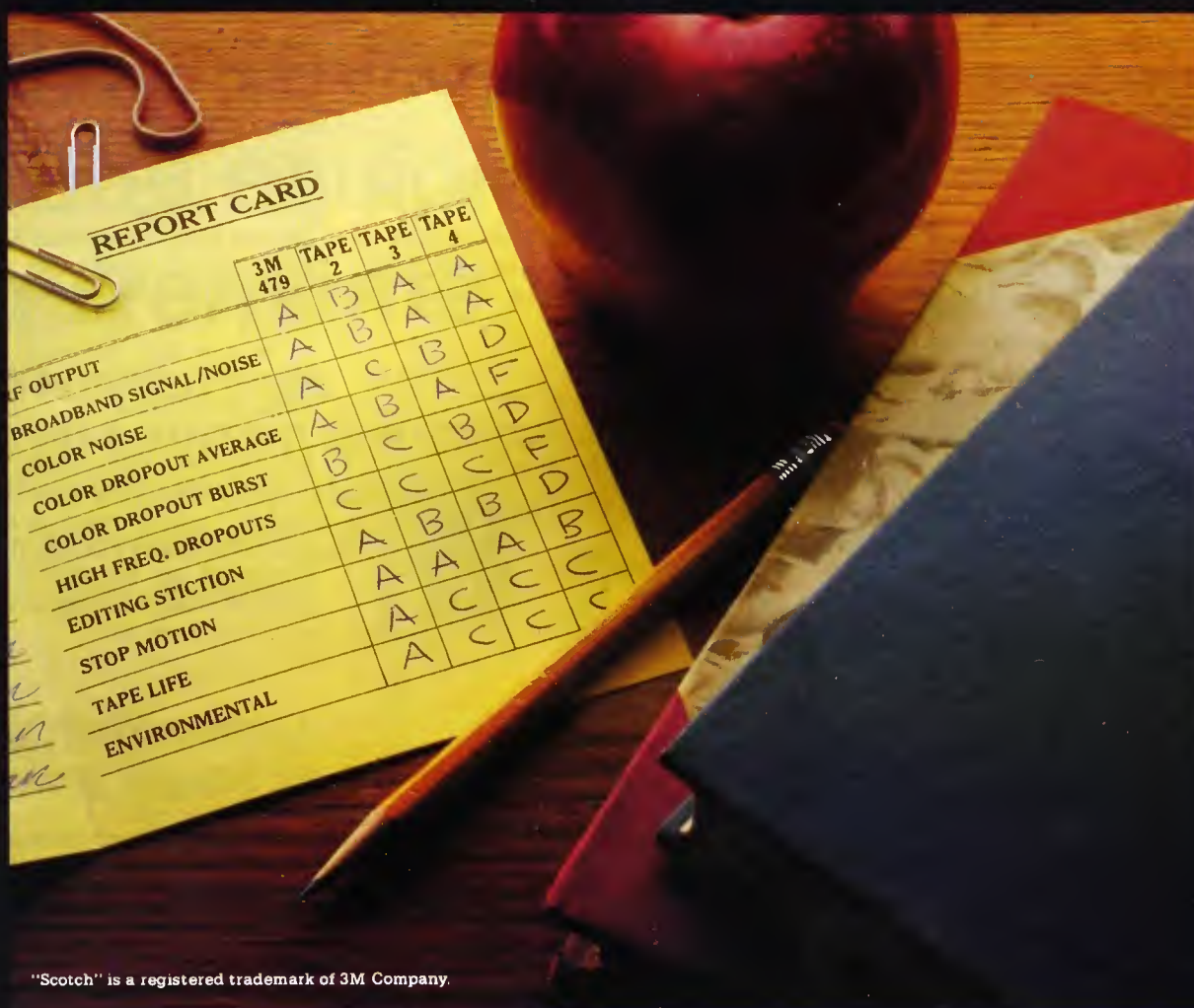
The reports are available from the National Technical Information Service, Dept. BE, 5285 Port Royal Road, Springfield, VA 22161.

## Intelsat incorporates management & operation

In a move effective January 1 of this year, Intelsat took over all of its own management and operational activities. It is the first time that it has incorporated all of its own executive functions, both administrative and technical. Comsat, which was handling the management function, will continue to perform some technical services for Intelsat under two technical services contracts and a laboratory service contract.

## Community service: New programming category?

The FCC has begun an inquiry to consider broadening the program definitions for commercial broadcast stations to include a new community service category. The category, noncommercial programs, would include programs produced by or in conjunction with nonprofit organizations.



"Scotch" is a registered trademark of 3M Company.

## IN A TEST OF ONE-INCH VIDEO TAPES, WE ACED OUT THE COMPETITION.

When we tested the top four brands under strict lab conditions, the overwhelming performance leader was Scotch 479 Master Broadcast Video Tape. In fact, we came out on top in all ten performance categories.

If that isn't reason enough to make us your choice, maybe this is. We're the only one-inch supplier that winds your tape onto a special cushioned flange reel to protect against shipping and handling damage. And we pack and ship our tape in a flame-retardant case to give you even more protection.

We're the people who pioneered the development of video tape 25 years ago. And according to the pros who know video tape best, we're still the best video tape. Give or take an inch.



# 3M

tions of local, national and international public affairs produced on a noncommercial basis by nonprofit organizations.

Parties have been invited to comment on whether a community service category should be added to the program definitions and, if so, should it be necessary that such programs be presented on a sustaining basis and be supplied by or

produced in conjunction with a nonprofit organization having significant membership in the service area.

### NRB files in license suit

An amicus curiae brief (friend of the court) has been filed with the Supreme Court of the US by the

National Religious Broadcasters concerning two consolidated cases involving music licenses for broadcasters. The association's brief notes state that its members' interests are parallel to the interests of CBS, the respondent in the two music licensing cases. The petitioners are BMI (Broadcast Music, Inc.) and ASCAP (American Society of Composers and Publishers). The court's ruling will determine whether or not the issuance of blanket licenses by BMI and ASCAP constitutes price-fixing.

Dr. Ben Armstrong, executive director of NRB, said, "Religious station owners are willing to pay fees for music which is suitable for their audiences. However, currently they must pay for all types of music, such as rock and roll, whether they ever use it or not."

### Reimbursement approved for citizens' groups

Reimbursement provisions contained in six licensee-citizens' group settlement agreements have been approved by the FCC. The Citizens Communications Center (CCC) made the request since the IRS had ruled that it may not accept reimbursement of expenses paid voluntarily by a licensee without jeopardizing its tax-exempt status unless the FCC approves.

### Educational public radio linked by satellite

Construction has been authorized by the FCC of domestic satellite earth station facilities as a part of a system to interconnect about 192 noncommercial educational radio stations throughout the United States, Puerto Rico and the Virgin Islands.

Western Union was authorized to establish the necessary channels of satellite communication to provide this service by means of its WESTAR domestic satellite system. The domestic earth stations will be licensed to the individual station operators with the exception of the main origination terminal in Fairfax, VA, which is licensed to the Public Broadcasting Service.

Initially, each earth station will be equipped to receive four audio program channels of 15 kHz band

# Beaucart II.

See us  
at NAB  
Booth  
No. 407

Our name alone spells quality. And performance. And dependability. And an increasingly broad array of NAB-quality products for broadcasters worldwide.

We knew when we came out with our economically priced Beaucart II audio cartridge tape machine that we had a tiger by the tail. Our experience with the full-featured Beaucart line indicated that you were ready for a step up in quality, and that what we needed were machines which offered the Beaucart pancake motor and audio heads in a trim, mono, A-size package without the broad capability and highly polished appearance of the original Beaucart.

We'd like to say "Thank you" to those savvy broadcasters who have discovered Beaucart II, and invite the rest of you to learn what they already know. That Beaucart II is today's best all-around cart machine value. Write today for Bulletin 104 or call us at (203) 288-7731 for the whole story. We're the Broadcast Products Division, UMC Electronics Co., 460 Sackett Point Road, North Haven, Connecticut 06473.

# UMC®

Outside Connecticut, toll free,  
(800) 243-6178

# A product line that satisfies everyone's editing equipment requirements

**DATATRON SUPPLIES  
VIDEOTAPE EDITING SYSTEMS  
AND PERIPHERAL EQUIPMENT FOR  
EVERY EDITING APPLICATION -  
AND EVERY BUDGET**

**DATATRON 2000** — THE ALL NEW THIRD GENERATION VIDEO—TAPE EDITING SYSTEM FEATURING DISTRIBUTED PROCESSING, AN INTERACTIVE COLOR CRT OPERATOR INTERFACE, CONTINUOUS RECORD VTR ROLL CAPABILITY, FLOPPY DISK EDIT LIST STORAGE, USER BITS, AND A HOST OF OTHER REFINEMENTS. THE MOST ADVANCED ELECTRONIC VIDEOTAPE EDITING SYSTEM YOU CAN BUY.

**TEMPO 76** — THE FIRST VIDEOTAPE EDITING SYSTEM THAT PUTS BOTH SMPTE TIME CODE AND CONTROL TRACK TECHNOLOGIES AT YOUR FINGERTIPS IN ONE UNIT. WITH ENHANCEMENTS SUCH AS TEXT EDITING, EXTENDED MEMORY, SYSTEM DEBUG AND EXPANDED INTERFACE CAPABILITY, TEMPO 76, IS STILL THE MOST SOPHISTICATED AND FLEXIBLE EDITING SYSTEM IN ITS CLASS.

**EDITMATE III** — A NEW, FULL FEATURE CONTROL TRACK EDITOR WITH EDIT DECISION LISTING CAPABILITY. SOPHISTICATED EDITING FEATURES AT A SURPRISINGLY LOW PRICE. ALSO AVAILABLE IN AN EDITOR—ONLY VERSION (EDITMATE II), AND IN AN EDIT LISTER—ONLY VERSION (EDITMATE I).

**PERIPHERAL EQUIPMENT** — DATATRON'S EDITING SYSTEMS ARE BACKED-UP BY A COMPLETE ARRAY OF FULLY COMPATIBLE PERIPHERALS, INCLUDING SMPTE CODE READERS AND GENERATORS (WITH OR WITHOUT USER-BITS), CHARACTER GENERATORS, JAM—SYNC GENERATORS, ROUTING SWITCHERS, PAPER TAPE PUNCHES AND READERS, AND MORE.

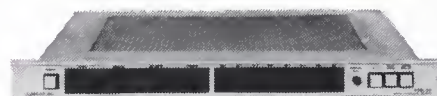
**WRITE OR CALL TO LEARN MORE  
ABOUT THE MOST COMPLETE  
LINE OF EDITING PRODUCTS  
IN THE INDUSTRY.**



5150 SMPTE CODE GENERATOR



5250 SMPTE CODE READER



5260 SMPTE/USER BITS READER



5170 SMPTE/USER BITS GENERATOR



5152 JAM SYNC GENERATOR

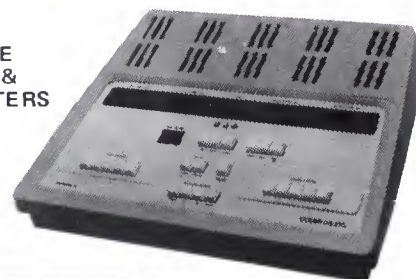


9 x 3 ROUTING SWITCHER



5450 CHARACTER GENERATOR

EDITMATE  
EDITORS &  
EDIT LISTERS



TEMPO 76  
EDITORS

## DATATRON 2000

# datatron, inc.

SEE US AT NAB BOOTH 491

1562 Reynolds Ave., Irvine, California 92705 (714) 540-9330 TWX 910-595-1589

Mailing Address: P.O. Box 11427, Santa Ana, California 92711

## Industry news

width, a pair of which can be made to distribute stereophonic channels. The system will have the capacity to distribute 12 audio channels simultaneously.

### Rules waiver for cable TV

Capitol Cablevision, an operator of cable television systems in Char-

leston, SC and Dunbar, WV, has been granted a waiver of the rules by the FCC so it does not have to give network program nonduplication protection to either of the ABC affiliates carried on its systems: WOAY-TV and WOWK-TV.

The commission also denied Gateway Communications, licensee of WOWK-TV, special relief to require Capitol to provide nonduplication

protection against WOAY-TV on these systems.

### EIA reports increase in '78 TV receiver sales

According to figures compiled by the marketing services department of the Electronic Industries Association, 1978 monochrome TV sales to dealers reached 6,064,404 units, representing a 7.1% increase over the 1977 sales figure of 5,664,191. Sale of color television receivers were the highest ever with 10,236,319 units sold, a 12.4% increase over 1977.

### FCC okays finance plan for minority broadcasters

The FCC has ruled that a plan by Storer Broadcasting Company in which the company would make \$1 million available to minority broadcasters would cause no violation of the FCC's multiple ownership rules.

Storer, a licensee of seven TV, four AM, three FM stations and several cable television systems, would make the money available to a Minority Enterprise Small Business Investment Company (MESBIC) which it would create and which would secure additional funds under the Small Business Administration regulations for loans to minority entrepreneurs who are unable to supply funds for station sale prices.

### Revised report forms available to broadcasters

Recently revised forms for broadcast applications and reports with the FCC are now available for use and include:

- Form 303-A Annual Programming Report (October 1978);
- Form 323-E Ownership Report for Noncommercial Educational Broadcast Station (January 1978, March 1976 edition may also be used);
- Form 324 Annual Financial Report of Networks and Licensees of Broadcast Stations (November 1978, Report and Instructions); and
- Form 324-A Annual Financial Report of Broadcast Networks (November 1978).

FCC Form 395, the Annual En-



**There are  
consoles,  
and then there are  
AMPRO CONSOLES...  
in a class by themselves.**

Dollar for dollar no other console offers you as many operational features as AMPRO. And that means your job is easier because you can control a myriad of functions right at your fingertips. *Standard* features included in 6 to 12 mixer models...

1. **FOUR INTERLOCKED PUSHBUTTON SWITCHES** per input channel allows selection of up to 48 individual sources.
2. **FOUR LEVEL LED "STRETCHED PEAK" INDICATORS** on each output channel in addition to two standard VU meters.
3. **REMOTE START SWITCHING** for all high level inputs.
4. **PHASE TEST SWITCH** for immediate audible check of mono sum signal.
5. **BALANCED TRANSFORMER** preamps on all mic and high level inputs.

Don't settle for less than Ampro perfection. Take a closer look for yourself. Send for a **FREE** brochure on CONSOLES today!



### AMPRO BROADCASTING INC.

850 PENNSYLVANIA BLVD., FEASTERTOWN, PA 19047 • (215) 322-5100

Professional Equipment for Broadcasting Professionals

Represented in Canada by Ward-Beck Systems Limited

Export Agent Singer Products, New York, NY Telex 423592 SPC UI

Circle (16) on Reply Card

We  
said it to  
**AMPEX**

VR-2000 & VR-1200

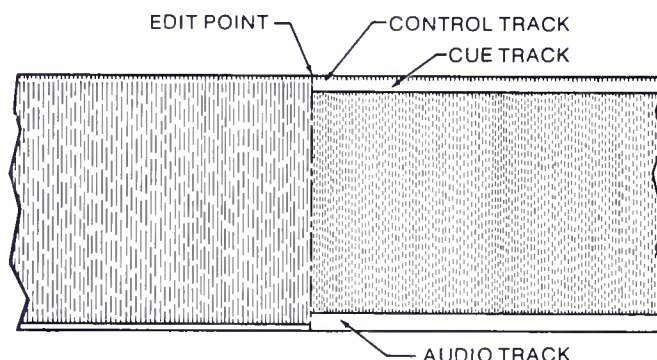
Now  
we're  
saying  
it to  
**RCA!**

TR-70 & TR-60

**AFA says:**

**BUZZ  
OFF!**

**to the 960Hz. tone  
in your video only edits**



If you've got it . . .  
you know it! . . .  
and AFA's unique  
Gated Video Circuit  
Module will get  
rid of it.  
Buzz tone during  
video only edits on a  
**VR 2000 or VR 1200 and  
now on RCA TR 70 or  
TR 60** can be stopped cold  
with this all-digital, CMOS  
module. Simple installa-  
tion, RF turn-on, turn-off.  
Used by major networks  
and post production  
operations.

For information, call or write: A.F. ASSOCIATES, INC.



**AFA**

A.F. ASSOCIATES, INC.

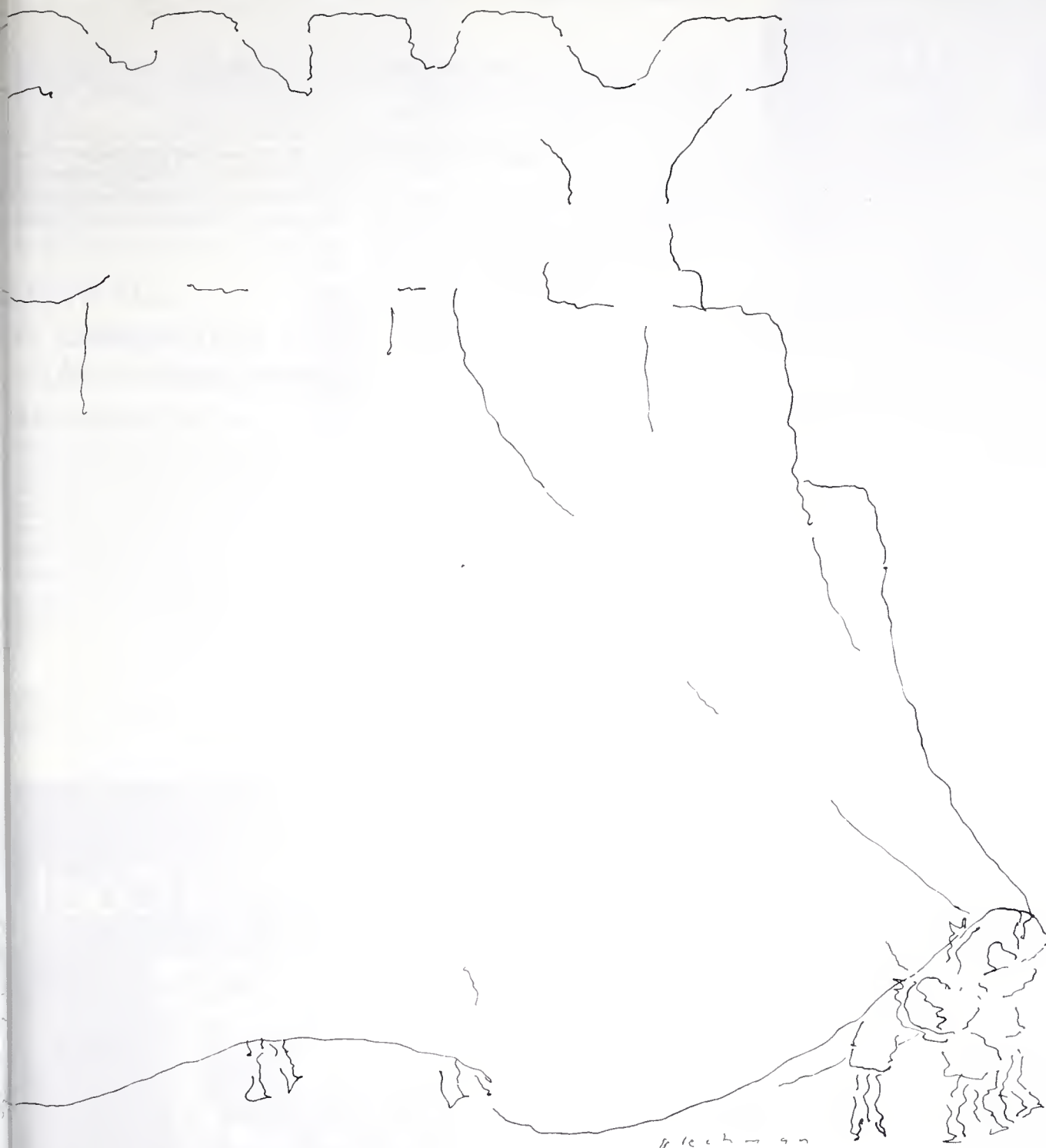
100 Stonehurst Court, Northvale, NJ 07647 ■ (201) 767-1000

2465 E. Bayshore, Suite 301, Palo Alto, CA 94303 ■ (415) 856-1060

Circle (17) on Reply Card



**SONY INVITES YOU TO SEE  
HOW FAR BROADCASTING  
HAS COME SINCE 1978.**



While the engineers at Sony continue to advance the state of broadcasting technology on a daily basis, NAB conventions are, unfortunately, held but once a year.

Which means you have only four visiting days to examine first-hand what Sony has been developing in the last 365.

And the past 365 days have indeed been fruitful.

This year at NAB, for example, we'll be introducing our improved 1" C VTR: the BVH-1100. A state-of-the-art recorder incorpora-

ting everything from Sony "confidence" heads for monitoring off the tape during recording, to a dynamic tracking option that makes noise-free "on air" transmissions possible from 1/4 speed in reverse to double speed in forward.

The NAB show will also mark the introduction of our new digital time base corrector, the BVT-2000, plus a new dynamic tracking remote control unit, a new mid-range editor, and some things so advanced they weren't finished in time to talk about here.

Sony is a registered trademark of the Sony Corp. of America, 9 West 57th St., N.Y., N.Y. 10019.

And, you'll also be able to examine the Sony computer editing unit, and the complete range of portable ENG/EFM cameras, recorders and monitors that have already proven Sony's leadership in 1" technology.

Don't miss the Sony booth at the NAB show this year.

Because it would be a pity to come all the way to Dallas and not see how far the industry has come.

**SONY  
BROADCAST**

## PRE-OWNED EDITING SYSTEMS

We have a large selection of reconditioned Sony Color Video Tape Recorders. VO-2850A's (with warranty). Sold individually or complete system.

1-VO-2850A \$2995.00  
or  
2-VO-250A's w/RM-400 Editor \$6295.00

Trade-in those old VO-2850A's for new VO-2860's. Top allowance offered. Call us first. Bud Lines or Cherly McKinney. Authorized dealer for Sony-JVC Video Equip.

### LINES VIDEO SYSTEMS

Jefferson at McDaniel  
Springfield, Missouri 65806  
(417) 862-5533

Circle (19) on Reply Card

## Industry news

ployment Report, has been amended by the commission as it pertains to broadcast licensees and permittees in order to obtain a more accurate picture of the status of minorities and women.

The commission amended the instructions to Form 395 to make them easier to follow and more specific to broadcasting and changed the race and ethnic terminology of Form 395 (and FCC rules and other forms) to the following categories: American Indian or Alaska Native; Asian or Pacific Islander; black, not of Hispanic origin; Hispanic; and white, not of Hispanic origin.

### Canada re-introduces Telecommunications Act

Jeanne Sauve, minister of communications of Canada, re-introduced communications legislation in hopes of making federal regulation

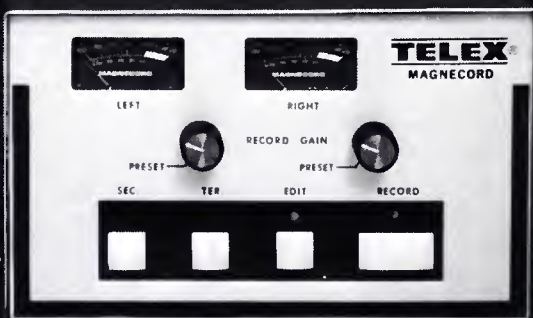
of communications more responsive to technological change and to provincial concerns.

The bill, the Telecommunications Act, is the second phase of a 2-step legislative process. The act contains provisions by which policy and delegation agreements with provincial governments can be implemented.

### ITNA seeks improved satellite transmission

The Independent Television News Association (ITNA), the only national daily video news network which uses satellite transmissions, has retained Rosner Television Systems (RTS) to consult on improved signal transmission techniques for the satellite network. ITNA of New York provides daily video news feed to 10 independent television stations throughout the US.

# At Last, a Cart Machine that Keeps its Cool



Telex/Magnecord broadcast cart machines run cool and steady. So cool no ventilation is required, so steady not even voltage or frequency fluctuations will alter their speed. Thanks to our dc servo flutter-filter drive.

The MC series offers broadcasters a host of options, including field convertability from mono to stereo or play to record and, of course, end of message, secondary/tertiary cue tones. Designed for type A or B carts, the MC series meets all NAB specifications, offers full immunity to EMI and RFI, is remote controllable and automation compatible with CMOS digital logic. Audio muting, air damped low voltage

dc solenoid and fast forward are standard features on every MC unit.

Four broadcast cart machines to choose from in the Telex/Magnecord MC series. Running cool and steady. With a pleasant surprise—they're affordable.

For detailed information please write:

PRODUCTS OF SOUND RESEARCH  
**TELEX**  
COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.  
Europe: 22 rue de la Legion-d'honneur, 93200 St. Denis, France  
Canada: Telak Electronics, Ltd., Scarborough, Ontario

# HITACHI SK-96

Inside this superlative broadcast studio camera lives an equally superb hand-held module for field production. Here at last is a convertible that makes no compromises in picture quality...with S/N ratio of better than 51 dB...three 2/3" Saticons...500-line resolution...built-in ABO...internal triax adapter...and more. All wrapped in a super tough but lightweight diecast housing. For an unprecedented low price. Call your Hitachi dealer for more details. Or see us at NAB.

**Hitachi...  
Wherever  
video makes  
an impact.**

**Regional Centers  
for Parts and Field Service**

**I New York (212) 898-1261  
I Los Angeles (213) 328-2110  
I Atlanta (404) 451-9453  
I Seattle (206) 575-1680  
I Chicago (312) 344-4020  
I Dallas (214) 233-7623  
I Denver (303) 344-3156**

**HITACHI**  
Hitachi Denshi America, Ltd.  
58-25 Brooklyn-Queens Expwy.  
Woodside, New York 11377

Circle (21) on Reply Card



# The 1979 Hitachi Hard-to-Top Convertible.

Ever tried to order a

528?

Well, maybe we've got an alternative for you. No, it's not a waveform monitor. It's a MATCHBOX!

What's a MATCHBOX?

Basically, it's a 3 IN/1 OUT vertical interval switcher, used on route to a waveform monitor, but with some unique features. If the WM is equipped with sequencer circuitry, then all three sources (say three cameras in a mobile van) can be *paraded* across the face of the screen. That saves you the price of 2 WM's; and besides, it's easier to ride the levels of 3 cameras displayed on 1 monitor than on 3. Or maybe you'd like to SUPER-impose them; that's OK too! The MATCHBOX will accept composite or non-composite inputs. DON'T STOP READING NOW. 'Cuz that's where others have stopped.

The above, primarily assists the technical operators and the VP of Finance. How about the engineer charged with the duty of color balancing (matching) say, all 3 cameras? Here's where the MATCHBOX *strikes* again. First, get the cameras matched as close as you can with the normal set-up procedure, then utilize the A-B and A-C feature of the MATCHBOX, and make a perfect match. Simply put, the A source is inverted with respect to B and C, and then the cancellation or nulling technique is employed to effect a perfect match. So, when you get a straight line on the face of the WM you've "gotta match."

Some of our favorite distributors are . . .

|                     |                       |
|---------------------|-----------------------|
| BCB Electronics     | RIA Corp.             |
| Custom Video        | Roscor                |
| Dyma Engineering    | RPC Inc.              |
| Gray Communications | Seneca Communications |
| GTN                 | Sonocraft             |
| Lake Systems        | Technical Video       |
| Midwest Telecom.    | Todd Communications   |
| Northern Video      | Video Equipment Corp. |
| Oregon A/V          | Video Masters         |
| Peirce Phelps       | Videomedia            |

Video Systems Network

Another interesting product from . . .

**Cezar**  
International, LTD.

494 MacARA Avenue  
Sunnyvale, CA 94086  
Tel. (408) 733-1436

Circle (22) on Reply Card

30 **Broadcast Engineering** March 1979

## association news

### National Association of Broadcasters

1771 N Street, NW  
Washington, DC 20036



### NAB studies reel-to-reel tape recording standards

A committee has been organized to revise and update the NAB reel-to-reel magnetic recording standard manual which was issued in April 1965. The NAB committee is chaired by Richard T. Schumeyer of Capital City Communications. Members include engineers from networks, stations, equipment manufacturers and syndicated recording facilities.

Several meetings have been held, the most recent on January 16 and

17 in San Francisco. The next meeting will be held on March 7 and 8, 1979 in Chicago. Technical input to the committee and participation by interested persons is solicited and welcomed. Contact Dick Schumeyer, Capital City Communications, 4100 City Line Avenue, Philadelphia, PA 19131. The upcoming meeting in Chicago will be at the O'Hara Motor Inn, 3939 North Manneheim Rd., Schiller Park, IL 60176.

### Association registers support for radio deregulation

The NAB and its committees have issued statements recently concerning broadcasting deregulation. In January, the NAB Television Board of Directors passed a resolution to continue seeking broadcasting deregulation.

In the resolution, the board recognized that the government favors greater deregulation of radio than TV; therefore, it resolved that NAB should continue to seek maximum deregulation of broadcasting with particular emphasis on radio deregulation.

In response, the NAB Radio Board of Directors passed their own resolution. Thanking the TV board for its support, they resolved to work for radio's deregulation and emphasized NAB's role as both a radio and TV association. The board said that "as federally regulated and licensed broadcasters, the radio and television members of our industry have many similar problems, responsibilities and opportunities..."

NAB president Vincent T. Wasilewski expressed a similar opinion in an address to the California Broadcasting Association. He said

that it is just a matter of time until TV will be deregulated in the same manner radio is headed towards.

For the first time since the inception of federal regulation, he said, radio appears to be on the brink of proving that the best service occurs in a "free and open marketplace." In a short while, the FCC will see that this is the ultimate regulator and will begin deregulating TV, he said.

#### Washington rally

The steering committee for the Broadcasters' Rally Against Over Regulation has urged the American broadcasters to ask government to reverse the decisions of regulation and return to the broadcasters the responsibility of making their own decisions.

The rally, held in Washington DC, on February 28, signified the unity of broadcasters throughout the nation pushing for deregulation of broadcasting beginning with radio. The committee stated this was "a all-industry effort with participating organizations completely burying any philosophical differences for the good of all broadcasters."

**First Hitachi developed the revolutionary Saticon™ tube. Then Hitachi designed the perfect camera for it...**



## **The new portable Hitachi SK-80A**

**Now with Automatic Beam Optimizer (ABO) circuitry.**

The remarkable SK-80A has three superior  $\frac{2}{3}$ " Saticons at its heart, for unexcelled image and color fidelity. At the same time, a new Automatic Beam Optimizer increases the camera's dynamic range—lets you shoot high contrast scenes with the assurance of quality results. Hitachi's sophisticated electronics, coupled with the high resolution capability of the Saticon, set a new high level of performance for a portable EFP camera under the most demanding conditions.

The SK-80A also feels and handles like a true portable should. And its 2-hour battery belt with 1-hour charge time assures you of adequate power for continuous long-term shooting when you're on location. The standard C-mount and optional Arri adapters give you the added versatility of selecting the exact lens that fits your shooting requirements.

But performance is only half the SK-80A story. A special training tape on videocassette is available with complete

camera set-up and maintenance instructions, to help you keep your SK-80A making its excellent pictures. Beyond this, our seven Hitachi regional offices are all staffed with qualified engineers and fully stocked with parts. They stand ready to back up our vast national network of servicing dealers.

We urge you to check out the performance features of the SK-80A, as well as its low price, before specifying any other camera. Arrange a demonstration with your local Hitachi dealer or call the Hitachi regional office nearest you.

**Hitachi...Wherever video makes an impact.**



**HITACHI**  
Hitachi Denshi America, Ltd.

**Executive Office:** 58-25 Brooklyn-Queens Expressway, Woodside, N.Y. 11377 (212) 898-1261 **Offices in:** Chicago (312) 344-4020; Los Angeles (213) 328-2110; Dallas (214) 233-7623; Atlanta (404) 451-9453; Denver (303) 344-3156; Seattle (206) 575-1680.

Circle (23) on Reply Card

March 1979 *Broadcast Engineering* 31

## Engineering lab approved

An engineering laboratory, unanimously authorized January 19 by the NAB board members, will be used in developing solutions to engineering problems facing the industry and in evaluating innovations which are proposed in FCC actions and filings. The laboratory will be located at NAB's headquarters.

Other actions taken by the board during the semi-annual meeting in Maui, HI, include the adoption of a resolution which authorizes the executive committee to initiate action deemed necessary for the NAB to protect First Amendment rights. Also the board voted to continue holding broadcast town meetings in various cities.

## Fee schedule opposed

NAB has filed an objection to the FCC proposed fee schedule for broadcasters on anything other than application processing costs. They

agreed with Margita White, FCC commissioner, that the new fee proposal is "a first step into a regulatory swampland."

Also, the FCC recommendation that Congress impose a spectrum use tax was opposed. NAB said that the spectrum fee is a discriminatory tax imposed on a single industry.

## Translator development

The NAB has filed with the FCC a statement saying the FCC should encourage the development of television translators. They also called for the elimination of separate treatment of UHF and VHF translators and uniform application of other rules.

Translators improve program diversity by bringing additional broadcast services to underserved areas but should be authorized only to insure that for each market size category the level of commercial television broadcast service is provided.

Also the NAB said that translators should be authorized to re-broadcast only the closest station or stations of the types permitted under the limitations.

## Radio allocations policy

At its semi-annual meeting, NAB Board of Directors adopted a resolution with respect to radio allocations.

It urged the FCC to adopt an overall radio allocations policy prior to the 1979 World Administrative Radio Conference.

According to the resolution, all broadcast stations should be authorized to provide fulltime service and urged the conversion of existing daytime AM stations into unlimited time facilities. The national allocations goal could be accomplished without significantly diminishing service by other classes of stations, according to the NAB.

The board also instructed its staff to petition the FCC to appoint a joint

# OPTIMOD-FM THE LOWER YOUR POWER, THE MORE YOU NEED IT.

Sometimes it seems like the cards are always stacked against the Class A's. Low power... low antenna height... poor terrain... they make it tough to reach the audience you deserve. The OPTIMOD-FM Compressor/Limiter/Stereo Generator can change the odds. Its cleaner, brighter, louder signal penetrates farther—and stands out even in strong-signal areas. Many of the almost 2000 OPTIMOD-FM stations now using it report dramatic improvement in coverage and in signal quality.

At \$3195,\* OPTIMOD-FM is the most cost-effective way we know to optimize your signal. Available through selected dealers. Call us toll-free at (800) 227-4498 for further information.

See it at NAB booth 429.

**orban**

ORBAN ASSOCIATES INC., 645 Bryant Street, San Francisco, CA 94107 (415) 957-1067



\*Suggested List Price

Circle (24) on Reply Card



# TOTAL CAPABILITY

Cablewave offers the  
Largest Selection of Coaxial  
Cable FOR ALL your system  
requirements . . . . .



## NEW! Antenna/Transmission Line Systems Catalog

Complete in every detail, total  
information needed to plan,  
specify and purchase a  
complete system or  
component, plus  
complete engi-  
neering data and  
more.



from smooth wall aluminum and corrugated copper coaxial  
cables in foam and air dielectric . . . to matching connectors  
for most standard interfaces . . . to hardware and installation  
accessories. All cables are jacketed for mechanical protec-  
tion, and you can specify either standard or phase stabilized  
versions. There's a full line of field assembled matching  
connectors, or if you desire . . . Cablewave will provide the  
completed cable assembly manufactured to your specific  
requirements. Most of your system requirements will be  
available from stock . . . all are fully tested, conservatively  
rated and backed by our field service organization.

Whether you require a single component or a complete  
system, rely on the TOTAL CAPABILITY of Cablewave!

Cablewave Systems, Inc., 60 Dodge Ave., North Haven,  
Conn. 06473, Phone (203) 239-3311.

In Canada: LeBlanc & Royle Communications Towers Ltd., 514  
Chartwell Rd., Oakville, Ontario, Canada L6J 5C5 Phone (416)  
844-1242.

SEE US AT NAB—BOOTH 381

**Cablewave Systems**

RF transmission lines with  
welded and corrugated  
conductors are also  
manufactured by our  
associated companies in West  
Germany and Brazil.

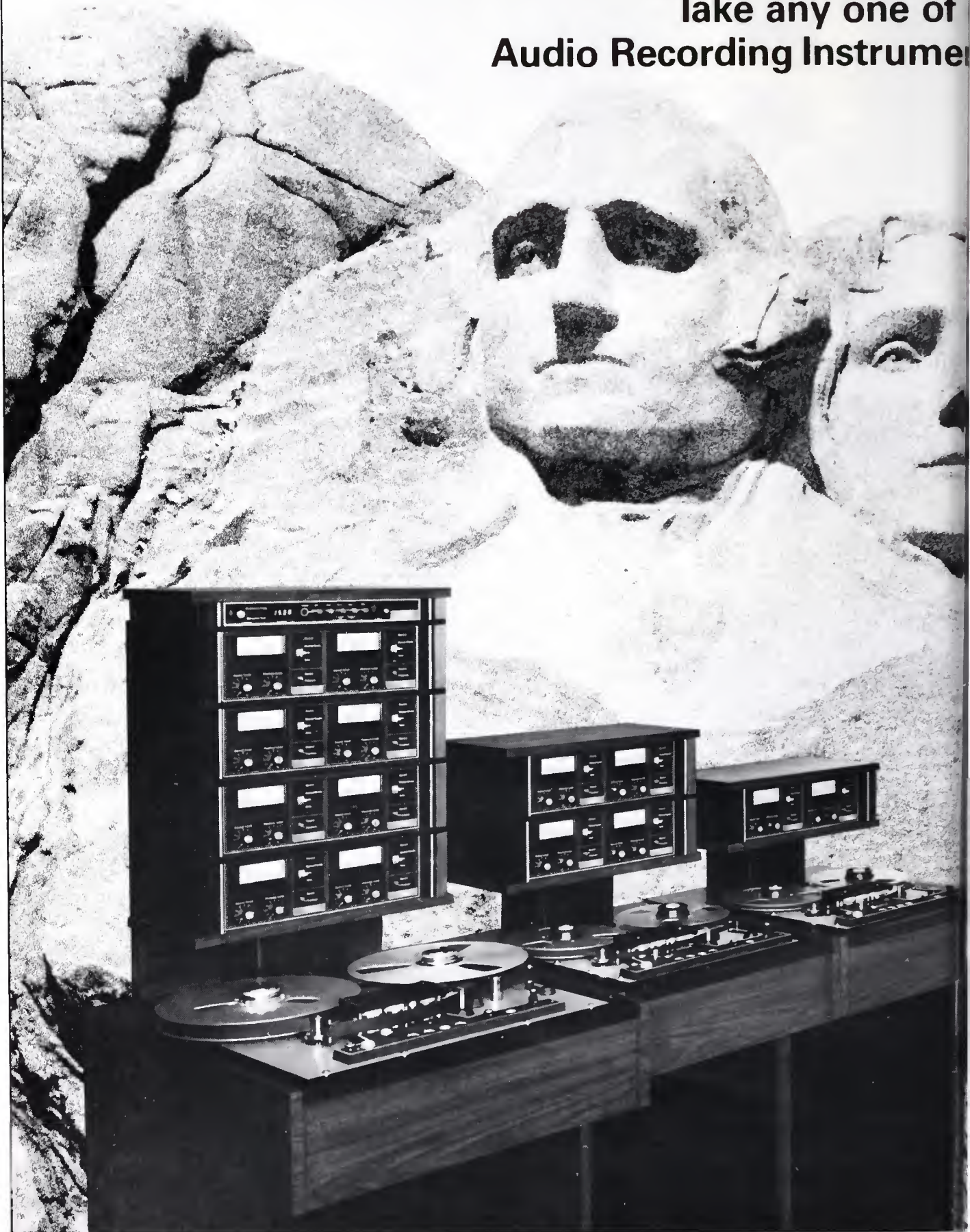
Kabel-und Metallwerke  
Gutehoffnungshuette AG  
Radio Frequency Systems Division  
Kabelkamp 20  
3000 Hannover  
West Germany

KMP  
Cabos Especiais e  
Sistemas Ltda.  
Caixa Postal 7 163  
Sao Paulo SP, Brasil

Circle (25) on Reply Card

# There are few things in life

Take any one of  
Audio Recording Instruments



# as dependable as a Scully.

Quality of sound is extraordinary... the rugged design  
to last. The performance is classic.  
by Scully... one of the first names in broadcast  
by. Equipment you can trust, by a company you've  
to depend on.

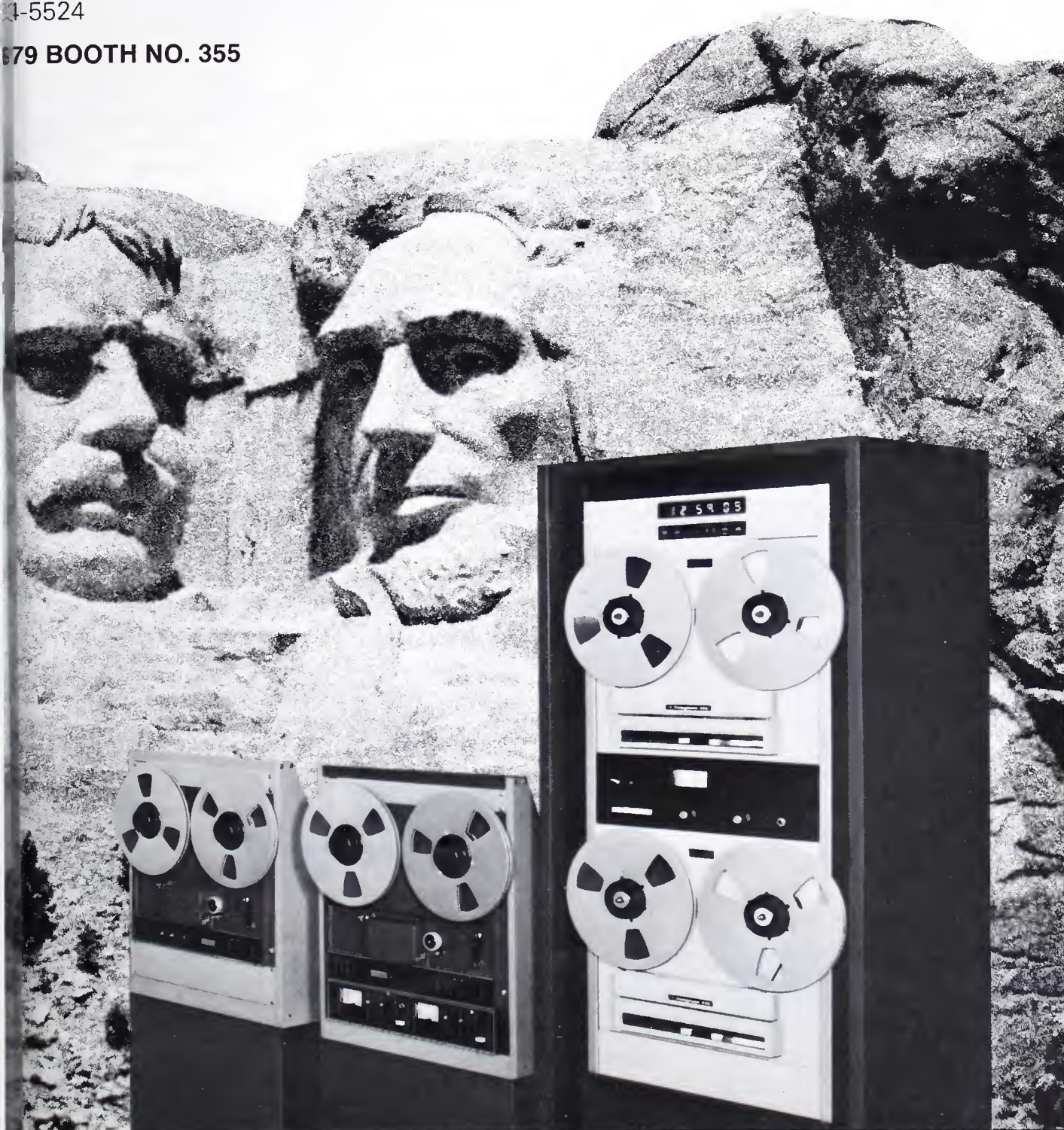
For complete details, write or call Scully Recording  
Instruments, Division of Dictaphone Corp., 475 Ellis  
Ave., Mountain View, California 94043 (415) 968-8389.  
4-5524

679 BOOTH NO. 355

► **Scully**

**Recording Instruments**

*For classic performance.*



# NEW 25 KW Air Cooled Calorimeter-Load

## FEATURES:

- Precise Power Measurement
- Exceeds FCC Specifications
- Mobile For Multi Use
- Interlock Protected
- Nonmeasurable VSWR
- Freq. Range D.C.-1.8 GHz



See us at NAB Booth 347

**WILKINSON**  
**ELECTRONICS, INC.**

701 Chestnut St. • P.O. Box 738  
Trainer, Pa. 19013 • Telephone (215) 497-5100  
TWX 510 669-3188 • Cables: WILEC

Circle (27) on Reply Card

## NAB news

government/industry advisory committee to prepare studies of the advantages and disadvantages of various methods to obtain the national allocations goal.

### Frequencies requested

The NAB has asked the FCC to return frequencies in the 947-952 MHz portion of the spectrum to broadcasters. The frequencies were assigned previously to broadcasters for auxiliary service and now are assigned for land mobile use.

NAB noted that there will be a demand for STL (studio-to-transmitters) channels if AM stereo is authorized. The frequencies would help satisfy the anticipated demand which looks hopeless under any channeling plan.

Moseley Associates petitioned the FCC to permit broadcast aural STL and aural intercity relay stations to operate in unassigned UHF TV channels on a secondary, non-interfering basis when desired frequencies are unavailable. According to the NAB this solution should not be used until all other solutions have been exhausted.

### 30-minute rule opposed

The NAB has asked the FCC not to adopt any general exception to its network nonduplication rules for TV programs of short duration. In reply to the NCTA's recommendation that the rule be changed so as programs 30 min or less can be duplicated, the NAB pointed out that the FCC did not intend to eliminate protection for 30-minute programs or even for 30-minute segments consisting of more than one network program.

NAB said that it is the length of the program, not the program to be broadcast by the station which determines whether or not protection would have to be provided.

In other cable business, the NAB said that ARTEC and NATC haven't shown that the FCC would reverse its waiver standards for importation of distant television signal by cable systems.

NAB said that this revision and the repeal of its distant signal rules

are contrary to the explicit requirements of the Administrative Procedure Act.

### Investigation applauded

The NAB has commended the FCC for deciding to examine the noncommercial educational broadcast stations which tend to be commercial in nature.

The NAB is concerned that some public broadcasters have exceeded the terms set by the FCC on the noncommercial nature of educational broadcasting. The NAB claims that activities such as underwriting credits, over-the-air promotions and announcement of promoting the sale of products and services are clearly commercial activities.

### TV receiver grading

The NAB has asked the FCC to modify the system of grading television receivers. The NAB said the inquiry consisted of a very narrow series of questions concerning antennas, transmission lines and noise figures as they relate to UHF fringe area reception and not an overall examination of television receiver grading.

NAB suggested that if the primary concern is UHF parity the FCC should issue an amended notice so the public will not misunderstand that the FCC is concerned with TV reception problems.

### Viewer study submitted

The NAB submitted a study to the FCC in December supporting the theory that the number of viewers is proportional to a television station's revenue.

The study conducted by Charles River Associates, Boston, also showed that:

- The closer the audience is to station's signal, the greater the gain or loss in revenue;
- UHF network affiliates and independent stations are affected more than VHF stations; and
- a small UHF independent will suffer a greater loss.

**Coverage of the NAB 57th Annual Convention  
& International Exposition begins on page 95.**

Get the

# LIVE LOOK



Why settle for less  
than brilliant fidelity in  
film-to-video transfer?

With the Digiscan Flying Spot MK3B Telecine, you can expect and get superb reproduction from color or mono, positive or negative, 16 or 35 mm film or slides—all on the same transport.

Here's a film chain with no camera, no lag, no complex optics, no intermittent projectors—not even a lamp house. It has a silent capstan drive with shuttle forward and reverse. Electronic Cinemascope panning handles 16 or 35 mm, full frame.

It is designed to deliver what you have always wanted in film reproduction—the immediate look of live video from film and all the quality, color, definition and contrast that you shot, or bought, with the film, positive or negative.

Send for details and literature. Call Neil Kempt (213) 670-6366 or write:

**Rank Precision Industries, Inc.**  
5432 West 102nd Street  
Los Angeles, CA 90045

Now available with  
pre-programming system for color  
correction, panning, and machine control.

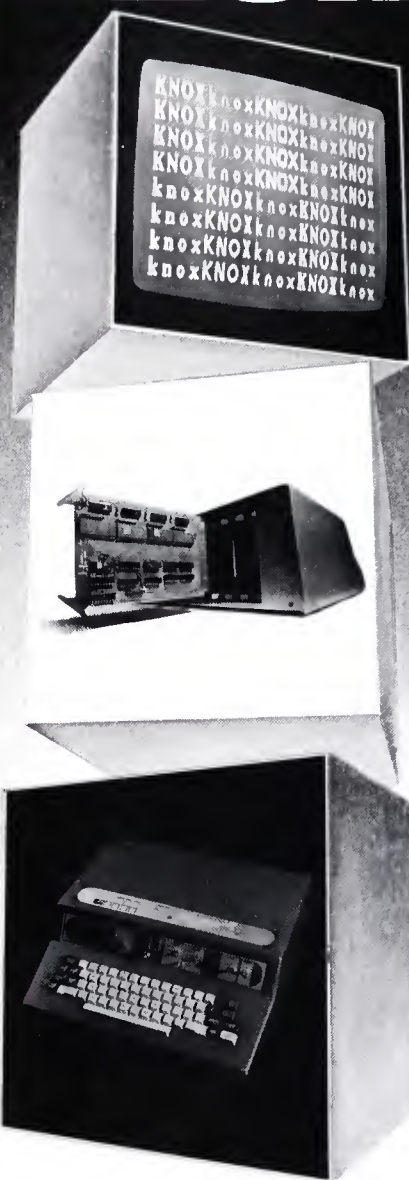
*MK3B Flying spot TELECINE by*



**RANK CINTEL**

Circle (28) on Reply Card

# KNOX BLOX



The K128 Character Generator is something to build on.

Every innovative feature found in today's K128 can easily be added to our very first K128 — and to every unit we've built since.

The Knox design assures that the K128 you buy today can always be upgraded to include all of the latest functions of tomorrow's K128.

Get your hands on a Knox — and build something.



9700-B Palmer Highway  
Lanham, Maryland 20801  
(301) 459-2106

Circle (29) on Reply Card

## association news

### NRBA

#### National Radio Broadcasters' Association

1705 De Sales Street, NW  
Washington, DC 20036

### Association questions deregulation proposals

The NRBA said in December that it found the speech made by FCC commissioner Tyrone Brown to the Southern California Broadcasters Association (see February **BE**, page 10) gratifying because it reflects a change in the FCC's attitude. In comments filed in January with the FCC, however, it questioned the value of the deregulation proposals which Brown outlined.

The NRBA also asked the FCC to institute a rulemaking proceeding as requested by the NAB to solicit additional comments from licensees, broadcast organizations and the public on the proposals by the commission.

The NRBA says it favors "deregulation, not reregulation introduced

in the guise of a commission reduction or elimination of certain regulatory requirements." The association expressed fear that piecemeal efforts to deregulate radio may undermine the impetus for deregulation.

In related news, NRBA president Jim Gabbert commended the NAB for recognizing that radio and television should be regulated separately. In the speech to the Utah Broadcasters Association, he did, however, offer a word of caution.

He said that the FCC, under its present legislative mandate, does not have the authority to completely deregulate radio. "We must look to Congress for true liberation," he said.

### Rally against broadcast over-regulation held

The Broadcasters' Rally Against Over-Regulation was held February 28 at the Quality Inn Capitol Hill in Washington, DC. Broadcasters asked their elected officials to support the beginning deregulatory steps outlined by FCC commissioner Tyrone Brown. Sponsors of the rally included Community Broadcasters Association, Daytime Broadcasters Association, National Association of Broadcasters, National Radio Broadcasters Association and Radio-Television News Directors Association.

The day began with an 8:30 AM "Kick-Off" continental breakfast which included a briefing for attendees. After the briefing, broadcasters proceeded to the offices of their respective congressmen or senators for talks with them on deregulation of broadcasting.

They assembled once more at a buffet luncheon held at the Quality Inn which included FCC commissioners and staff personnel in addition to the broadcasters.

### FTC's PSA proposal:

#### 'Intrusion into...1st Amendment rights'

The NRBA says the proposal by the Federal Trade Commission (FTC) regarding public service announcements (PSAs) is "a radical intrusion into broadcasters' First Amendment Rights." The proposal requested that the FCC require broadcasters to air a minimum number of PSAs

and to establish standards leading to matching the content of the announcements with the audience likely to be watching or listening at the time they are aired.

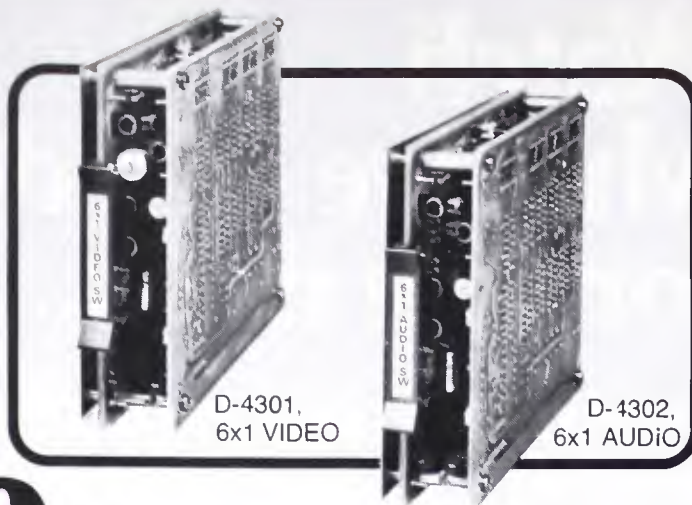
The NRBA opposes the proposal because it would increase the regulatory burden already imposed

# THE BETTER WAY

# We make small routing switchers too!

Datatek has now added the D-4300 series video and audio switching units to its line of routing switchers. With building blocks of 6x1, 16x1 and 20x1, these switching units may be used for:

- Input preselects to production switchers to expand their capacities
- Switching inputs to vectorscopes and monitors
- Adding preview busses to existing switchers
- VTR Input selection
- These units may also be stacked to make up small routing switchers at an economic price.



D-4301,  
6x1 VIDEO

D-4302,  
6x1 AUDiO



D-4307, 16x1  
VIDEO-AUDIO



D-4304,  
20x1 VIDEO



D-4305,  
20x1 AUDIO

**For More Information,  
Write or Call**

**D**  
**DATATEK**  
CORP

1166 W. CHESTNUT ST. UNION, N.J. 07083 • (201) 964-3656

Circle (30) on Reply Card

March 1979 *Broadcast Engineering* 39

# Watch what we can do for you now...

## with our new models and our faster delivery.



As manufacturers of solid state video equipment, Electrohome has gained worldwide acceptance with reliable, high-performance 9", 11", 14", 17", 23" monochrome, 19" and 25" color monitors. Built to NTSC and PAL standards, these monitors are specifically designed for broadcast, educational, industrial, commercial, medical, security and data applications.

Now, we have added the new 2000 Series to our product range. Developed to meet high standards of the broadcast industry, the 2000 Series color monitor is modular for easy adaptability to RGB/NTSC/PAL encoded signals. Available in 19" case and rack and 25" case, the 2000 Series maintains Electrohome's high standard of engineering.

In addition to an expanded line, Electrohome has a new west coast distributor network to provide fast delivery. For complete information on all our video equipment, contact Electrohome Limited at one of these offices:

### **Electro-Visual Corporation of America**

3617 West MacArthur Blvd., Suite 508, Santa Ana, Calif. 92704  
(714) 545-6991

### **Electrohome (U.S.A.) Limited**

182 Wales Ave., Tonawanda, N.Y. 14150  
(716) 694-3332

### **Electrohome Limited**

809 Wellington St. N., Kitchener, Ontario, Canada N2G 4J6  
(519) 744-7111  
Telex: 069-5449

# ELECTROHOME

... an extra degree of excellence in video equipment for every application.

## NRBA news

upon licensees. Abe Voron, NRBA executive vice president/government affairs, stated that, "Yet another regulation by a government agency to impose a Washington regulator's conception of what 'should' be in the 'public interest' is simply not needed."

## More women in radio

Results of a study by the Radio Television News Directors Association show that twice as many women were employed in broadcast news in 1977 than in 1972, making up close to one quarter of radio and television news staffs.

Black women made the most impressive gains, however, male minorities "barely held their own in TV news and actually lost ground in radio." Minority employment was highest in the south, almost three times higher than in midwest stations.

## Multi-ownership rules

In reply comments filed by the NRBA with the FCC regarding the proposed changes in the commission's multiple ownership rules, the NRBA noted that the diversity of voting trust arrangements makes clear-cut categorization difficult.

The FCC has been considering extending the definition of what constitutes a cognizable interest to include trust arrangements where voting stock in a corporate licensee is held by a trustee.

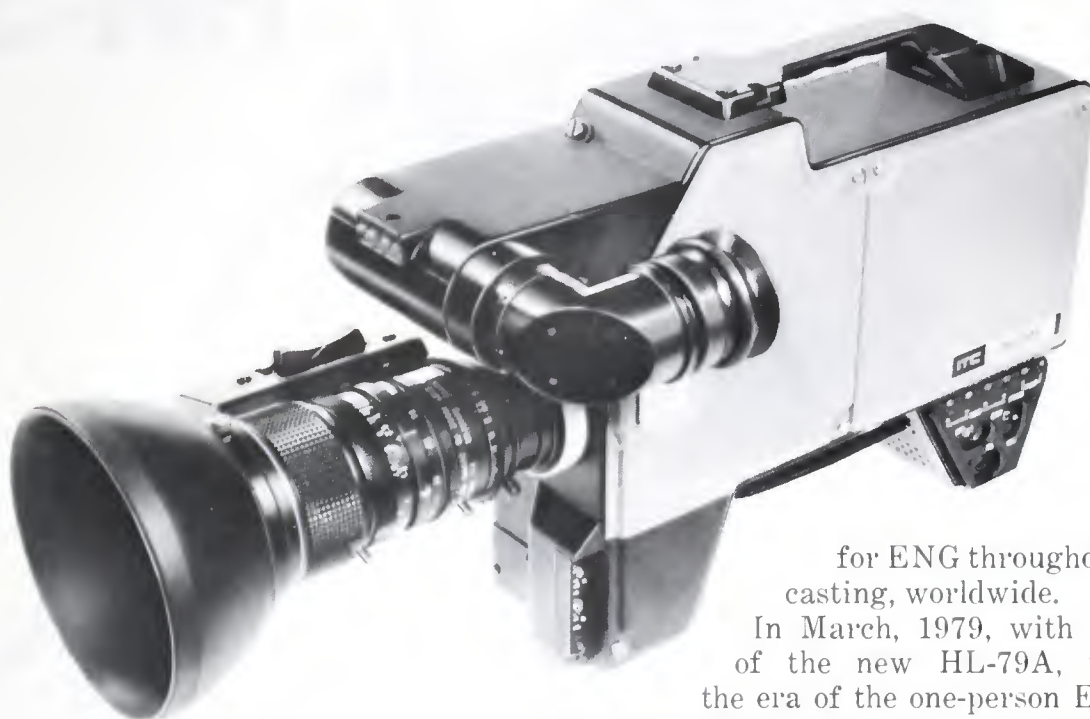
The NRBA maintains that these changes "would not provide the commission with any actual knowledge as to the identity of those in control and appear to be a step backward which would impose artificial inaccurate guidelines."

## Personal attack rules

The NRBA is supporting the FCC's proposal to exempt licensees from Fairness Doctrine requirements and personal attack rules resulting from uses by legally qualified political candidates. NRBA justified its stance by maintaining that enforcement of the personal attack rule impose "substantial and difficult burdens upon broadcasters and upon the FCC." Also licensees lack control over political broadcasts, therefore they should have no obligations due to material.

Circle (31) on Reply Card

# Ikegami inaugurates the era of one-person ENG camera crews.



for ENG throughout broadcasting, worldwide.

In March, 1979, with deliveries of the new HL-79A, we enter the era of the one-person ENG camera crew, for this new camera is an all-in-the-head design — fully integral, with no power cord to a separate battery. Its reduced weight and size enable the camera-person to slip solo in or out of vehicles or through crowds, unhampered as never before. In performance and reliability it is the ENG camera of tomorrow in the authentic lineage of Ikegami cameras of yesterday and today.

Ikegami Electronics (USA) Inc., 37 Brook Ave., Maywood, N.J. 07607, (201) 368-9171; West Coast: 19164 Van Ness Ave., Torrance, Calif. 90501, (213) 328-2814; Southwest: 330 North Belt East, Suite 228, Houston, Texas, 77060, (713) 445-0100.

A remarkable new television camera is ready for ENG broadcasters, a new-generation camera significantly more compact, yet higher in performance than any prism-optic ENG camera now offered.

The new HL-79A is like other Ikegami cameras in its performance and reliability. This tradition is well-known in the industry. It dates back some six years to the pioneering HL-33 head-plus-backpack camera that first made broadcast-quality ENG truly feasible. The HL-33 and its successor, the HL-35, carried on this tradition of reliability. And the current HL-77A head-plus-battery camera is today's standard

VISIT US AT BOOTH #406 NAB SHOW



**Ikegami HL-79A**

# WGBH engineers talk about the Ikegami HK-312



WGBH covers Boston Pops Orchestra concerts  
with Ikegami HK-312 cameras from Symphony  
Hall, Boston.

Eight Ikegami HK-312 studio color cameras are in service at WGBH, Boston, some dating back to October 1977 — long enough for intelligence on their performance. From recent interviews with key WGBH people, read these excerpts.

### **Pops without noise**

*Tom Keller, Director of Engineering:*

“The HK-312s have such high sensitivity that we were able to reduce significantly our light levels at the Boston Pops and Symphony telecasts. Yet, despite the major light reduction, we experienced no visible noise with the HK-312s... With their remarkable reliability record, we can depend on 6 cameras for 6-camera coverage, and not 7 for 6 as in the past. After all, you can't stop a live orchestra performance for a retake if you've lost a camera.”

### **2 IRE, but a complaint**

*Ken Hori, Senior Engineer for Advanced Development:*

“We tested several camera makes for RFI within a quarter-mile of a 50 KW radio transmitter. The HK-312 measured 2 IRE, whereas most others were in the 5 to 7 IRE area, and some as high as 20 IRE... For symphony remotes we'd need 2 to 5 hours for warm-up, but nowadays we're set up in less than an hour... We like its straightforward design — example, its truly high signal-to-noise ratio as compared to other cameras that resort to reduced bandwidth to attain a comparable ratio but wind up delivering noise too...”

We did get one complaint from the maintenance crew. They said that because they rarely found the problem of a down HK-312, they would never get to know the HK-312 well enough to fix it.

### **Washouts and dropouts**

*Bill Fairweather,  
Video Control Engineer:*

“During a lighting seminar staged here by Imero Fiorentino Associates, an actor in a normally lighted scene held up a sheet of white paper with printing on

it to show loss of detail in the case of more than 60 percent tv white reflectance. The HK-312, however, was able to retain enough detail for the printing to be readable on the monitor.

Next came a demonstration of the dangers of too much or too little light on a chroma-key background. The HK-312 held the key to such a low light level on the blank background that the lecturer grinned and said, “I guess WGBH has pretty good cameras!” and went on to the next subject.”

The HK-312 is the camera that met WGBH criteria for performance, stability, and reliability. They also have HL-53s, high-performance portable cameras that interface with HK-312 CCUs and can operate portably with their own CCUs.

Adapters for triax cable, using digital techniques, make their cameras remote-usable at nearly a mile from base stations, yet easily revertible to multi-core cable whenever needed.

In daily use, their HK-312s and HL-53s are interfaced with microprocessor-computer control units that automatically cycle them through all set-up adjustments, including black-and-white balance, flare and gamma correction, video gain, and eight registration functions, then recheck all those adjustments — all within 45 seconds. The cameras can also operate independently of the set-up computers, a feature that is an Ikegami exclusive.

If all of this suggests that the HK-312 is probably the best studio/field color camera in the industry, consider this: camera, set-up computer, and triax adaptor are not only operational, they are deliverable. For details or a demonstration, contact **Ikegami Electronics (USA) Inc.**, 37 Brook Ave., Maywood, NJ 07607, (201) 368-9171 / West Coast: 19164 Van Ness Ave., Torrance, CA 90501, (213) 328-2814 / Southwest: 330 North Belt East, Houston TX 77060, (713) 445-0100.

VISIT US AT BOOTH #406 NAB SHOW

# **Ikegami HK-312**

Circle (33) on Reply Card

AMERICAN SOCIETY OF  
TELEVISION CAMERAMEN, INC.

P.O. Box 296, Sparkill, NY 10976



Billy Fox, our member at KCST in San Diego, rises to new heights on a Chapman crane. (Billy's the one minus the beard.)

## Take 1: Trained help wanted

(ASTVC Editor's note: This is the first article in a projected series dealing with the problems of finding sufficient numbers of properly trained personnel for the operations areas of the TV broadcast industry.)

A letter to ASTVC offices back in February of 1975 read as follows: "From time to time we have received inquiries regarding training for TV cameramen. Our cameramen are trained on the job and we know of no specific training sources for cameramen. Perhaps your organization could furnish us with the names of schools or training sources for TV cameramen. We would appreciate any information you might be able to furnish us as many of our inquiries are from high school counselors and students...(signed) W. Henry White, director of engineering, WSB Television."

This letter is typical of those we

receive from station management, industry personnel reps and vocational counselors in the various schools of learning. In this first article, we are going to address ourselves to future broadcasters by printing a letter which we send out to those schools providing TV related courses or departments. For the young aspirant currently enrolled in a TV-related program or about to choose courses or a school, we believe these words of advice may prove extremely helpful. In succeeding articles, we will follow-up with some case histories, including the experiences of some of TV's top cameramen and others in the related operating areas.

The letter from ASTVC's then-director of schools liaison section follows.

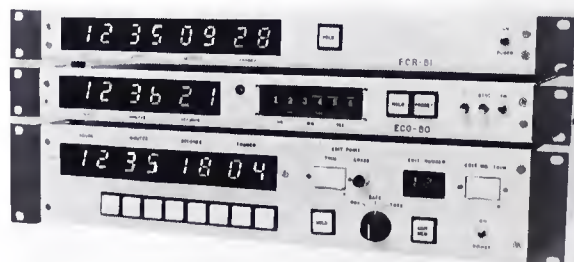
## Take 2: The letter

"Graduating seniors in the broadcasting field are finding that jobs are in short supply. Production oriented grads are confronted with personnel staffers who are deluged by an endless stream of equally qualified applicants for the same position. Let's face it, broadcasting has always been a tough nut to crack, and it's becoming increasingly difficult every day.

"Part of the problem has been the lack of a national organization (except perhaps the IEEE) that can aid the grad in getting that well-

## SMPTE Edit Code Generator and Reader,

Edit Memory Control, Time Code/Computer Interface, Character Generator, Syndicated Tape Programmer, Delay Program Controller . . .



All Kaitronics equipment are designed for easy integration into your existing editing system, syndicated programming, news, delay program recording and other station operations.

**ALWAYS QUALITY PRODUCTS AT REASONABLE PRICES!**

(We've been doing that for over a decade.)

For further information, call Paul Tarrodaychik, (408) 739-4262

**KAITRONICS** 1540 Gilbreth Road, Burlingame, CA 94010

Tel: (415) 697-9102

# The NEW MARK IX Family of Color Cameras

## We Have It All!

- Studio/Remote/Portable • Multiple Configurations • Standard or Triax Cable • Low Power Consumption (400 Watts) • 110/220 VAC or 24 VDC • Manual or Automatic Registration/Operation • Over ½ mile with Standard Cable, up to 1 mile with Triax • Compact, Lightweight CCU • Select from choice of view finders 1", 3" or 7" • Selection of pick-up tubes includes Bias Light and HOP • Remote Control Operation up to 500 ft. . . . and much more!



**STOP PRESS!!**  
**1" Helical Type C VTR's**  
**We've Got Them!**

**See Them All At NAB-Booth 322**

# Marconi Electronics, Inc.

100 Stonehurst Court Northvale, New Jersey 07647 (201) 767-7250

Circle (37) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)



S-20 10 Mixer Stereo

**JOIN** . . . the many hundreds of satisfied users of  
**LPB Signature Series Consoles.**  
 Contact us for the reasons that have made LPB Consoles the  
 practical choice among broadcasters.

**LPB®** LPB Inc.  
 28 Bacton Hill Road, Frazer, PA 19355 (215) 644-1123  
 See us in Dallas, NAB Booth No. 383

# COAXIAL TRANSFER SWITCH



- High Power Handling
- Very Fast Switching
- Remote Control
- Manual Override

- Independent Dual Interlock/Logic Systems

**MICRO COMMUNICATIONS INC.**  
 GRENIER FIELD, P.O. BOX 4365  
 MANCHESTER, NH 03108



Circle (36) on Reply Card

known "foot in the door," or supply information that would be useful to the undergraduate. Unlike other big corporations, networks and local stations do not send headhunters to technical schools or universities.

"Things are happily changing. Our organization, The American Society of Television Cameramen, has been formed as a "Professional-Fraternal organization . . . to bring together . . . members of the industry with similar occupational interests and experiences . . . and to promote the standards of professionalism within this segment of the TV industry . . ."

"Although we are known as the American Society of Television Cameramen, we are not all cameramen. Our membership is open to all individuals in the operational areas of broadcasting, and most importantly here, broadcasting students.

"In offering student memberships, the society, and I as director of the Schools Liaison Group, hope to give the future broadcaster an insight into the industry, appraise them of the most current techniques and equipment, help them to get the best out of job interviews, and hopefully in the not-too-distant future, make available a nationwide job information center.

"As the society grows, we'll be sending out newsletters containing information on the achievements of members, notes on the innovative and dates of upcoming meetings and seminars which are open to students. Also, as we open chapters in every state and/or city that has a television station, members of the society will become available for lectures, advice, or just plain "raping" with students about the day-by-day workings of the medium.

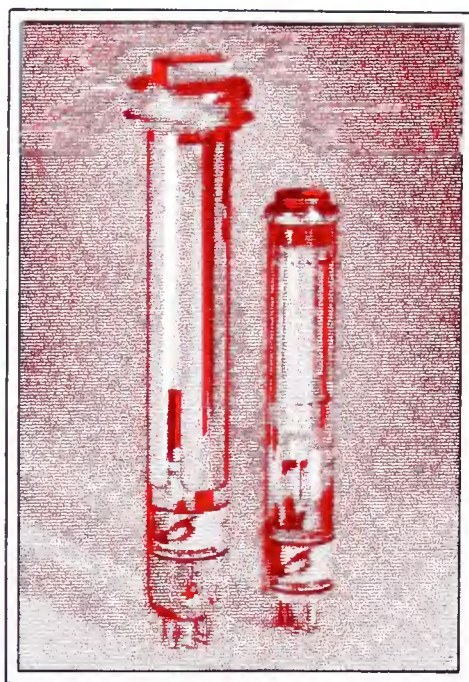
"We look forward to welcoming broadcasting students from all areas of the country, and from all types of learning institutions into our non-profit society. If you feel that the ASTVC can be a useful tool for your students, kindly pass along to them the enclosed information sheets.

"It is my sincerest wish, and that of the board of directors, that those of us actively engaged in television can open up a new and lasting dialogue with our future broadcasters for our mutual benefit and ultimately the enrichment of the medium."

The letter is signed by Kay Kaessler, then director of school liaison for the ASTVC.

# **Amperex continues investments in your future with next generation Plumbicon\* TV camera tubes.**

**Invest some time with us at NAB.  
Booth 310**



## **Amperex®**

TOMORROW'S THINKING IN TODAY'S PRODUCTS

A NORTH AMERICAN PHILIPS COMPANY

Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. Phone 401-762-3800.

\*Registered trademark N.V. Philips of the Netherlands.

**Circle (35) on Reply Card**

## Rep network completed

The Professional Audio Products Division of Sony Industries has appointed four sales representatives, completing its national network.

The four firms are 2001 Enterprises, Denver, CO; Kramerson-Randall Sales, North Syracuse, NY; Norpac Marketing, Bellevue, WA; and Ferman-Goldman & Assoc., Hollywood, FL.

Sony Professional Audio Products representatives sell Sony professional and semi-pro mics, mixers and headphones.

## Hot line installed

L-W International has installed a 24-hour hot line. Customers may contact L-W for service, parts or sales information at any time seven days a week at (213) 348-8614. L-W



ABC Sports used 2 Ampex VPR-2 VTRs for instant replay/slow motion during a recent Monday night football game. It was network TV's first use of Type C for slow motion and of the SMC-60 slow motion controller.

# Introducing the TCU-1!

## A very affordable, highly reliable digital Time Control Unit for broadcasters.

The TCU-1 is the newest digital time control unit from PWH Electronics.

Designed to provide precision timing and control operations for broadcasters seeking reliability, flexibility and expandability at a moderate price, the TCU-1 incorporates many important features in a standard size, rack mountable frame with easy access hinged front panel.

Features include two time bases with automatic switching, power supply backup, and a time event generator for controlling up to

four time events every 24 hours. In addition, options are available to increase capacity to six events per day, to allow multiple switching of each event every day, and to program activations on seven day cycles.

The TCU-1 is completely compatible with other PWH units. It can be used as a master clock for driving any number of Cenchron

remote slave readouts, and it provides a parallel 24 bit BCD real time output for interfacing.

Ask us for complete details on technical specifications and applications.

**pwh**  
electronics Ltd.

*Designed and built for broadcasters by broadcasters.*

PWH Electronics Limited, 637 College Street, Toronto, Ontario, Canada M6G 1B6. Tel: (416) 533-6331.

Circle (38) on Reply Card

## Looking for a professional audio product?

Westlake Audio is a lot more than a studio builder. We represent, stock, sell and service the finest professional audio products available today! Microphones, tape machines, amplifiers, speakers, consoles and more. Whatever your product need, call Westlake Audio.

### Consoles

Audiotronics • Automated Processes • Harrison • Cetec  
Allen & Heath • Yamaha

### Tape Machines

3M • Electro Sound • Otari and Nakamichi

### Synchronizers

Automated Processes • 3M • EECO

### Monitor Speakers

Westlake Audio • JBL • Gauss/Cetec

### Amplifiers

Crown • JBL • Crewin-Vega • SAE • Yamaha

### Microphones

AKG • Electro-Voice • Neumann • Sennheiser • Shure • Sony

• Beyer • PML

### Support Equipment

Allison Research • Amber • Atlas • Auratone • Countryman • DBX

• Dolby • Editall • Eventide Clockworks • Inovonics • Koss

• Lang Electronics • MRL • MXR • Multi-Sync • Orban-Parasound

• Pandora • Pultec • Sennheiser • Sony • Stephens • Suprex

• U.R.E.I. • White • EMT • Micmix

### Custom Acoustic Design and Construction

Complete Studio, Control Room and Echo Chamber Design,  
Construction, Wiring and System Interface.



from acoustic design  
to down beat...

**Westlake  
Audio**

6311 Wilshire Boulevard  
Los Angeles, California 90048  
(213) 655-0303  
Telex 698645

Circle (39) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

# MICROCAM<sup>®</sup>...



# because life is a contact sport.



Cover it close. Right where it lives. In the political arena or on the fifty yard line. In the heart of the city, or miles from nowhere. On location, or in studio A, Microcam covers it all.

Microcam, developed by Thomson-CSF Laboratories. The first shoulder-mount color TV camera to offer the combined benefits of studio-quality broadcasting with lightweight portability. In fact, Microcam weighs just 12.4 pounds for a total of 22 pounds, complete with motorized lens and a 5 pound silver cell battery which operates the camera for 6 hours on a single charge. Microcam provides all the essential features for superior pictures from the field or in the studio.



- Automatic beam optimizer prevents comet-tailing
- Low power consumption of 20 watts
- High index f/1.4 prism assembly
- Three position gain switch 0, +9, +18 dB
- Automatic color balance, automatic iris, and black level
- Built-in masking, split-field color bar generator and 2-line enhancer
- Color genlock included as standard
- Superior light sensitivity to allow clear, sharp pictures with only two footcandles of available light
- Variable H & V Blanking to meet the latest production requirements
- Available with optional 4½" Viewfinder and Remote Control System for EFP or studio operation.

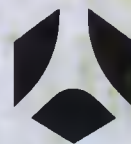


Plus complete VTR Control, including start-stop, VTR stand-by and return video. And a complete set of operating indicators, including VTR status, located in the viewfinder.

Only Thomson-CSF gives you a choice between the monoblock MC-601 Model and the two-piece MC-602. Both cameras bring broadcast quality and ease of operation to Electronic News Gathering, field production, as well as studio applications.

Microcam. For close-up coverage. Because life is a contact sport.

For more information about the remarkable Microcams, call or write.

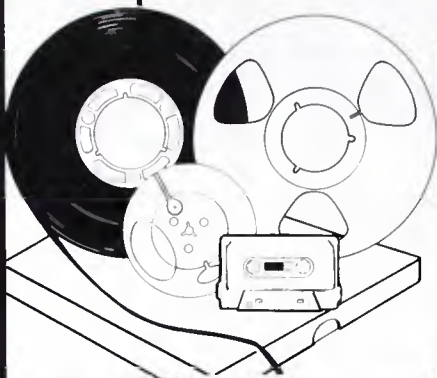


## THOMSON-CSF

Thomson-CSF Laboratories, Inc.  
37 Brownhouse Road  
Stamford, CT 06902  
Tel. (203) 327-7700  
TWX (710) 474-3346

Circle (40) on Reply Card

## Audio Tape for professionals



### REEL TO REEL TAPE

Ampex, 3M. All grades.  
On reels or hubs.

### CASSETTES, C-10—C-90.

With Agfa, Ampex, 3M tape.

### LEADER & SPLICING TAPE

### EMPTY REELS & BOXES

All widths, sizes.

— COMPETITIVE • FROM STOCK —

For your catalog, call or write: **Tom Franke**



Div. of  
Polyline Corp.

312/297-0955

**Recording Supply Co.**

1233 Rand Road  
Des Plaines, IL 60016

Circle (41) on Reply Card

## Business news

International manufactures stop-motion, slow motion analytical and telecine projectors, film viewers and analyzers and markets a 16mm cine-pulse data recording camera.

### Companies merge

Chyron Corporation and its subsidiary, Systems Resources Corporation, have merged. The name of the merged organization will be Chyron Corporation. The merger took effect January 2.

### Service award debuts

Dynair Electronics has established an award to be presented to active members of the television industry with 15 or more years of service. The Order of the Iron Test Pattern award, a medallion and credential, will be presented to all qualified applicants.

Applications are available from Phyllis Lynch, Herald, Order of the Iron Test Pattern, Dynair Electronics, Dept. BE, 5275 Market Street, San Diego, CA.

### New facility begun

Oak Industries of Crystal Lake, IL, has begun work on a \$4.5 million corporate headquarters in the Rancho Bernardo Industrial Park, San Diego, CA. The complex also will house a corporate research center and Oak Communications.

The colonial Spanish style structure is expected to be completed by the end of this year.

### CVS reduces prices

CVS has announced price reductions of 8-20% on three of the company's digital time base correctors. The new prices apply to the CVS 520, CVS 516 and the CVS 517.

According to William Miller, director of marketing, the reductions resulted from lower component costs and manufacturing efficiencies made possible by high sales volume.

All orders received after January 3, 1979, will be delivered at the new prices. Detailed price lists and information about volume purchase can be obtained from the CVS.

## McMARTIN DELIVERS A KNOCKOUT PUNCH!



BA-5K2

See it on display — NAB Booth 317

Give your station a lively signal that attracts listeners. Take a look at the new **McMartin BA-5K2** — a 5KW, single ended, three tube AM transmitter based on the design of the highly successful BA-10K ten kilowatt model.

The BA-5K2 features 125% positive modulation capability using a straight-forward plate modulated design providing high performance and reliability at reasonable cost. Other features include a 12 phase power supply, an oil filled modulation transformer, crystal controlled oscillators, LED status indicators, full metering, and cutback power of 2500 or 1000 watts.

**McMartin is what you've been looking for.**

**McMARTIN** • McMARTIN Industries, Inc. • 4500 S. 76th St. • Omaha, NE 68127 • Phone (402) 331-2000 • Telex 4844

Circle (42) on Reply Card

# The CSD-510 ...

all the capability and accuracy  
you are likely to need

**MASTER**

**CLOCK SYSTEM**

**DRIVER!**



**LEITCH**

Progressive Concepts in Television Technology

Leitch Video Inc.  
210 South 8th Street  
Lewiston  
N.Y. 14092  
Phone: (716) 754-4349

Leitch Video Limited  
705 Progress Avenue  
Scarborough, Ontario  
Canada — M1H 2X1  
Phone: (416) 438-5060  
Telex: 065-25420

Circle (43) on Reply Card

## Business news

Marketing Department, Dept. BE, 1255 E. Arques Ave., Sunnyvale, CA 94086.

### No growth predicted

Robert Garbutt, manager of the professional products department of Sharp Electronics, forecast a little or no growth in 1979 of the A/V cassette sales for the industry as a

whole but predicted an increase by as much as 15-20% for Sharp's A/V cassette sales.

Garbutt based his predictions on the effects of President Carter's anti-inflation campaign and California Amendment 13's mini-tax revolt. Because of these, funds for training and education will be cut, thus stopping the growth in sales of equipment.

In 1978, Sharp's A/V tape record-

er sales were over 25% of their 1977 level. Sharp has new A/V products to be introduced throughout the year, therefore, Garbutt is convinced that Sharp won't follow the industry's trend.

### Ampex

Ampex will supply the National Broadcasting Company with broadcast video equipment and support services for NBC's coverage of the 1980 Moscow Olympics. The contract, valued at approximately \$4 million, calls for Ampex to deliver 41 VPR-2 helical scan videotape recorder/reproducers, 41 TBC-2 digital time base correctors, nine SMC-60 slow motion controllers, six VPR-20 portable VTRs and 17 HPE-1 helical editing systems.

Deliveries to NBC in New York will start in May with deliveries to Moscow commencing in January 1980.

The Iraqi Ministry of Information ordered 12 Ampex AVR-3 quadruplex videotape recorder/reproducers and supporting equipment for regional television stations in Mosul, Basrah and Kirkuk. Ampex will also provide installation training for engineers.

### Victor Duncan

The Video Division of Victor Duncan announced the sale of three MNC-71CP color video cameras to ABC affiliates, KVII in Amarillo and KVIA, El Paso, TX. The cameras will be used to upgrade both news and production departments of these stations.

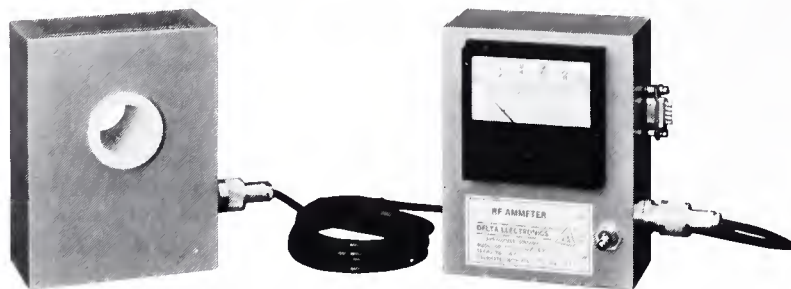
### Bosch-Fernseh

Bosch-Fernseh will deliver two outside broadcast cars to the Soviet Union for live transmission and recording of news and sports events during the Moscow Olympics. The two Mercedes 250s will be equipped with two KCA hand-held color cameras, audio system, radio link and portable VTRs. The vehicle will provide active cameras while in motion, one on a roof turret and the other in a trailer.

### Companies move

Microband Corporation of America and Microband National System have moved their corporate office

## DELTA does it accurately



TCA-10/20-EXR Dual Scale Remote Output  
On/Off and Hi/Lo Switching.

### RF Ammeter Systems

- MEETS FCC REQUIREMENTS OF 2% ACCURACY •
- MINIMUM MODULATION EFFECT •
- ALL COMPONENTS CAN BE GROUNDED FOR SAFETY •
- ON/OFF SWITCH FOR GREATER LIGHTNING PROTECTION •
- PATENTED TEMPERATURE COMPENSATED RECTIFIER CIRCUIT •
- WIDE TEMPERATURE RANGE  $-40^{\circ}\text{F}$  to  $+150^{\circ}\text{F}$  •

The Delta series of TCA RF Ammeter systems utilize a toroidal current transformer (TCT) to obtain a sample voltage proportional to the RF current flowing in a conductor. This sample is then connected to a special temperature compensated rectifier circuit via a 50 ohm coaxial cable. The rectifier converts the RF sample voltage to a DC current to drive an indicating instrument.

Every TCA system is calibrated at our laboratory at an RF frequency in the broadcast band—corelated to the National Bureau of Standards. Correction curves are supplied when more than 2% accuracy is required.

We have a wide range of models, scales and optional items which are illustrated and explained in our RF Ammeter Products catalog. Just call or write us for more information.

**DELTA ELECTRONICS**



5730 GENERAL WASHINGTON DRIVE  
P.O. Box 11268 • ALEXANDRIA, VIRGINIA 22312  
TELEPHONE: 703/354-3350 TWX: 710-832-0273

Circle (44) on Reply Card

# We're Unwrapping Some Surprise Packages at the NAB in Dallas.

## **SURPRISE #1**

### **HIGH-RESOLUTION, SHADOW-MASK COLOR MONITORS**

The finest professional shadow-mask color monitors available. Priced far below the competition. Ready for immediate delivery. Compare these features:

- Broadcast and teleproduction master monitor quality
- A/B, RGB differential inputs standard
- Complete remote control of *all* monitor functions
- Comb filter standard
- Available in 14", 20" and 23" rack or cabinet models

## **SURPRISE #2**

### **A SENSIBLE ALTERNATIVE TO WAVEFORM AND VECTOR MONITORS**

Now you have a reliable, high-quality alternative in a full line of waveform and vector monitors — with a no-nonsense delivery schedule. Check these outstanding features:

- 8-10 week delivery
- Full broadcast performance
- PAL and NTSC versions
- Vector encoder option
- Exceptionally bright, 10x10 cm display
- Compact, 5-1/4" high half-rack package

## **SURPRISE #3**

### **THE Lenco TREASURE HUNT**

If all that isn't enough to have you stampeding to our booth, we're continuing with our fabulous Lenco TREASURE HUNT. *Our 4th Annual Giveaway is \$531!* No need to purchase. No restrictions. Customers, prospects, suppliers — even our competition — can play. Just sign in at our booth, or at our hospitality suite high atop the new Lowes Anatole Hotel. You'll get a set of clues to lead you to the Lenco TREASURE. The first to find it collects the loot. Don't miss the fun!



### **LENCO, INC., ELECTRONICS DIVISION**

300 N. Maryland St., Jackson, MO. 63755, (314) 243-3147

**SURPRISE YOURSELF AT BOOTH #372  
NAB / DALLAS**

Circle (45) on Reply Card



## Business news

to 655 3rd Avenue, New York, NY 10017.

### Satellite service organizes

Since the signing of the International Maritime Satellite Organization (INMARSAT) Operating Agreement on January 10, COMSAT has called for an early establishment of INMARSAT. INMARSAT will re-

place the MARISAT system after the expiration of its services in the early 1980s. MARISAT provides communications satellite services to the US Navy and to commercial shipping and off-shore industries through three multi-frequency satellites. INMARSAT would provide commercial global maritime communications services.

Dr. Joseph Charyk, president of COMSAT, said that COMSAT will

accept an initial investment share of 35%. At least 95% of the shares must be accepted before INMARSAT can come into existence. If the 95% of the shares have not been accepted by May 15 COMSAT is prepared to commit the deficiency to insure that INMARSAT will come into existence 60 days thereafter, said Charyk.

INMARSAT would be patterned along the lines of INTELSAT, through which COMSAT provides international communications satellite services.

### Test extended

The FCC extended the special AM stereophonic test authorizations. Station WSM in Nashville was permitted to continue operation through February 27 and station WGAR in Cleveland through February 28. The terms of the extended authorizations are the same as those contained in the original authorizations.

### Retrofitting BVH-1000s

The recently adopted SMPTE Type C helical-scan format has given 1-inch non-segmented videotape recorders a shot in the arm. With standardization, tapes made on the machine of one manufacturer can be played back on those of others which conform to the Type C criteria. As a result, much confusion has been eliminated and the format has been strengthened.

To help those who purchased 1-inch units before standardization, Sony, as one of the participants and supporters of the agreement, instituted a retrofit program for all machines sold before the Type C standardization.

This major undertaking, originally planned to be completed by the end of 1978, is now nearing completion as BE goes to press.

"To meet this tough schedule," said Arnold Taylor, vice president, Sony Broadcast Division, "the company has had to focus many resources and draw on engineering talent from throughout the US and Japan. To change an original BVH-1000 to meet the SMPTE Type C standard requires several modifications, including the installation of a whole new head drum assembly.

### Retrofit program

As soon as the Type C format was adopted by the SMPTE, Sony Broad-

# NEW! Beaucart Audio Console.



See us  
at NAB  
Booth  
No. 407

Here's a console that will, literally, win a place in your heart: The new Beaucart® audio console from UMC/Beaucart. Our eight-channel stereo console incorporates every feature a broadcaster could ask for. Expandable to sixteen-channel stereo with the addition of standard top plug-in channel modules. Three fully metered matching stereo busses out plus a standard mono feed buss. Three selectable inputs on each channel module for a maximum of 48 hard wired console inputs. A momentary, cue buss access, select button on each channel for auditioning without disturbing pre-set volume levels. On/off buttons are noiseless DC switched. Rear lighted VU meters. Optional LED clock and weather station. And on top of all that, the Beaucart console has been beautifully human engineered to make it a real pleasure to program with.

Want to know about our new audio console? Write today, or call 203/288-7731 for a look at the state-of-the-art in audio consoles. Don't forget, we're the Broadcast Products Division, UMC Electronics Co., 460 Sackett Point Road, North Haven, CT 06473.

# UMC®

Outside Connecticut, toll free, (800) 243-6178.

Up to now you had to choose between the turntable you wanted and the turntable you could afford.



Technics MKII Series. The SL-1300 MKII automatic, the SL-1400 MKII semi-automatic and the SL-1500 MKII manual.

You expect a quartz turntable to give unparalleled speed accuracy. And these do. What you didn't expect were all the other advantages Technics totally quartz-controlled direct-drive system gives you.

Like torque that cuts buildup time to an incredible 0.7 seconds. And at the same time maintains 0% speed fluctuations with loads up to 300 gms. That's equivalent to 150 tonearms tracking at 2 gms. each.

And that's not all. Technics MKII Series adds quartz accuracy to whatever pitch variation you desire. In exact 0.1% increments. At the touch of a button. And instantaneously

displayed by the front-panel LEDs.

And to take advantage of all that accuracy, Technics has a low-mass S-shaped universal tonearm that's so accurate, friction is down to 7 mg. (vertical and horizontal).

Technics MKII Series. Compare specifications. Compare quartz. And you'll realize there's really no comparison.

MOTOR: Brushless DC motor, quartz-controlled phase-locked servo circuit. SPEED: 33 $\frac{1}{3}$  and 45 RPM. STARTING TORQUE: 1.5 kg · cm. BUILDUP TIME: 0.7 seconds (= 90° rotation) to 33 $\frac{1}{3}$  RPM. SPEED DRIFT: Within  $\pm 0.002\%$ . WOW & FLUTTER: 0.025% WRMS. RUMBLE: -78 dB. PITCH VARIATION:  $\pm 9.9\%$ .

Technics MKII Series. A rare combination of audio technology. A new standard of audio excellence.

**Technics**  
Professional Series

Circle (46) on Reply Card

## QUALITY TALKS FOR KCKC

San Bernardino, California



Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the cleanest sound around. Listen to Continental: quality talks.

Write for brochure: Continental Electronics  
Mfg. Co. Box 270879 Dallas, Texas 75227  
(214) 381-7161

**Continental**  
**Electronics**

Circle (47) on Reply Card

## Business news

cast's R&D department began developing the necessary engineering preparations for retrofit. In the US, engineers designed a retrofit line to optimize the efficiency of the modification process at facilities in Long Island City, NY, and Compton, CA. "As nearly as possible," noted Carlo Severo, broadcast engineering and service manager of the Eastern Region, "the machines were recalled in the same order in which they'd been purchased: first sold, first retrofitted. Sony provided crates when necessary and shared the cost of shipping. The cost of the modifications to Sony customers was set at a nominal sum of \$1000."

### Assembly line

Each machine runs through a streamlined "assembly line" where different stages in the retrofit process are performed. The engineers, technicians and support personnel who work on the retrofit line are carefully selected, rotated every few weeks and come from all parts of the world. "We choose our best engineers to work in the retrofit program," said Severo, "but it's still important to match their particular



Using assembly-line techniques, Sony is retrofitting BVH-1000s sold before the SMPTE Type C agreement to conform to the new standards. Here technicians at Sony Broadcast's Long Island facility install new head drum assemblies in BVH-1000s.

Now appearing on your TV screen...

THE MOST  
UNFORGETTABLE  
CHARACTERS  
YOU'VE EVER SEEN

Plus ■ 27 Nanosecond Resolution ■ Full Function Dual Channels ■ Instant Italics  
■ 64-Color Palette for Characters and Backgrounds ■ Animation Effects  
■ Prompting Displays ■ A Wide Array of Font Styles and Sizes ■ Software-Based

**CHYRON IV<sup>®</sup>**

the All-New Titling and Graphics System

See us at NAB Booth 382

**CHYRON** TELESYSTEMS DIVISION OF CHYRON CORPORATION

265 Berthpage-Spagnoli Road, Melville, New York 11747 ■ Telephone: (516) 249-3296 ■ Telex: 144522 CHYRON MEL

Circle (48) on Reply Card

# Now. A broadcast quality TBC for heterodyne VTRs



## it controls blanking problems too!

It's the CVS 516, first digital TBC made and priced to give users of non-segmented, heterodyne VTRs all the proven advantages of modern digital video processing.

The CVS 516 is ideal for ENG, teleproduction, studio VTR backup and much more because it has features that, before, you'd find only in TBCs costing up to twice as much.

Correction of chroma/luminance delay problems, a chroma noise reduction of 3 dB, velocity compensation and color dropout compensation are all standard. So are a broadcast stable, gen-lock sync generator and a built-in, completely adjustable processing amplifier.

The 516 also includes circuitry to closely control FCC blanking problems. For example, it combines exclusive CVS Gyrocomp memory organization with a 12 line (or optional 16 line) memory, automatic VTR advanced sync and available H and V blanking adjustments. The result is complete control of output blanking.

Simple operation is another plus. Front panel con-

trols give you total mastery of your video signal. Each control also has a preset unity position to give you a consistent starting point for all your tapes.

If all that's not enough, add our optional, moderately priced Image Enhancer/Noise Reducer. This plug-in card substantially reduces luminance and chroma noise, and significantly improves subjective resolution.

The CVS 516 weighs only 35 pounds, stands just 3½ inches high and uses only 175 watts—major advantages with today's increased emphasis on ENG and field production.

So, to give your heterodyne productions the quality they deserve, get the one digital TBC made and priced to do the job—the CVS 516.

For full details and/or a demonstration, contact your Authorized CVS Distributor, or CVS, today. Also, be sure to ask for our popular booklet about the basics of digital time base correction, and a reprint of the article "TBCs, Blanking and the FCC."

**CVS** Consolidated  
Video  
Systems, inc.

1255 E. Arques Avenue, Sunnyvale, California 94086 (408) 737-2100 Telex: 35-2028

Circle (49) on Reply Card

## Business news

talents with the right job. Some engineers are particularly good at video measurements, others at audio and so on."

### The retrofit path

Sony's retrofit process takes place in the following steps:

- Each machine is first inspected for optimum performance.
- The tape path alignment is checked to assure that the new head drum lays down the video track precisely as required by the SMPTE Type C format.
- In the next two steps, audio and video alignment, the relevant circuit boards are electronically aligned.
- Reassembly and final check.

Sony reports that the retrofit program has progressed smoothly with a minimum of difficulties and that the program is expected to be completed by the end of January, 1979.

## Equipment order

ABC-TV has placed an order with Ikegami Electronics for approximately \$4 million worth of HK-312D studio color broadcast television cameras. The announcement was made recently by Julius Barnathan, ABC vice-president for broadcast operations and engineering, and Nick Nishi, vice-president of Ike-

## RCA

RCA has announced its sales of studio and transmitting equipment since the new year.

Combined Communications has purchased RCA equipment valued at approximately \$1.5 million for upgrading the technical facilities of its seven group television stations. Fourteen TK-76B ENG cameras and three TK-46 studio cameras are included in the sale.

Competitive Edge Productions is adding three RCA color TV cameras to expand its commercial teleproduction capabilities. The company is installing two TKP-46 studio-quality portable production cameras and a TKP-76B lightweight portable unit.

Unitel Production Services is expanding its New York City facilities with RCA videotape systems. Two TR-600 quadruplex videotape recorders have been added.

gami.

The network already has 32 of the cameras in operation in its stations and affiliates in New York, Chicago, Los Angeles and elsewhere. Seventeen of the first units will be equipped with triaxial cable adapters that allow operation up to a mile from their base station. □



ABC president for Broadcast Operations and Engineering Julius Barnathan, left, shakes the hand of Nick Nishi, vice president of Ikegami Electronics, at the SMPTE show.

**announce that these studios have already chosen the new Studer A800 multitrack tape recorder.**

| Studio              | Location       | Qty | Model |
|---------------------|----------------|-----|-------|
| Air Studios         | London         | 4   | A 800 |
| Bayrischer RDF      | Germany        | 1   | A 800 |
| CBS Sony            | Tokyo          | 4   | A 800 |
| Canyon Records      | Tokyo          | 4   | A 800 |
| EMI                 | London         | 2   | A 800 |
| Easy Sound          | Copenhagen     | 1   | A 800 |
| Fuji TV             | Tokyo          | 1   | A 800 |
| Filtrosn            | Montreal       | 1   | A 800 |
| Hessischer RDF      | Germany        | 1   | A 800 |
| Kitty Records       | Tokyo          | 2   | A 800 |
| Life Records        | Hong Kong      | 2   | A 800 |
| London Weekend      | London         | 2   | A 800 |
| Marcus Studios      | London         | 5   | A 800 |
| NTV                 | Tokyo          | 1   | A 800 |
| Philips             | Netherland     | 1   | A 800 |
| Rockfield Studios   | Wales          | 4   | A 800 |
| Sierra Audio        | Burbank        | 1   | A 800 |
| TBS                 | Tokyo          | 2   | A 800 |
| Trident Studios     | London         | 2   | A 800 |
| Wessex Studios      | London         | 1   | A 800 |
| Eastern Sound       | Toronto        | 3   | A 800 |
| CSSR                | Prague         | 2   | A 800 |
| Radio Transamerica  | Rio De Janeiro | 1   | A 800 |
| Studio 55           | Los Angeles    | 1   | A 800 |
| Dawnbreaker         | San Fernando   | 1   | A 800 |
| Studios             | Detroit        | 1   | A 800 |
| PAC-3               | Chicago        | 1   | A 800 |
| Paragon Recording   | New York       | 1   | A 800 |
| Sterling Sound      | Sharon, VT     | 1   | A 800 |
| Suntreader Studios  | Atlanta        | 1   | A 800 |
| Glixman Productions |                |     |       |

# STUDER

# Studer A-800



When performance is  
more important  
than price

...demanding recording engineers and studio managers choose Studer. And when the requirement is multi-track, their choice is likely to be the new Studer A-800 with 14" reel capability, 1/2 horsepower spooling motors and microprocessor controlled deck functions for the smoothest, fastest tape motion you've ever seen. It also includes new phase compensated amplifiers, a self-contained Autolocator function and numerous other convenience and quality features that make Studer's slightly higher purchase price less costly in the long run. For complete information on the Studer A-800-16 and A-800-24, please write to us.

## STUDER

Studer Revox America, Inc., 1819 Broadway, Nashville, Tennessee 37203 / (615) 329-9576 • In Canada: Studer Revox Canada, Ltd.

Circle (51) on Reply Card

# The \$1950 V-blanking alternative



## CVS AVA and your TBC

AVA is short for Automatic VTR Advance, a stand alone, 1 $\frac{3}{4}$ " high, 19" wide unit that works with your existing broadcast TBC to greatly reduce the possibility of excessive vertical blanking errors.

Connection of the CVS AVA to most brands of digital TBCs is fast and easy, and operation is straightforward. AVA continuously monitors off-tape vertical sync and compares it to the TBC vertical. It then generates an advanced comp sync signal which steers the VTR output and keeps it centered within the TBC window, thus reducing the possibility of excessive vertical blanking errors. If you want, you can override automatic operation and use a front panel control to set the VTR sync phase manually.

So before you go out and spend a lot of money on new equipment, just to prevent excess V-blanking, consider the AVA alternative. It may be all you need to do the job, for a fraction of what you expected to spend.

To ensure timely delivery of your AVA, order today from your Authorized CVS Distributor, or from CVS in Sunnyvale, California.

Price stated is F.O.B. Sunnyvale, CA.



**Consolidated Video Systems, inc.**

1255 E. Arques Avenue, Sunnyvale, California 94086  
(408) 737-2100 Telex: 35-2028

Circle (52) on Reply Card

62 *Broadcast Engineering* March 1979

## meetings, events & seminars

**See the NAB preview coverage  
beginning on page 95**

**March 24-28**—The fourth European conference on electrotechnics, Eurocon '80 will be held in Stuttgart, Germany. It will review recent significant developments, trends and applications in the field of microelectronics.

For more information, contact: Dr. W. E. Proebster, IBM Deutschland GmbH, Dept. BE, Postfach 80 08 80 D-7000 Stuttgart 80, Germany.

**April 6**—The NRBA Sales Management Seminar is a 14-hour program divided into two parts. Part 1 deals with recruiting and screening new personnel and then leading them to successful sales. Part 2 outlines new concepts in managing and motivating the veteran staff.

The seminars will be conducted in Tulsa, OK, with Jim Williams and Larry Elwell of the Welsh Company and station owner/consultant Jay Smith conducting. Total cost of the seminar is \$195.

Other seminar dates are May 18, June 15, July 20, August 17, September 14, October 26 and November 16.

For further information, contact: NRBA, Dept. BE, 1705 De Sales Street NW, Washington, DC 20036.

**April 16**—Abstracts for papers for presentation at the 12th Annual Connector Symposium are due. Abstracts should contain a minimum of 200 words plus the author's name, full company address and work phone number. Final manuscripts are due on August 13.

Papers will be published in the Symposium Proceedings to be presented at the 1979 symposium, October 17-18.

For more information, contact: Paper Chairman, 12th Annual Connector Symposium, Dept. BE, P.O. Box 1428, Camden, NJ 08101.

**April 17-19**—The 11th Annual Video Forum sponsored by the Video Systems Division of Peirce-Phelps will be held in Philadelphia. A second forum will be held in Washington, DC on April 24-26.

There will be an exhibit of new state-of-the-art video and audio equipment with particular stress on equipment introduced at NAB.

For more information, contact: Darlene Zultewio, Peirce-Phelps, Dept. BE, 2000 Block North 59th Street, Philadelphia, PA 19131.

**April 23-26**—Audio-Visual '79 will be held at the Wembley Conference Center, London. Audio-visual equipment, projectors, wallboards, microprocessors and show programming techniques will be exhibited.

For more information, contact: MacLaron Exhibition Limited, Davis Housso, Dept. BE, P.O. Box 109, 69 High Stroot, Croydon, Surrey CR91QH.



# VERSATILE.

## O'Connor Model-50. A fluid head with 378 combinations.

### NEW, ADJUSTABLE BALANCE, QUICK RELEASE PLATFORM.

The Model 50-D Fluid Head can be ordered with one of six different forms. Each has its special features and purposes, but our newest is the ultimate.

First, it has a unique camera mounting plate which can be attached to your camera in one of eight different positions. This is used to balance your camera on the head, greatly improving the head's performance. Besides an adjustable camera mounting plate, the entire platform (with camera atop) can be shifted



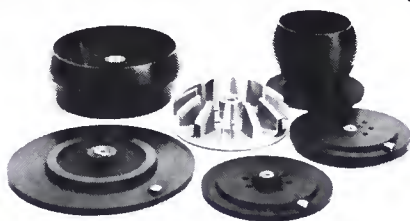
back and forth on the head so that you can find the precise center of gravity for whatever particular gear you're using at any given moment, such as heavy lenses, large magazines, etc.

It takes only a second to release your entire camera with O'Connor's new quick release option. To prevent accidental releases, it has a built-in safety feature.

### WITH BASES, WE'RE LOADED.

The Model 50 can be ordered with one of six bases. Besides two Pro types, Mitchell, Arri 16 and

Arri 35, we also offer the O'Connor Claw Ball Base with the "ultra positive grip." The distinctive aluminum ridges



dramatically increase the holding power with far less effort needed to secure it in position. This Claw Ball design can also be adjusted  $\pm 15^\circ$  to the horizontal plane within the top casting of the tripod to correct or alter your panning plane.

### O'CONNOR COUNTERBALANCE DEFIES GRAVITY.

Three counterbalance spring options are available for the Model 50. It is important that you use the proper method to determine which spring is correct for your needs. If you're not sure, consult an O'Connor dealer or talk to us direct.

When you have the correct counterbalance spring, you should be able to stop the camera at any point in the normal tilting range and release the handle without the camera moving.

And it should take no more effort to tilt it upward than it does to tilt it downward. We specifically design counterbalance into all our heads to correct this natural act of gravity so that your "tilts" are as steady as your "pans."

### MORE CONTROLS FOR MORE CONTROL.

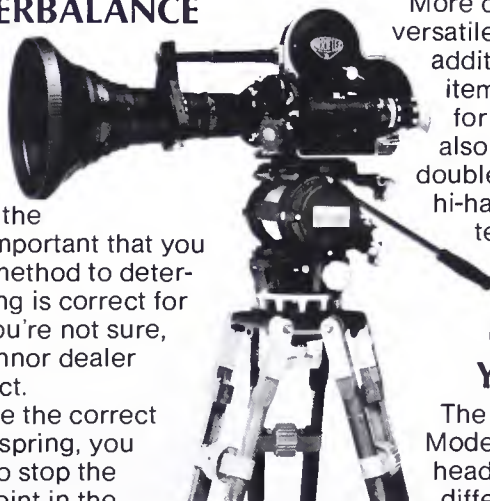
Like all O'Connor heads, the Model 50 is designed to provide maximum versatility. Separate controls for the pan drag, pan lock, tilt drag lock—all improve the flexibility and repeatability of camera movement.

### O'CONNOR HAS MORE OPTIONS.

More options mean a more versatile system for you. In addition to some of the items already mentioned for the Model 50, we also have adjustable double video handles, hi-hats, cases, adapters, teak tripods and the ever amazing Hydro-ped.

### ORDER IT YOUR WAY.

The basic O'Connor Model 50 fluid camera head can be ordered 378 different ways. If you're not sure how you want yours, maybe you should send for our brochure and price list to help you pick the equipment that's perfect for your needs.



# O'Connor

FLUID CAMERA HEADS

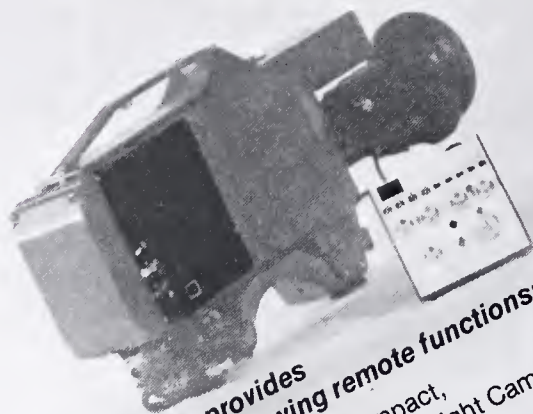
BOOTH NO. 2500

O'Connor Engineering Labs., Inc., 100 Kalmus Drive, Costa Mesa, CA 92626 • Phone (213) 627-4057 • TELEX 685 641  
O'Connor Engineering Ltd., 11 Rue des Moraines, 1227 Carouge, Geneva, Switzerland • Phone (022) 42 79 38 • TELEX 23 329

Circle (53) on Reply Card

March 1979 *Broadcast Engineering* 63

## ANNOUNCING DIGITAL CONTROL FOR YOUR HL-77



A single coaxial cable provides the following remote functions:

iris  
ped.  
R gain  
B gain  
R ped.  
B ped.

RV cent  
BV cent  
RH cent  
BH cent  
auto/man iris  
auto/man gain

mono  
cap  
wht. clip  
detail  
tally  
genlock

Compact,  
Lightweight Camera  
Interface,  
Network Proven  
(Encoder not shown)

innovation that works...

**Swic hegami**

a division of Spectrum Video, Burbank, CA 91502  
See The SWICKEGAMI D.C.U.  
At NAB Dallas, Booth 412

**NEW PRODUCT**

Circle (54) on Reply Card

## Meetings, events & seminars

**May 22-24**—A seminar, *Telecommunications: trends and directions*, will be held at Dunfey's Hyannis Resort at Hyannis, MA. The program sponsored by the Communications Division of the Electronic Industries Association, is designed to provide an in-depth briefing on the status of the telecommunications industry for members of the financial community.

The formal sessions consist of 3½ days of panels covering a wide range of telecommunications functions, including manufacturing and operations.

For more information, contact: Peter Bennett, EIA, Dept. BE, 2001 Eye Street NW, Washington, DC 20006

**May 31**—Abstracts for papers to be presented at the first annual *Gallium Arsenide Integrated Circuits Symposium* are due. The papers should cover topics related to Gallium Arsenide Integrated Circuits including linear integrated circuit applications, digital integrated circuit applications, processing technology and packaging and testing. The seminar will be held at Lake Tahoe in September.

For more information, contact: Dr. D. Howard Phillips, Symposium Chairman, Lockheed Microelectronics Center, Space Systems Division, Dept. 62-23 Bldg. 151, Lockheed Missiles & Space Company, P.O. Box 504, Sunnyvale, CA 94086.

## New DATA-FILM<sup>TM</sup> computerized editing system prints your editing/timing log—automatically

SEE IT AT NAB  
BOOTH 539  
LEVEL III

Save hours of editing time daily! DATA-FILM automatically logs film segments, out-takes, and cue tabs, times film by section—and gives you printed reports that also note locations of film defects



and splices. A digital display provides a running record of time remaining in a program! Flip a switch to translate from minutes/seconds to footage or convert European to U.S. framing standard. And DATA-FILM features a real computer that can be programmed to do even more. DATA-FILM comes as the newest option on our TV-120 film editing/inspection system which also includes our 40 square inch screen Previewer<sup>®</sup>. Optional Quik-Trac<sup>®</sup> Speed Processor lets you run films at twice normal speed and hear all the words at normal pitch! Altogether the most useful single system ever engineered for the film room. Call toll-free 800-323-7520\* for color brochure and latest TV equipment and supplies catalog. Ask about lease/purchase plans.



4700 Chase, Lincolnwood IL 60466

\*From Illinois, Alaska, Hawaii or outside U.S. call 312/677-3000

Circle (55) on Reply Card

# This UHF Transmitter Has Beauty More Than Skin Deep



A quick glance reveals that Townsend UHF television transmitters are better looking than Harris or RCA transmitters. That's nice. But what is really important is the fact that our transmitters also have superior design features. Look for yourself.



**TOWNSEND ASSOCIATES, INC.**

Circle (56) on Reply Card

P.O. Box 1122 • Mainline Drive Industrial Park, Westfield, Massachusetts 01085 • 413-562-5055

| FEATURE                            | TOWNSEND ASSOC.                                                               | HARRIS                                             | RCA                                                                                |
|------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------|
| INSTALLATION CONFIGURATION         | Back-to-wall mounting. All servicing from front of transmitter.               | Middle-of-floor mounting. Servicing front & rear.  | Large, rambling cabinetry. Servicing front & rear.                                 |
| SPACE REQUIRED FOR KLYSTRON CHANGE | 4 ft. in front of cabinetry.                                                  | 8 ft. in rear of cabinetry.                        | 8 ft. in front of cabinetry.                                                       |
| KLYSTRON TUNING                    | From front control panel.                                                     | From rear of transmitter.                          | From front of transmitter.                                                         |
| CONTROL CIRCUITRY                  | Plug-in octal relays mounted on front panel. Spares avail. from several mfgs. | Solid state. Spares avail. only from original mfg. | Hand wired relays of many types buried in transmitter. Spares only from orig. mfg. |
| METERING                           | Complete metering of all important circuits. No meter switches.               | Lacks several meters used by Townsend.             | Lacks several meters used by Townsend.                                             |
| BEAM POWER SUPPLIES                | One for each amplifier.                                                       | One for entire transmitter.                        | One for entire transmitter.                                                        |
| HIGH VOLTAGE CONTACTOR             | Vacuum type.                                                                  | Vacuum type.                                       | Air type.                                                                          |
| COOLING                            | Avail. with vapor or water Klystrons to suit customer requirements.           | Avail. only with vapor cooled Klystrons.           | Avail. only with vapor cooled Klystrons.                                           |
| EXCITER                            | I.F. modulated, solid state.                                                  | I.F. modulated, solid state.                       | I.F. modulated, solid state.                                                       |



## Even though we're No. 1 in Broadcast Monitors, **WE STILL TRY HARDER**

The more customers we earn, the more we learn and the more we improve on our quality line of AM, FM and TV frequency and modulation monitors. It's this close attention to our user's needs and desires that has put TFT on top of the heap and continues, year after year, to make TFT the standard of the industry.

Features like fully frequency-synthesized tuneable RF preselectors for off-the-air monitoring, digitally settable peak flashers, digital readout and pushbutton function selection are the direct result of customer input; and the pay-off is versatility, lower maintenance costs, greater reliability and extended coverage. TFT monitors (the world's largest line) include Frequency and Modulation Monitors as well as Aural Modulation TV Monitors, AM and FM Monitors and Preselectors, SCA and Stereo Monitors and complete Emergency Broadcast Equipment.

For full facts, call or write:

**TFT** TIME & FREQUENCY  
TECHNOLOGY INC.  
3090 OAKMEAD VILLAGE DR., SANTA CLARA, CA 95051  
TEL 408 246 6365 TWX 910 338 0584

Circle (57) on Reply Card

## Meetings, events & seminars

**May 31**—All summaries for papers to be presented at the *IEEE Engineering Management Conference* will be due. Papers will be accepted based on the content of the summary submitted.

Suggested topics range from administrative experts to technology forecasting. Accepted summaries will be printed in a conference digest distributed at registration.

The 1979 Annual conference will be held in October.

For more information, contact: Dr. Edward A. Wolff, Dept. BE, 1021 Cresthaven Dr., Silver Spring, MD 20903.

**June 5-7**—The 26th Annual *Cleveland Electronics Conference and Exposition* will be held at the Cleveland Convention Center Mall. Technical meetings and workshops are designed for decisionmaking personnel in the electrical/electronic field.

For more information, contact: Mike Lapine, conference director, Dept. BE, 2728 Euclid Avenue, Cleveland, OH 44115.

**June 19-21**—A call for papers has been issued for the *International Microcomputers Minicomputers Microprocessors '79 Conference* to be held at the Palais des Expositions in Geneva, Switzerland. The subject matter includes microcomputer technology, software development systems and tools, advances in software technology, peripherals for minicomputers and microcomputers and instrumentation applications of microcomputers.

For more information, contact: Dr. Fred L. Morritz, Industrial and Scientific Conference Management, Dept. BE, 20, rue Hamelin, F 75116 Paris, France.

**June 20-22**—*APRS-International Exhibition of Professional Recording Equipment* will be held at the Connaught Rooms, Great Queen Street, Kingsway, London. Professional sound recording equipment will be on display.

For more information, contact: Association of Professional Recording Studios, Dept. BE, 23 Chestnut Avenue, Chorleywood, Hertfordshire WD34HA.

**July 2-6**—Motion picture, television, sound and audiovisual equipment will be exhibited at the *Film-International Technology Conference and Exhibition*. The conference will be held at the Royal Lancaster Hotel, London.

For more information, contact: British Kinematograph, Sound and Television Society, Dept. BE, 110-112 Victoria House, Vernon Place, London WC1B4DJ.

**July 17-20**—The 2nd Joint *INTERMAG-Magnetism and Magnetic Materials Conference* will be held at the Statler-Hilton Hotel, in New York City. This will be the only meeting of either of these major conferences during 1979. The joint conference is co-sponsored by the Magnetics Society of the Institute of Electrical and Electronics Engineers and by the American Institute of Physics.

For more information, contact: Dr. E. F. Luborsky, conference chairman, Dept. BE, General Electric R&D Center, P.O. Box 8, Schenectady, NY 12301.

# Get the full picture from NEC at NAB



## See us at Booth 2404

Circle (58) on Reply Card

# NEC

Nippon Electric Co., Ltd.

**NEC America, Inc.**

Broadcast Equipment Division

130 Martin Lane

Elk Grove Village, Illinois 60007

## Radio/Television

**John A. Lack** has been appointed to the position of executive vice president, programming and marketing for Warner Cable, a subsidiary of Warner Communications. Lack, who joins Warner from CBS where he was vice president of the CBS radio division and general manager of WCBS radio, New York, will be responsible for all programming services provided by Warner to its subscribers and the cable TV industry.

**Roy Martin-Harris**, former senior producer for the BBC, has been named executive producer of the Christian Broadcasting Network's internationally syndicated "700 Club" telecast. Martin-Harris plans to expand the program by going out on location more often and "to be creative and exciting."

**Randall H. Brown** has been appointed as a staff producer/director in the industrial-commercial video production department of Video Concepts. Brown was most recently field producer for the NBC affiliate in Columbus, OH, WCMH-TV.

The new chief engineer at 99X is **Ed Knapp** who has been maintenance supervisor at the station since December of 1977.

**Jack E. McKain** has been appointed director of engineering for KCMO-TV and Meredith Video Productions, Kansas City. McKain has served as assistant director of engineering at KCMO-TV since 1976.

**Ralph Thompson** has been appointed director of engineering at WIVB-TV, Buffalo, where he will supervise the station's entire technical facility, including studio switching and camera control equipment, videotape, film and master control areas, live ENG equipment, a color weather radar unit and a satellite earth station. Thompson comes to the station from WDVM-TV, Washington, DC, where he was chief engineer and director of engineering for the Post-Newsweek stations.

**Austin Walsh**, who is director of sales at WRKO radio, Boston, has been named chairman of the Boston Creative Screening Panel for the 19th annual International Broadcasting Awards sponsored by the Hollywood Radio and Television Society. Walsh will be responsible for naming a panel of seven to 10 members selected from the advertising and broadcast industries who will select the award winners.

**Chuck Goldmark**, former general sales manager at WXLO, New York, has been appointed general manager of WRKO, Boston.

The Massachusetts Broadcasters Association recently has appointed **Rodger Allan**, news director of WRKO radio in Boston, to the board of directors. Allan has been with WRKO for 18 years. He also teaches

broadcasting at Emerson College and the Leland Powers School and is an assistant professor of communications at Curry College in Milton.

## Manufacturers/Distributors

**John Dale** has been promoted to vice president and general manager of the magnetic tape division of Fuji Film. Dale joined the firm in 1974 most recently serving as general manager of the division.

**Robert W. Maier** has been named vice president of marketing at EAO Switch and will be responsible for marketing all of the firm's products in the US. Maier joins EAO Switch from Unimax Switch where he served as marketing manager for lighted products.



Dale



Maier



Park

The broadcast division of Sony has named **Bill Park** as the operations manager responsible for managing and directing the daily operation of the division. Before coming to Sony, Park was with Ampex in engineering and marketing positions.

**Bill Gillen** has been appointed to the position of general manager at Electronics Arts Intermix. Gillen's responsibilities will include expansion of existing programs, development of new programs and new outlets for programs.

The newly formed measurements and control system group of Analogic has appointed **Dr. Pierre Dogan** as manager. Dogan's latest position was as corporate development manager at C. S. Draper.

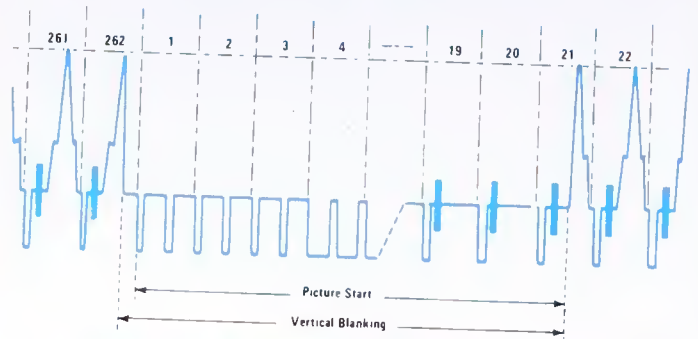
Installation checkout and subsequent service work with Broadcast Electronics control 16 automation system will be the major responsibilities of **W. D. Jones** in his position as automation service manager. Dow joins the firm from the automation service department of Harris' broadcast products division.

**John Leay** has joined Reeves Teletape's facilities group as vice president of engineering. For the past three years, Leay has been an engineering consultant for Lincoln Center, the Metropolitan Opera, Rossmore Television Systems and IBM.

**Fred Nakamura**, executive vice president and chief executive officer, Fuji Photo Film, has been elected to the board of directors. Nakamura has been with the

# MARCONI has the proven answer to 'H' & 'V' Blanking Measurements

**Marconi Television Interval Timer  
Model 2920 measures the  
following parameters**

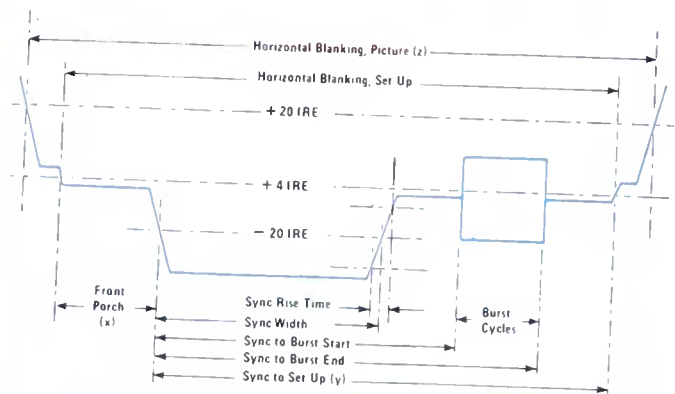


## VERTICAL BLANKING MEASUREMENTS

Total Vertical Blanking Interval  
Picture Start  
Equalizing Pulse Width  
Serration Width



Fast accurate measurements at the touch of a button  
Results based on samples taken throughout the active field  
Blanking at set-up (+4 IRE) and picture (+20 IRE) measured  
independently to 10 nsec. resolution  
Vertical Blanking resolved to 1/10 line  
Printout from BCD output on command  
All functions may be remotely controlled for simple system  
integration  
Manufactured in U.S.A., domestic price \$4500



## HORIZONTAL BLANKING MEASUREMENTS

Set Up Blanking (+4 IRE)  
Picture Blanking (+20 IRE), (z)  
Front Porch, (x)  
Sync Width  
Sync to Burst Start  
Sync to Burst End  
Sync to Set-Up, (y)  
Burst Length in cycles  
Sync Rise Time

## REFERENCE MEASUREMENTS

Burst Amplitude in IRE  
Sync Amplitude in IRE

Circle (60) on Reply Card

See How Easily Timing Measurements  
Can Now Be Made  
At NAB Visit MARCONI Booth 322  
Instrument Section

**mi MARCONI INSTRUMENTS**  
100 STONEHURST COURT, NORTHVALE, NEW JERSEY 07647  
TELEPHONE: 201/767-7250 • TWX: 710-991-9752

## People in the news

firm since 1953 most recently as executive vice president and resident manager.

The newly created position of executive vice president at Penril has been filled by **Paul E. Keane**. Keane has served as vice president for the past several years.

At the annual stockholders meeting of Penril held late last year, members re-elected **Alva T. Bonda** as chairman of the board and **Kenneth M. Miller** and **Merrill Solomon** as directors. The board re-elected as officers **Alva T. Bonda**, chairman and treasurer; **Kenneth M. Miller**, president and chief executive officer; **William S. Lambdin**, vice president; **Jack D. Phillips**, vice president; **Walter S. Robinson**, vice president; **Walter P. Olson**, secretary; **Gloria Ehrlich**, assistant secretary; and **Richard Margolis**, assistant secretary.

**John Camarda** has been named director of marketing for RF Technology. Camarda was most recently general sales manager for Thomson CSF Labs.

In a recent election, the Comsat board of directors elected president **Joseph V. Charyk** as president and chief executive officer and **John D. Harper** as vice chairman of the board. **Joseph H. McConnell** will continue to serve as board chairman until May when he plans to retire.

**Kenneth M. Leondar** has been appointed general manager of Cetec's antennas division. Leondar resigned from his position as marketing director for radio navigation systems at Teledyne Systems to accept the managership position last December.

**Paul F. Amedick**, former administrator of news and information, Broadcast Systems News Services, RCA Broadcast Systems, has been promoted to manager of the services. Amedick has been with RCA since 1968 in various public relations and publicity posts.

Marketing manager of Audio-Video, **Theodore M. Klarsfeld**, has been appointed to the board of directors. Klarsfeld has been with the firm since 1975.

The appointment of **Jim Lucy** as broadcast sales manager of C.S.P., Incorporated was recently announced. Lucy comes to the firm from Broadcasting for American Electronic Laboratories where he was national sales manager.

TRW Semiconductor has named **Kevin Finn** to the position of general manager, succeeding Stan Czerwinski. Finn has served as operations manager for the past year.

**Elliot Schwartz** has been named director of sales for KLH Research and Development joining the firm from Boss where he was national sales manager.

# SAVE THIS! AD!

## JUST A FEW OF OUR MANY LINES

AKG  
Ampey  
Ashly  
Beyer  
BGW  
CM Labs  
dbx  
Delta Labs  
Editall

Electro Voice  
Micro Trak  
MXR  
ORX  
Recordex  
Revox  
RSD -  
Studiomaster

Russco  
Scotch  
Sennheiser  
SESCOM  
Shure  
Soundcraft  
Sound Workshop  
Stanton  
STL  
Switchcraft  
Tapco  
Tascam  
Teac  
Technics Pro  
Uni-Sync  
Whirlwind

Even if you can't take advantage of these great deals, save this ad. K&L Pro Audio is dedicated to the cost conscious buyer. And you can always feel free to call us for technical information, system design assistance, or merely immediate on that microphone you need.

### STANTON 680 EL Cartridge w/Extra Stylus

Specially designed for the rigors of back-cueing, the Stanton 680 EL in an industry standard. Stanton cartridges and stylus are regularly stocked.

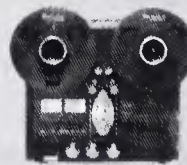


\$40.

### Technics PRO by Panasonic

#### RS-1500US

A work horse production deck, designed for the demands of the broadcast industry. Half-track/quarter-track, Quartz locked direct drive, isolated loop transport.



\$1440.00

### TDK Audio-Visual Cassettes

C-60 **96¢**  
C-90 **\$1.37**

### LIMITED OFFER SPECIALS

|                |            |              |          |
|----------------|------------|--------------|----------|
| Audio Technica | ATP-12T    | 12" Tonearm  | \$120.00 |
| Audio Technica | ATP-16T    | 16" tone arm | 120.00   |
| Electro Voice  | RE-50      | microphone   | \$85.00  |
| Scotch Classic | 10" - 2400 | reel tape    |          |
| Stanton 500AL  | cartridge  | \$10.50 ea.  |          |
| Koss Pro 4AAA  | headphones | \$15.00      |          |
| Technics SP-10 | turntables | in stock     |          |
| MKII           |            | \$49.95      |          |

75 North Beacon St.  
Watertown, Mass. 02172

**K & L  
PRO AUDIO**

(617) 926-6100

Circle (61) on Reply Card



See us at Booth 398 NAB

# CEI's newest camera goes out for the long ones.

CEI's new 330 can take you from one end zone to the other, from the tee to the green or anywhere up to 2400 feet from the control unit to the camera head.

You can achieve this extra half mile of reach at about half the cost of comparable equipment, plus the CEI-330 gives you more camera control at the electronics unit. Add to that the fact the CEI-330 is reliable, requires minimal power, is compatible to TV-81, and is of U.S. manufacture. We think you'll agree the 330 is your best buy in video today.

For the many CEI-310 users across the land, your system can be easily converted to a 330.

## cei

880 Maude Avenue, Mountain View, CA 94043  
(415) 969-1910 (Telex) 348-436

Circle (62) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

# The 13th annual SMPTE television conference

**Record attendance,  
828 paid attendees**

**Spectacular digital VTR  
demonstrated by Ampex**



**The Digital Panel** shown here fielded a barrage of questions on the future of digital television from a packed house at SMPTE's final Saturday session. From left, members of the panel were Ed Herlihy, Golden West Broadcasters (KTLA), Los Angeles; Dominique Nasse, CCETT, France; Arch Luther, RCA; Peter Rainger, BBC, London; Joachim Diermann, Ampex, Redwood City, CA; Marcel Auclair, Canadian Broadcast Corporation; Charles Ginsburg, Ampex; and K. Blair Benson, Video Corporation of America, New York.

The SMPTE Winter Television Conference convened February 2-3 at the St. Francis Hotel in San Francisco and the air was sparked with anticipation of new advances in digital television. Word had mysteriously leaked out that Ampex would unveil something special in its Saturday afternoon paper, and the house was packed with engineers eager to hear the news. They were not disappointed. Two Ampex engineers, Joachim Diermann and Maurice Lemoine, authored a paper which was delivered by Diermann during the Saturday afternoon session, relating Ampex progress on digital video recording. Because the word was out, this was somewhat more than a progress report; it included a spectacular demonstration of a laboratory digital video system.

But more about this achievement later. The SMPTE 13th Annual Television Conference set all new attendance records this year, exceeding all expectations even in view of the advanced billings for the conference format. The general arrangements for the conference were handled by Don Lincoln of KPIX in San Francisco, and the papers program was chaired by Carlos Kennedy of Ampex. The exceptional attendance this year appeared to be due to the efforts of the SMPTE Chairman as well as the content of the technical sessions and the exceptional quality of the exhibits.

## **Production update**

The opening technical session on Friday morning was devoted to production and post-production operating experience with 1-inch videotape recorders. The welcoming remarks were delivered by Fred Remley, the SMPTE vice president for television

affairs and technical director of the University of Michigan Broadcasting Service. This was followed by a paper presented by David Fibush, chairman of the SMPTE Helical Sub-Committee, who presented a report on the SMPTE 1-inch helical VTR standards effort. Fibush, from Ampex, was the session chairman for this first session and is remembered for his excellent paper presented last year covering the technical developments of continuous field VTR which acknowledged the hard work of both companies and networks for the emergence of a compatible Type C 1-inch VTR format.

The first paper from industry was presented by Ray Schneider, CBS Television Network, New York describing the CBS operating experience with 1-inch VTRs. He reviewed the CBS installation of 1-inch videotape facilities in New York, at Television City in Hollywood, and at CBS's Studio Center Film Production operation in North Hollywood. His account illustrated a marked devotion to the 1-inch non-segmented Type C format usage since CBS initiated this service in July 1977. Since then, CBS has introduced the 1-inch videotape equipment into production recording, production insert playback, post-production editing, and delayed network record and playback.

In addition, a number of edit systems have been designed, constructed and operated specifically at studio-dedicated facilities. CBS's experience to date has revealed that the 1-inch facilities provide an exceptional ease of operation of machines and systems, acceptable long-term video and audio quality, improved machine reliability and maintenance, and reduced storage space for tapes. The tone of Schneider's report left no doubt in the minds of the

## Ampex steals show with digital VTR demonstration

Two Ampex engineers reported at the SMPTE winter conference in San Francisco on the company's progress in digital videotape recorder technology and demonstrated an experimental digital VTR at the final session on Saturday that grabbed the full attention of a packed house.

The engineers, Joachim Diermann and Maurice Lemoine, cautioned their audience that the experimental digital VTR is being used as a development tool in Ampex's laboratories and is not a product, or even close to becoming one. Diermann pointed out that many questions must still be answered before a practical digital VTR can become a reality. Among the questions are size, weight, operating cost, initial cost and total operating characteristics of a digital system.

At Ampex headquarters, Donald V. Kleffman, vice president and general manager of the audio-video systems division commented on this system. "This is a status report on an experimental recorder," he said. "And although its video performance is extraordinary, it is not a product and we are not even suggesting that the format we have chosen is close to ideal. We firmly believe that a practical digital videotape recorder that satisfies the real needs of the broadcast industry is not just around the corner; it will be quite a few years before such a recorder can become a viable product.

"We feel an obligation," Kleffman continued, "to keep the industry informed and to help it maintain a balanced view. This report and



Ampex engineers Maurice Lemoine, left, and Joachim Diermann captured a record SMPTE audience's rapt attention with a remarkable demonstration of digital video. The system was housed in a standard VPR-3 quadruplex VTR cabinet, but the electronics bay (below) in the base contained an impressive array of new PC boards to yield striking digital pictures.



### Tape Format Parameters

|                                    |            |
|------------------------------------|------------|
| Track width                        | 5 mils     |
| Guard band                         | 2.5 mils   |
| Head-to-tape speed                 | 1600 ips   |
| Linear tape speed                  | 15 ips     |
| Linear packing density             | 27 Kbit/in |
| Number of lines per dual head pass | 16         |

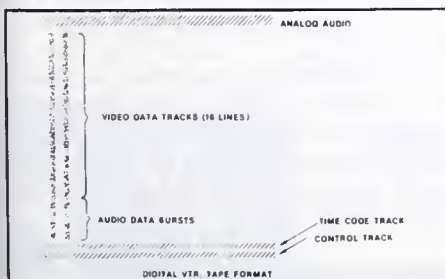
demonstration serve that purpose. We hope that others will follow our example and give the industry further insight into the status of this technology, and we also hope to encourage the users in this industry to tell the manufacturers in turn what it expects to gain from digital TV."

The Diermann/Lemoine SMPTE paper represents the latest in a continuing series from Ampex reviewing Ampex's progress in digital video development. At last year's conference, Diermann gave a paper outlining the parameters of this system; this year he followed up with an operating system.

The digital VTR demonstrated at SMPTE used Ampex AVR-3 quadruplex VTR chassis modified for test

purposes and containing an impressive array of new circuit boards. The system had a special video head assembly with eight transducers and a writing speed of approximately 1600 ips. The digitized video signal was recorded on two channels with each channel accommodating a bit rate of 43 mbits/sec. The composite 525/60 NTSC signal was sampled at  $3 \times f_{sc}$ , and each sample was digitized into an 8-bit word. Linear packing density was 25 kbits/inch.

This experimental unit had a conventional tape transport and utilized standard quad videotape. Track width was 5.0 mils with a guard band of 2.5 mils. The longitudinal tape speed was the standard 15 ips. □



# you can't resist russco!



What's to resist? Turntables that are the standard of the industry...Audio mixers, stereo and mono amps and preamps that are modern, trouble-free and built Russco-Rugged! Write or call today and get all the particulars on our great specs and LOW PRICES...You'll find RUSSCO is IRRESISTIBLE!



## **RUSSCO**

**ELECTRONICS INCORPORATED**

5690 E. Shields Ave., Fresno, Calif. 93727 • Ph. (209) 291-5591

Circle (63) on Reply Card

## News feature

audience that CBS will continue its adaptation of network stations to the 1-inch format.

A similar report was presented by Richard Green and Christopher Cookson, ABC in Hollywood on their design of and operating experience with a 1-inch videotape recorder complex. ABC also began the process of converting videotape operations from the 2-inch quadraplex standard to the 1-inch helical scan format in July 1977. First they converted the production of *General Hospital* and advertising to this format. The use of the 1-inch systems made it possible to convert *General Hospital* from basically a live-to-tape production with a minimum of editing, to a program which is heavily edited, involving over 25 edits per each hour segment. The speed and accuracy of electronic editing using 1-inch VTRs made possible for ABC to rely heavily on post-production to create its hour-per-day drama. Green described these facilities which utilize a CMX-340 computer video editing system with a Grass Valley digital effect processor and E-MEM effects memory interfaced with Ampex VPR-2 machines. In addition, ABC uses an audio sweetening post-production facility with an MCA automated console.

In terms of remote field operations, Green described ABC's use of a VPR-2 to generate slow-motion effect on December 18, 1978 during the Miami/New England football game. (See page 48, this issue.) ABC used the SMC-60 slow motion controller to generate slow-motion effects directly from 1-inch VTR for the first time in the field remote operation. As true for CBS, ABC also praises the results of its conversion to 1-inch videotape machines. They have enhanced production and post-production capabilities and Green reports that expanding requirements in post productions will step up use of the 1-inch systems.

Allen Henderson, KSL Productions in Salt Lake City reported on the advantages which KSL Video Production has realized in the use of 1-inch VTRs in production creativity and profits. KSL began experimenting in 1976 with the 1-inch format using Ampex VPR-1 video recorders. The result is that KSL is now fully launched into the "video film-style" revolution.

Citing the advantages of 1-inch over quad Henderson reported a required capital investment 40% less than for 2-inch machines; far less videotape stock; lower total operating costs; reduced noise level because air conditioning and air compressors are not required; less space needed; high mobility in field productions; special production features such as still frame and slow-motion capabilities; a high confidence level from being able to see playback while recording; and the advantage of two full tracks of audio, plus a time code track.

Gridley Quihuis, Oral Roberts TV Productions Tulsa, reported on their use of the 1-inch Type C videotape format. Quihuis reported that the battery operation, light weight, and versatility of the 1-inch videotape system has aided the university in production and editing its prime-time shows. Furthermore, Quihuis reported extensive use of the system in videotaping programs in Haiti, Trinidad and Israel, with virtually no difficulties with environment conditions of temperature or dust.

### Microprocessors in editing

The afternoon session was devoted to microprocessor

# MOSELEY HAS IT!!

*Technology in step with today*

**NEW!**

**Model MRC-1**

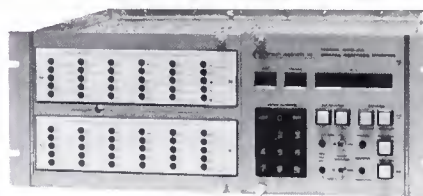
"The future"



Microprocessor  
Based  
Technology

**Model DCS-2A**

"The industry standard"



CRT display  
with  
Computer  
Option

**Broadcast Transmitter  
Microprocessor Remote Control**

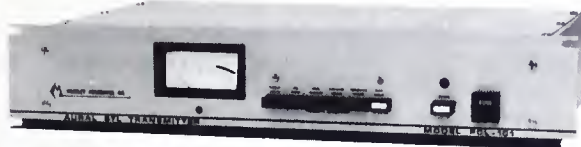
**Broadcast Transmitter  
Digital Control System**

**Models PCL-505 & PCL-505/C  
Aural Studio Transmitter Links**



**Model PCL-101**

"THE" STLs  
148-960  
MHz bands



**Stereo-AM and FM STL**

**Model SCG-9 Stereo Generator  
Model SCG-8 SCA Generator**



"The Combos"



**Model TFL-280 Audio Limiter  
for FM Stereo/Quadraphonic,  
FM Mono, SCA, TV Aural**

**Models RPL-3A, 4A, 4B**

150 MHz  
450 MHz  
bands



**FCC Type Accepted  
Remote Pickup Links**

"15 KHz  
Stereo"  
450 MHz

**Models TCS-1, TCS-2, TCS-2M**

"Utility"



**Telecontrol Systems for  
Broadcast, Communications,  
Earth Stations, Industrial**

Moseley Associates started the technology evolution in broadcast remote control and aural STL. We keep pace with the Models TRC-15A Analog Remote Control, DRS-1A Digital Remote System, ESC-10 Earth Station Control (PBS-TV), and a complete line of original accessories.

Moseley Associates introduces new products in step with today's technology. New models MRC-1 Microprocessor Remote Control and TRL-1 450 MHz Telemetry Return Link are industry firsts. Innovations in AM Stereo STL and RPL Service are yours for the asking.

*Write now for details and our product brochures. See Moseley at NAB Booth 329*

**MOSELEY ASSOCIATES, INC.**

A FLOW GENERAL COMPANY

SANTA BARBARA RESEARCH PARK, 111 CASTILIAN DRIVE • GOLETA, CA 93017  
(805) 968-9621 • CABLE: MOSELEY • TELEX: 658-448



sors in video editing and machine control systems, and the technical sessions were packed as usual. Norm Hobson, RCA, began the afternoon session by describing the TK-47 microprocessor-controlled color video camera. While this paper was, in essence, a replay of the RCA paper presented at the SMPTE conference in New York late last year, it provided an excellent balance to other papers by showing what microprocessors can do when used to the fullest in creating a fully automated, studio-type color camera.

In the paper that followed, George Bates, Convergence, described the use of a microprocessor with a unique software algorithm used in conjunction with a standard longitudinal time code and videotape recording control track to overcome limitations (such as velocity and change of velocity and direction) in time code editing systems. The use of the microprocessor in this application has made a marked advance in instrumentation possible.

Masahiko Morizono and Jun Takayama, Sony, Japan, described a microprocessor-based videotape editing system with film editing ease of operation using a microprocessor and hardwired arithmetic logic unit. As a result of this development, the authors expressed the belief that the key point in designing a videotape editing system is the ability to overcome the man/machine interface problems, especially if one is to surmount inherent system problems and realize fast decision making.

Hans-Dieter Geise of Bosch Fernseh GmbH, West Germany, described the use of microprocessors and mini-computers in the development of modern VTR controls. He described the development of helical scan broadcast VTRs that are broadening the horizons of production techniques with the use of intelligent components inside the VTR, and these are based upon sophisticated microprocessors. He described the 1-inch segmented field Type B Format VTR with slow-motion operation capabilities using a slow-motion programmer built around a microprocessor. Geise pointed out that their equipment employs a distributed processing concept which allows the equipment to fall into line with other control systems for Type B format VTRs.

This paper was followed by a stunning demonstration by Bruce Rayner of the Grass Valley Group, who used a videotape to show the full capabilities of video production and editing with a microprocessor-con-

trolled switcher using their E-MEM effects system. Rayner indicated that video switching philosophies may well change as experience is gained in applying memories and intelligent control aids in the operation of new switchers and switcher functions. Furthermore, he pointed out that microprocessor devices provide extensive aid in audio switching in post-production activities and provide significant intelligent links for character generators and in developing still store capabilities.

### Exhibitor's popular

Throughout the technical sessions on both Friday and Saturday the exhibitor booths were open to the SMPTE conference attendees, and they were crowded with potential buyers, even though the conference sessions themselves were packed during most sessions. Nearly 40 exhibitors were on hand displaying sophisticated products for TV broadcasters.

### Digital takes over

The entire Saturday morning technical sessions dealt with digital video effects and computer animation.

Michael Magri, NBC in New York, described in a paper on tracking chroma-keys with digital video effects how rear-screen TV projection systems can be replaced by chroma-key inserts controlling electronic image frames using digital video effects instrumentation. He pointed out that the alignment of the cameras and special effects generators is important, as well as special care to prevent insert motion and tearing, studio lighting, chroma-key screen position, and the relationship of the talent to the insert screen.

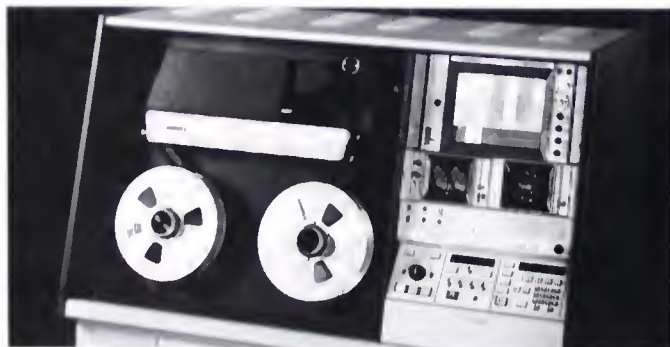
This paper was followed by one presented by Richard Taylor, Quantel, England, on the expanding world of digital effects. He described three new enhancement options for the Quantel digital effects system, all of which can be retrofitted on existing DPE 5000s. These enhancement effects include picture reversal, autolink, and multilink. The picture reversal gives the illusion of a picture reversing, mirror imaging, and picture spinning or tumbling. Autolink is a control routing switcher that enables multiple control panels to be used with one digital effects system.

Multilink, more sophisticated, allows interlinking up to four DPE-5000s with four control panels, in any combination, when multiple picture manipulation is required. First delivered late in 1977, the DPE-5000 system incorporates an LSI minicomputer, an Intel 8748 computer, and a 6800 microprocessor.

The one paper of the morning which seemed to fairly reach out and freeze the audience's attention was prepared by J. K. Moore, A. Kaiser and H. W. Mahler, CBS Technology Center, on further developments in the CBS Action Track. This system captured the audience's attention when Hank Mahler demonstrated how digital signal manipulations could produce striking visual effects when used with moving subjects. Action Track originally was introduced by CBS early in 1978 to produce multi-image displays of moving objects in real time. However, while last year's system was dramatic, it had undesirable limitations.

The adhorant problem in the first generation Action Track was that early movements being stored and displayed intorfered with subsequent movoments tha

AVR-3 quadruplex videotape recorder/reproducer housed the experimental digital VTR demonstrated by Ampex at the SMPTE conference.



THE MOST PRESTIGIOUS and EDUCATIONAL  
SEMINAR EVER HELD

April 1-4, 1979



Hilton Head Isle, SC

THE WORLD'S LARGEST INTERNATIONAL AUDIO/VIDEO TRADE ASSOCIATION

*presents*

**ITA Ninth Annual Seminar**  
**"AUDIO/VIDEO UPDATE — 1979"**

**Separate Workshops for 5 Areas of Interest!**

INDUSTRIAL and EDUCATIONAL VIDEO ☐ AUDIO  
MARKETING ☐ COPYRIGHT

*and*

**All Aspects of**  
**HOME VIDEO TAPE AND DISC SYSTEMS**

**Attendance Limited to 400**

Because of the limitation we place on capacity,  
at past ITA Seminars hundreds have been turned  
away — so don't let this happen to you.

More than 300 have already registered at Hilton Head,  
and there's room for less than 100 more.

*For complete program and information, write or phone:*

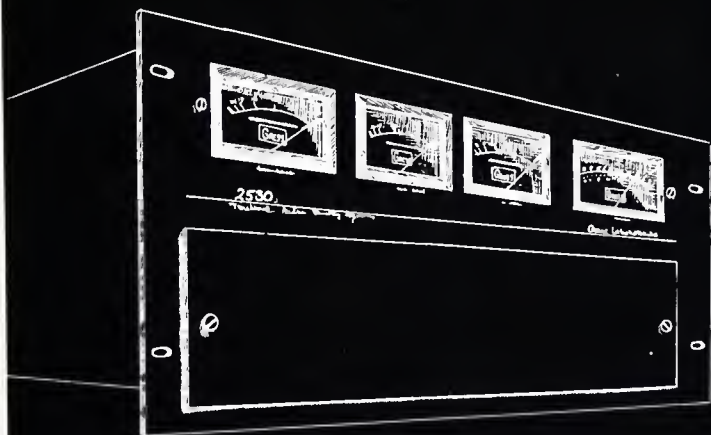


INTERNATIONAL TAPE ASSOCIATION, INC.

*The Sole Forum of the Audio/Video Tape and Videodisc Industry*

10 West 66th Street New York, New York 10023 (212) 787-0910 Telex: 42 15 08 ITA  
Executive Director, LARRY FINLEY

# Successful Radio Is More Than A Mental Process . . . It's An Audio Process.



Delivering **HOT AUDIO**

**Gregg Laboratories introduces  
the most highly perfected  
Audio Processing System available  
for AM/FM/TV and Recording Applications.**

**Astonishing Quality, Increased Loudness,  
and Less Listener Fatigue  
are only a few of the amazing differences  
achieved with these systems.**

**Hear these systems at NAB Dallas, Booth 2118  
or contact**

**Gregg Laboratories**

**2120 EAST HOWELL SUITE 505-506  
ANAHEIM, CALIFORNIA 92806  
(714) 937-1100**

Circle (65) on Reply Card

## News feature

were to be viewed. The CBS system displayed this year overcomes this limitation so that continuous movement can be displayed without earlier sequence pictures obscuring the following pictures.

The resultant effect displays the path of a ball, the stroke of a tennis player during a serve, or any other action where the sequence of every portion of the motion can be observed continuously from beginning to end. Another useful feature now incorporated in Action Track is that early images of a motion sequence can be made to decay, or to fade away at a selectable rate, as the action continues. The sequence of events then, as the action is followed, allows the ghost images of earlier events to fade away without interfering with subsequent action.

The next paper, by Edwin Catmull and Alexander Schure, New York Institute of Technology, on the use of computers in animated production contained some striking examples of what talent and computer-aided equipment can do to produce computer generated animations. The staff at NYIT consists of computer scientists, video technicians and animation artists assembled for the specific purpose of researching techniques to generate images and animations of broadcast quality. Their facilities include many computers, frame buffers, 2-inch VTRs, sophisticated computer graphics equipments and post-production facilities. The key piece of equipment for producing these graphics is the frame buffer, a memory which stores an entire colored video picture and is interfaced to their computer. However, even with sophisticated equipment and extensive software programs, digital synthesizing of pictures for animation takes from 15 seconds to 2 minutes duration. Even so, the resulting creations are striking in terms of color, motion and sound sync. To conclude, the authors presented a series of videotapes showing the use of their animations techniques and the power and versatility of their total system.

This paper was followed by one presented by Richard Shoup of Xerox Research on some experiments in television graphics and animation using a digital frame buffer. While this system seems to have been developed as an experimental toy by the staff of the giant Xerox Research facilities and is reported to have no commercial implications, the results demonstrated some remarkable achievements in terms of computer graphic creations. The experimental digital video system, which Shoup referred to as "SuperPaint," was built as a research program in computer imaging and digital graphic composition. He demonstrated the power of this system as used for news coverage of the NASA Pioneer Venus mission. SuperPaint consists of a digital image frame buffer holding 480x640 pixels (8 bits/pixel) representing the image picture, a data tablet and pen, several digital disc drives for picture storage and the mini-computer. Using a color monitor, the artist generating a graphic views an assortment of available colors, various brush shapes and sizes, and icons of various picture editing operations which he can utilize. A nearby monitor displays the picture he is creating, and this is, in essence, the artist's canvas.

The SuperPaint system provides power and flexibility.

# WELCOME TO DALLAS



## Mutual, the Network of the '80's, invites you to join us at the N.A.B. Convention in our Hometown.

Mutual...the innovator in Network Radio. We invite you to see and hear all about it during the NAB Convention, March 25-28, in Dallas (some of the Mutual Southwest Radio Network).

Visit our 10-foot satellite receiving antenna on display on the exhibit floor, Booth 2200, Level II. Learn why Mutual leads the way in satellite transmissions. Hear live 15 KHZ stereo broadcasts and network programming via satellite from our Washington, D.C. World Headquarters.

We'll also demonstrate hard copy transmission via satellite...another innovation from the leader in network radio.

Learn where radio is going in the coming decade from Mutual...“The Network of the 80's.”

### AFFILIATES LUNCHEON -

Sunday, March 25, at 12 Noon in the Grand Ballroom, Dallas Hilton. In attendance: The Dallas Cowboys Cheerleaders, Members of the NFC Champion Cowboys and Southwest Conference Representatives.

### HOSPITALITY SUITE -

Suite #2728, Hyatt Regency Hotel, 300 Reunion Blvd., Dallas. Open 4-11PM Sunday; Noon-11PM Monday & Tuesday; Noon-7PM Wednesday.

### EXHIBIT BOOTH #2200 -

Level II, Dallas Convention Center. Hours: 10AM-6PM, Sunday-Tuesday; 10AM-5PM, Wednesday.

### LARRY KING SHOW -

Mutual's all night, nationwide talk show broadcasting live from the lobby of the Hyatt Regency, 11:05PM-4:30AM, Monday and Tuesday. Larry will host numerous celebrities; come and see the show!

### MUTUAL SOUTHWEST NETWORK -

Open House at the Mutual Southwest Radio Network Headquarters, 4141 Office Parkway, Dallas. For information and transportation, talk to any Mutual representative at the Convention Center or Mutual Hospitality Suite.



**mutual broadcasting system**

Circle (66) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

ty in interactive processes which help the artist create the computer images. And, an important feature is that the operator need not have any command of computer programming. He composes pictures from figures drawn by hand, from prepared art work, or any materials scanned with a convention vidicon, or from computed or synthesized images previously stored in memory. Furthermore, he has full command of the size of the picture, its movement and whether its overlaid, combined, saved or erased from the disc.

### Digital video recording

The afternoon session on Saturday was the one awaited by all attendees. The house was packed, and standing room only was available for latecomers. Papers were presented by Peter Rainger, BBC, on a low bit rate system for digital coding of the television picture; Charles Ginsburg, chairman of the SMPTE study group on digital television, Ampex, on picture impairments caused by passing the NTSC color signal through a number of codecs in tandem; Dominique Nasse, France, on how separate-components digital video recording is needed and possible; Edward Herlihy, Golden West Broadcasters, on a review of digital video recording and what it will do for the broadcaster; and the anxiously-awaited progress report by Diermann and Lemoine, Ampex.

As previously indicated, word had escaped that the paper by Diermann and Lemoine would be accompanied by a laboratory demonstration of an Ampex digital video system. While all of the papers in the afternoon session were well attended, this one paper and its accompanying demonstration eclipsed everything that the conference had to offer. In the technical portion of the presentation, Diermann described a continuation of the design of a digital VTR system as previously outlined in his 1978 SMPTE winter conference paper. In that paper, he described the salient features of a digital VTR, conceived as a laboratory investigative tool, which could provide an

experimental vehicle to research the effect of digital video signals passing through magnetic recording channels. This year, with the help of co-author Lemoine, Diermann was able to demonstrate an actual experimental model of a laboratory system with broadcast quality digital video pictures.

The Ampex staff was quick to point out that this was an experimental digital VTR, not a commercial product. They acknowledged that this is not the first demonstration of this type; however, everyone at the conference recognized the far superior quality of the Ampex demonstration tape over previous systems. In fact, the quality of the tape demonstrated to the conference surpassed the quality of conventional videotape, with 60 dB S/N.

In the panel session that followed the digital tape session, numerous questions arose as to the future of digital video recording. In the final paper of the day, Herlihy, analyzed this problem from the broadcasters point of view. The key points of concerns to present day broadcasters, as reported by Herlihy, involve the status of recording digital standards, technical specifications for equipment, capital costs (this could be a problem if digital equipment costs exceed that of the 1-inch VTRs), operating costs, maintenance and the interfacing to remote control and editing facilities. Of all the points raised, Herlihy concludes that probably the most challenging aspect of the digital video questions is the adopting of suitable standards for the industry. He concluded that the role of the SMPTE in this aspect should take on new aspects; namely, standards should be set before the equipment is produced—not afterwards.

The digital panel which followed the digital session was moderated by Don West of Broadcasting magazine and consisted of Peter Rainger, BBC; Charles Ginsburg, Ampex; Dominique Nasse, France; Joachim Diermann, Ampex; Ed Herlihy, Golden West Broadcasters; K. Blair Benson, Video Corporation of America; Arch Luther, RCA; and Marcel O. Clair, Canadian Broadcasting Corporation. Questions from the floor and among the panel itself was lively and informative. Numerous questions were raised regarding the quality of the Ampex digital videotape itself. The conclusion voiced by both the attendees and by the panel itself was that Ampex had displayed a remarkable product in terms of picture quality.

The most significant conclusion drawn from the interaction of the panel and the audience was that digital video was certainly possible with today's technology, but that practical commercial systems would, and indeed should, be five to eight years away. A delay of this period is for the problems in digital standardization to be ironed out so that the new generation of commercial equipment would have standardized digital techniques already built-in. Therefore, expensive new equipment would not be quickly obsolesced. Everyone urged that efforts to continue standardization be pushed rapidly so that now equipment could be made available at the earliest practical time.

Following the SMPTE program, Ampex demonstrated their digital video system in a hospitality suite at the St. Francis hotel. People clamored and clawed their way to the foreground to see the digital system and to talk to its developer. While Ampex continued to proclaim that this was only a laboratory experiment, there was little doubt in anyone's mind as they left the conference that digital video is at hand. □

This is the vectorscope reading for the color bars in Ampex's demonstration experimental digital VTR.





# Raidettes

**Broadcast  
Quality in Slow  
Motion and  
Frame  
Advance  
Color Broadcast  
Motion and  
File Disc Recorders**

30 Seconds for Slow Motion or 1200  
Frames Slides • Unlimited Freeze  
Capability • Dual Channel Operation  
• 10,000 Hours Typical Head/Disc Life •  
Proven Reliability  
See our slo-mobile at NAB, booth #2125

**Okte Corporation**

490 Division Street, Campbell  
California 95008 (408) 374-1841

Circle (68) on Reply Card

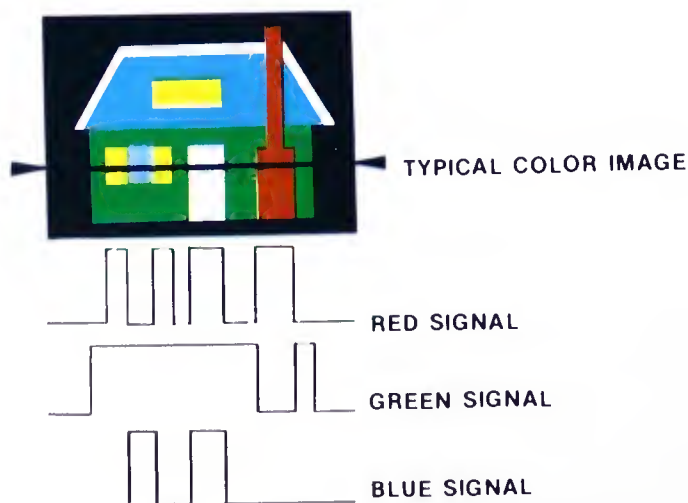


# Basics of color video

## Basics of color video Part 2



In the scanning process of a color image (upper left), the color camera separates the subject into three color image counterparts for transmission.



Waveforms show how the red, green and blue signals vary across a model color image during one scan line (indicated by the horizontal bar and arrows).

By John W. Wentworth, manager of broadcast technical training at RCA Broadcast Systems.

This concludes the coverage of the basics of color video which began on page 44 of the February issue of Broadcast Engineering.

### The Gamma-correction problem

The relationship between the grid-cathode voltage at the electron gun and the light output at the screen of typical kinescope (either monochrome or color) is nonlinear, usually following a power law with an exponent (gamma) about 2.2. That is, to a first approximation,  $L_s = e_s^{2.2}$ , where  $L_s$  is the screen luminance and  $e_s$  is the signal voltage (biased so that zero signal voltage corresponds to cut-off). Because proper color fidelity requires strict proportionality in the handling of the red, green and blue primary values, it is necessary to provide gamma correction for red, green and blue video signals to compensate for the kinescope nonlinearity. For both economic and noise-immunity reasons, it is best to provide the correction at the transmitting end of color TV rather than in every receiver.

Thus, a standard feature of broadcast-quality color cameras is a set of nonlinear amplifiers (gamma correctors) for the red, green and blue channels, as shown in Figure 11. The red, green and blue video signals are nonlinear functions of the basic colorimetric values of great practical significance in subsequent portions of the transmission system. (The gamma

correctors will not be shown in all subsequent diagrams in this article, but they are always implied.)

### Encoding and decoding

To achieve compatibility with monochrome television, color TV signals must be processed so they can be transmitted through the same channels used for monochrome signals, and they also must be capable of producing good monochrome pictures on monochrome receivers. Since color TV involves three variables in contrast to the single variable (luminance) of monochrome television, an encoding process is required (Figure 12). Likewise, a decoding process is required in the color receiver to recover independent RGB signals for control of the electron guns in the color kinescope. Moreover, the process used must enable monochrome receivers to produce monochrome pictures from the three-variable color signal.

The specific encoding and decoding processes used in compatible color TV are known as *matrixing*, *bondshaping*, *two-phase modulation* and *frequency interleaving*.

### Matrixing and band-shaping

Color video information is produced originally in most color cameras in the form of three gamma-corrected signals controlled by the red, green and blue components of the image. By repackaging this information in the form of a different set of three independent signals, it is possible to satisfy the compatibility requirement and also to restrict the bandwidth of the three signal components to achieve greater RF spectrum efficiency.

The repackaging is accomplished by so-called matrix circuits, which cross-mix the three primary-color signals in accordance with the following equations:

$$M = 0.30 R' + 0.59 G' + 0.11 B'$$

$$I = 0.60 R' - 0.28 G' - 0.32 B'$$

$$Q = 0.21 R' - 0.52 G' + 0.31 B'$$

The prime marks indicate that the R, G and B signals are nonlinear functions of the corresponding colorimetric values.)

One of the many possible circuit arrangements for performing the matrix operation is shown in Figure 13, and a typical set of M, I and Q waveforms derived from a simple image is shown in Figure 14.

If it were not for the gamma-correction problem, the signal component designated by M would be identical to the output of a monochrome TV camera with an ideal spectral sensitivity curve matching the standard luminosity function. That is, the coefficients for the red, green and blue signals have been made proportional to the relative contributions each primary makes to the total luminance, and they also have been fixed in such a way that 100% levels in all three primary channels (corresponding to the scanning of a reference white surface) will yield an M signal of 100% level. (Incidentally, in much of the literature of color television, the signal component designated here as M is designated Y or  $E_y$ .)

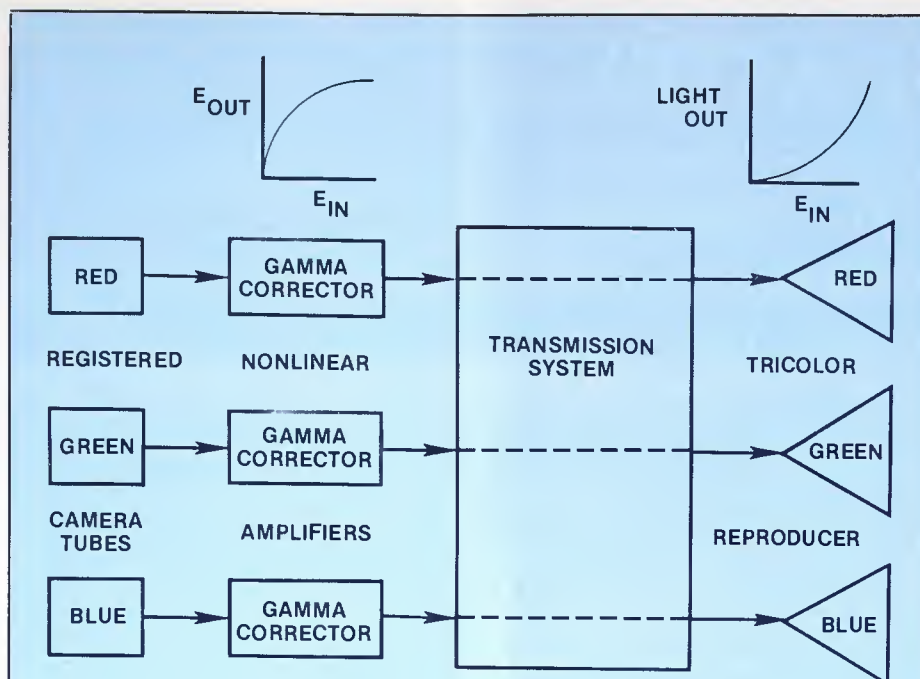


Figure 11. Broadcast-quality color video cameras contain a set of non-linear amplifiers (gamma correctors) inserted to achieve over-all linearity in the red, green and blue channels.

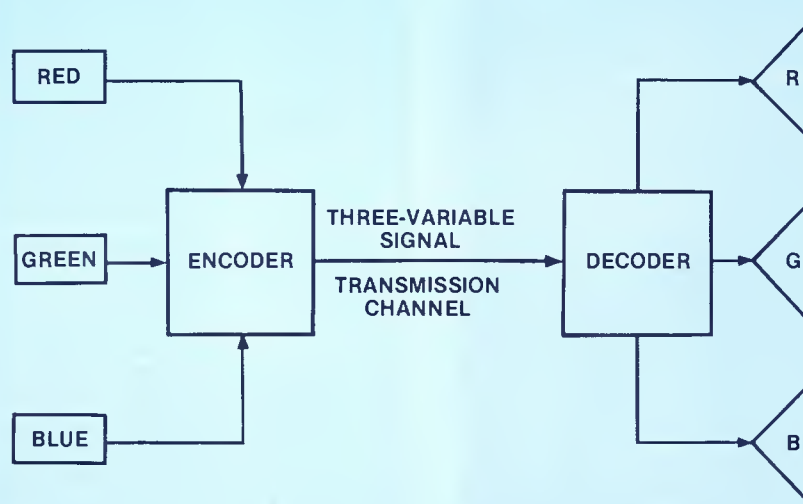


Figure 12. Encoding is required for the red, green and blue signals to provide a 3-variable signal that can be effectively broadcast over the single monochrome transmission channel.

Because of gamma correction, the M signal is only an approximation to a true luminance signal, but it is a sufficiently good approximation that this signal component is capable of producing good images on monochrome receivers. Note from the matrix equations (and the M waveform sketch in Figure 14) that the M signal is allowed to assume positive values only. This signal component is handled in most respects like an ordinary monochrome signal; that is, it is generated in accordance with the conventional scanning standards, it is combined with the standard synchronizing waveform, and it is modulated on a

carrier in a conventional TV transmitter.

### I and Q signals

The I and Q signal components are known as *color-difference* or *chrominance* signals; they indicate how the color being transmitted differs from a white or neutral in two independent directions on a color diagram in which white is plotted at the center. The I signal conveys information pertaining to color differences in the orange to cyan (blue-green) direction, while the Q signal conveys information pertaining to color differences in the green to purple direction.

# FACT!

## No one can match The Complete Lightning Protection Systems from LEA.

- ANTENNA DISSIPATION ARRAYS FOR AM, FM, TV, MICROWAVE TOWERS
- SURGE ELIMINATORS\* FOR MAIN POWER LINES OF SERIES HYBRID DESIGN TO HANDLE REPEATEDLY ENERGY LEVELS OF > 5500 JOULES PER PHASE
- \*THOUSANDS IN USE REFERENCES AVAILABLE
- KLEANLINE ELECTRONIC FILTERING SYSTEMS TO PROTECT AGAINST LIGHTNING STRIKES AT > 5500 JOULES PER PHASE PLUS AN RFI/EMI FILTER TO HANDLE RF INTERFERENCE FOR SENSITIVE SOLID STATE EQUIPMENT.
- TRANSIENT ELIMINATORS FOR DATA LINES, PHONE LINES, COMMUNICATIONS EQUIPMENT WITH A FREQUENCY RESPONSE FROM D.C. TO 1 GIGAHERTZ.
- LIGHTNING WARNING SYSTEMS PROVIDING 1/2 HOUR ADVANCE WARNING OF AN APPROACHING STORM.

- SURGE AND TRANSIENT GENERATORS
- GROUND SYSTEMS
- CONSULTING SERVICES

SEE US AT NAB  
DALLAS BOOTH 437

**Lightning Elimination  
Associates**



Box 1118  
Downey, CA. 90240

Circle (69) on Reply Card

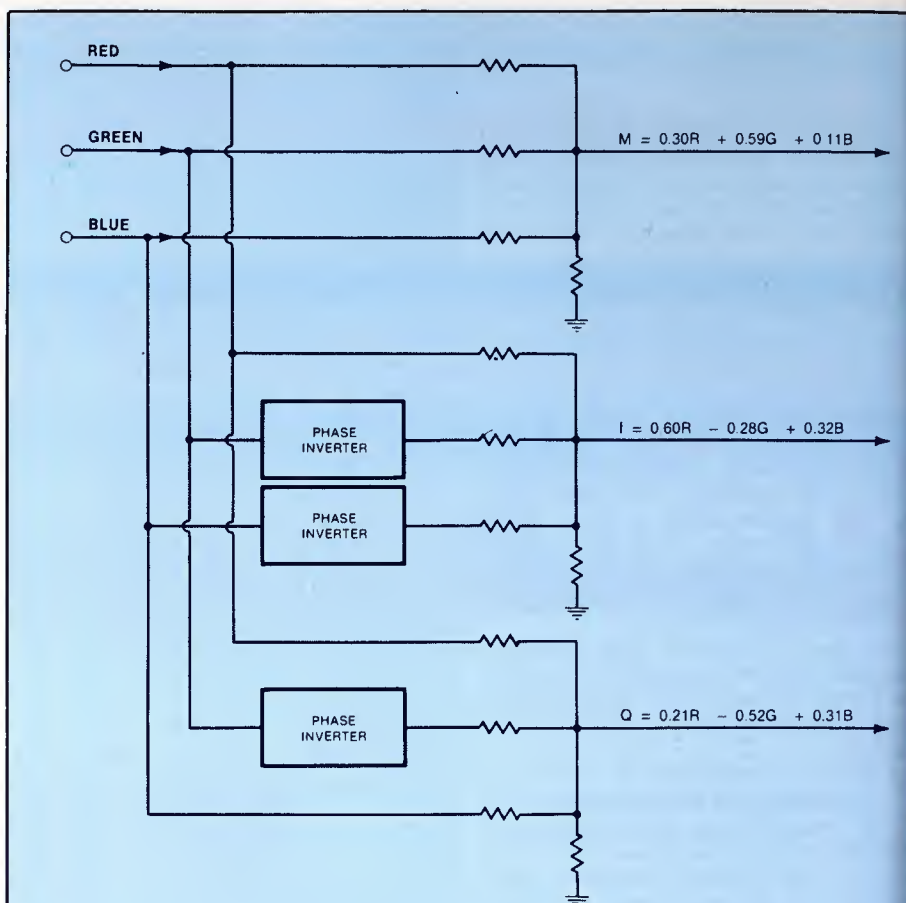


Figure 13. A typical matrix circuit, one of many possible, is shown here for re-packaging the primary video signals in a compatible color video system.

## Color television

Because some of the coefficients are negative, the I and Q signals may swing either positive or negative, as indicated by the waveform sketches in Figure 14. Note that both I and Q go to zero when  $R = G = B$ , designating a white or neutral condition. This condition is illustrated by the white door in Figure 14. It is noteworthy that when a color television camera is pointed at a scene with no chrominance values (a monochrome test chart, for example), the I and Q signals automatically disappear

and the remaining signal (M) becomes truly identical to the output of monochrome camera.

To recover red, green and blue signals suitable for the control of a tricolor reproducer, the M, I and Q signals are passed through a second matrix circuit in the color TV receiver which performs a cross-mixing operation that is the inverse of the original cross-mixing operation at the transmitting end of the system. The receiver matrix simply solves the set of three

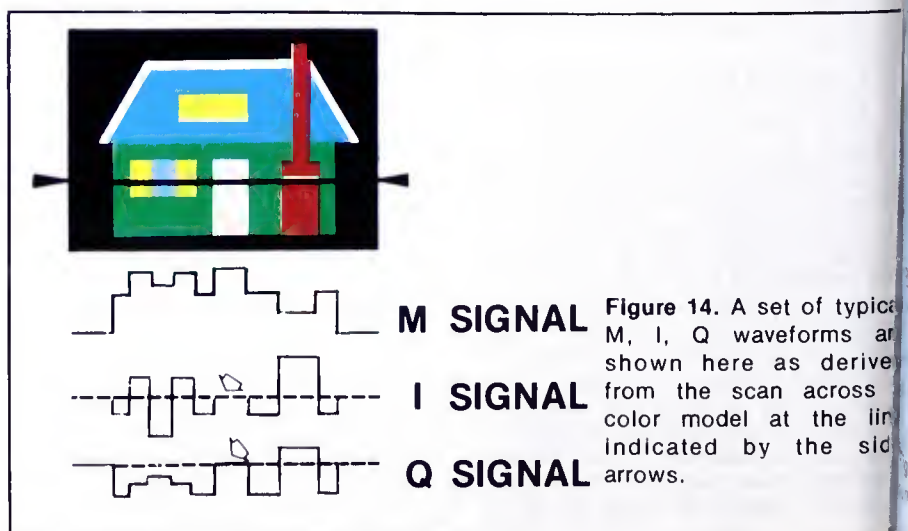
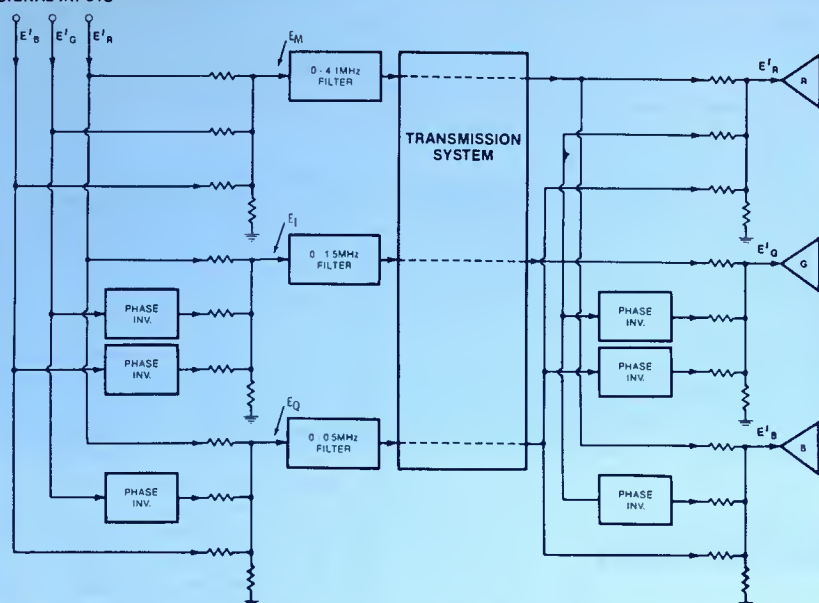
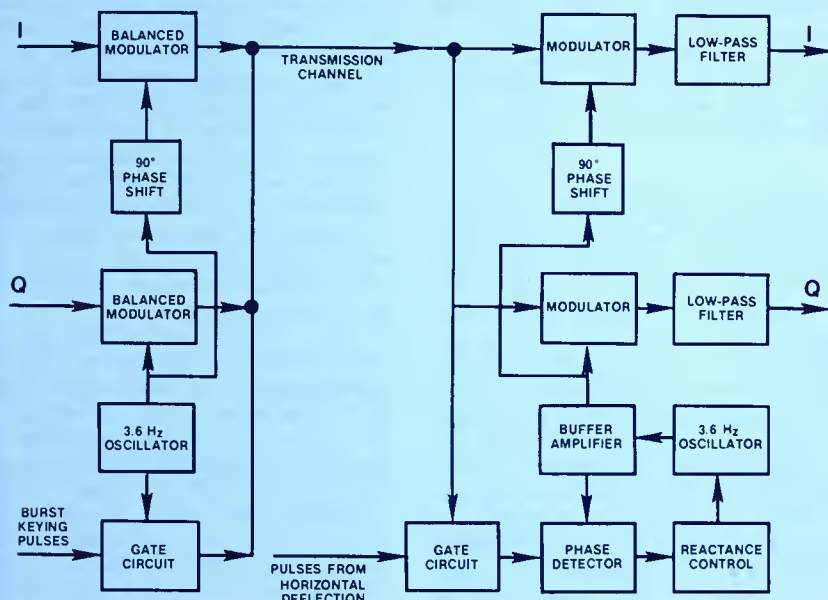


Figure 14. A set of typical M, I, Q waveforms are shown here as derived from the scan across color model at the line indicated by the side arrows.

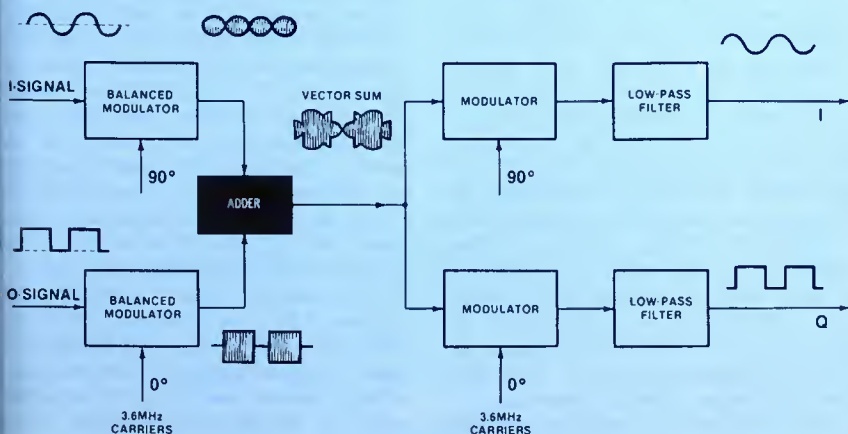
# GAMMA-CORRECTED SIGNAL INPUTS



**Figure 15.** Typical compatible color video circuits are designed using the knowledge of the acuity of the human eye to adjust the bandwidths of the M, I, Q signals so that no more than the required information is transmitted.



**Figure 16.** This block diagram shows the basic elements for transmission and reception of the I, Q and burst pulses.



**Figure 17.** These waveforms represent the I and Q signals plus the vector sum of the suppressed carrier sidebands following the modulator.

# OTARI BROADCAST RECORDERS



**MX-5050-B**

A complete line of professional tape machines (from one to eight tracks) built to meet the current and future needs of the broadcaster (including AM stereo) for long term reliability, high performance, full production capability, and backed by a new expanded program of parts and technical support.

## MX-5050-B Compact Broadcast Recorder.

Newest version of this field-proven two-channel machine, widely used in broadcasting worldwide. Three speeds, 24 dBm headroom, dc capstan servo, and modular construction.



**Mark II**

**Mark II Broadcast Recorder.** Separate transport and electronics for mounting convenience, plug-in card electronics, complete alignment accessibility. Two-channel 1/4-inch or four-channel 1/2-inch models.



**ARS-1000**

## ARS-1000 Automated Radio Station

**Reproducer.** Two-speed two-channel stereo reproducer specifically for automation systems. Ruggedly constructed for long term reliability and continuous operation.

Call Ruth Pruett at 415/593-1648 for your nearest Otari broadcast dealer.

## PREFERRED BY PROFESSIONALS

**OTARI**  
WORLDWIDE

Circle (70) on  
Reply Card

Otari Corporation, 981 Industrial Road,  
San Carlos, California 94070  
415/593-1648 TWX 910-376-4890

# Low Cost High Performance Professional Degaussers

- Save Time
- Save Tape and Film
- Save Money

WRE's wide range of degaussers are designed for years of dependable service for clean and simple erasure of magnetic film and tapes in just about any configuration.

Backed by years of proven reliability, these units are the answer to cutting man-hours and reducing material costs by allowing reuse of prerecorded media.



TYPE 9205A Degausser is ideally suited for complete erasure of program and residual noise from video, audio, and data recording tape and magnetic film—in reels, cartridges and cassettes. This unit will bulk erase reels up to 2 inches thick and 17 inches in diameter. Available for 115 or 230 volt operation.



TYPE 642-21 Degausser is similar to the 9205A except it is limited to erasure of 10½ inch reels. This unit is recommended where size and cost are limiting factors.



TYPE 8905 Magnetic Erasing Pencil is an excellent tool for erasing limited, small areas of tape or film and for demagnetizing record/play heads. In program material, words, complete sentences, and even syllables may be erased. This unit is equipped with a press-to-operate switch on the handle.

MODEL 22-323-1 Foot Switch is a companion accessory to the bulk degaussers that allows convenient, "hands free" operation and provides a positive means of turning the degausser off immediately after use. This is a momentary acting switch and can help extend the life of the degausser.

If you're looking for a degausser with proven reliability that will save you time and money, call or write WRE today.



2119 Schuetz Road • St. Louis, Mo. 63141 U.S.A.  
314 567-5366 • Telex: 442560

Circle (71) on Reply Card

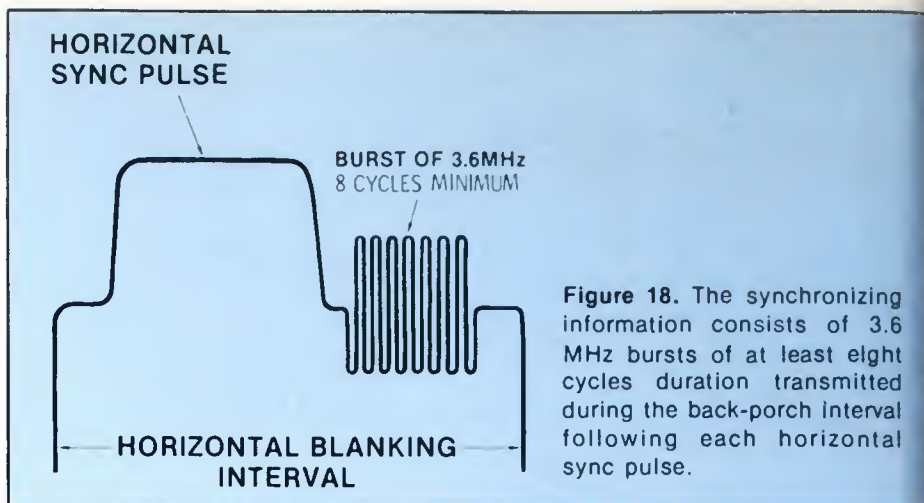


Figure 18. The synchronizing information consists of 3.6 MHz bursts of at least eight cycles duration transmitted during the back-porch interval following each horizontal sync pulse.

## Color television

simultaneous equations used at the transmitter matrix to find the three unknowns: R', G' and B' as follows:

$$\begin{aligned} R' &= 1.00 M + 0.96 I + 0.62 Q \\ G' &= 1.00 M - 0.27 I - 0.65 Q \\ B' &= 1.00 M - 1.11 I + 1.70 Q \end{aligned}$$

Use of the matrixing or cross-mixing technique not only satisfies a basic compatibility requirement by providing a signal component nominally equivalent to an ordinary monochrome signal, but also results in two signal components whose bandwidths can be greatly restricted without significant loss of useful picture information. Studies of the acuity or resolving power of the human eye have shown the normal acuity for hue and saturation differences is much less than for brightness differences, and that acuity for color differences along a green-to-purple axis on a color diagram is considerably less than for color differences along an orange-to-cyan axis. This knowledge has been exploited by adjusting the bandwidths of the M, I and Q signals so as to transmit no more than the required amount of information in each case, as indicated by Figure 15.

The M signal component is transmitted with the standard 4.1 MHz bandwidth so that the luminance resolution in color images is nominally the same as for monochrome images. The bandwidth of the I component is limited to approximately 1.5 MHz, while that of the Q component is further restricted to only about 0.5 MHz. Although the resolution of the final color images is not great with respect to color differences, enough information is transmitted to produce perfectly satisfactory images at the normal viewing distance. The eye cannot perceive color differences in very fine detail, so it is pointless to use spectrum space to transmit high-resolution color difference information.

### 2-phase modulation

The 2-phase modulation technique

permits I and Q signals to be combined into a 2-variable signal for transmission over a single channel. This is accomplished by simple addition of the sidebands generated by the balanced modulation of two 3.6 MHz (nominal) carriers separated in phase by 90°. The resultant waveform is the vector sum of the two quadrature components. Basic elements of the transmitting and receiving system are shown in Figure 16. The two carriers, which are derived from the same oscillator, are suppressed by the balanced modulators.

Thus, only the two sets of amplitude modulated sidebands, 90° out of phase are transmitted. At the receiving end of the system, the I and Q signals are recovered by heterodyning the two phase wave against two locally-generated carriers of the same frequency but with a 90° phase separation, and applying the resultant signals through low-pass filters to the matrix circuits. The process is further illustrated by simple waveforms (distinctly different for the I and Q channels) in Figure 17.

The 3.6 MHz oscillator at the receiver must be accurately synchronized in frequency and phase with the master oscillator at the transmitter. The synchronizing information consists of 3.6 MHz bursts of at least 8 cycles duration transmitted during the back porch interval following each horizontal sync pulse as shown in Figure 18. The bursts are generated at the transmitter by gating circuit which is turned on by burst keying pulses derived from the synchronizing generator; the output of this circuit is simply added to the outputs of the two balanced modulators.

At the receiver, the two-phase modulated signal is applied to another gating circuit, known as a burst separator which is keyed on by pulses derived from the horizontal deflection circuit. The separated bursts are compared in phase detector with the output of the local 3.6 MHz oscillator. Any error voltage developed is applied through

smoothing filter to a reactance control device (such as varicap diode) which corrects the phase of the local oscillator.

FCC standard phase relationships between the I and Q signals and the color synchronizing burst are shown in the vector diagram of Figure 19. The I and Q signals are transmitted in phase quadrature, and the color burst is transmitted with an arbitrary 57° phase lead with respect to the I signal. Actually, this phase angle and the coefficients used in the basic I and Q equations are not quite as arbitrary as they might seem. These parameters were chosen in such a way that relatively low-cost receivers with chrominance bandwidth limited to 0.5 MHz can use simplified demodulator and matrix circuits. Demodulation along an axis exactly out of phase with the burst will yield a signal equivalent to 0.493 (B' - M), and demodulation along an axis exactly 90° behind burst phase will yield a signal equivalent to 0.877 (R' - M). These signals need only be adjusted in level and added directly to the M signal to yield B' and R' signals ready to be applied to the corresponding guns of the color kinescope. (A simple matrix is all needed to form the G' signal.)

#### 2-phase modulated signal

Several interesting properties of the 2-phase modulated signal can be illustrated by vector diagrams which represent the resultant signal under known transmission conditions. For example, when a pure red color of maximum amplitude is being transmitted, the green and blue components are at zero and the I and Q signals have levels of 60% and 21%, respectively. (100% represents the full range between black and reference white in the accompanying M signal.) When modulated upon their respective carriers, these signals produce the resultant shown in Figure 20. The phase and amplitude shown is characteristic of pure red of maximum relative luminance.

Figure 21 is a composite vector diagram showing the phase and amplitude characteristics of all three primaries and their one-to-one mixtures. This composite diagram indicates that there is a direct relationship between the phase of the resultant 2-phase modulated signal and the hue of the color being transmitted. There is also a relationship (although an indirect one) between the amplitude of the resultant signal and the saturation of the color being transmitted. If the phase of the resultant subcarrier and the level of the monochrome signal both remain constant, then a reduction in the amplitude of the subcarrier indicates a decrease in color saturation. The composite vector diagram also shows an interesting symmetry between complementary colors (colors are complementary if they produce a neutral when added together). The resultant vectors for any two complementary colors are equal in amplitude but opposite in phase.

#### Frequency Interlace

Since the 3.6 MHz carriers, along

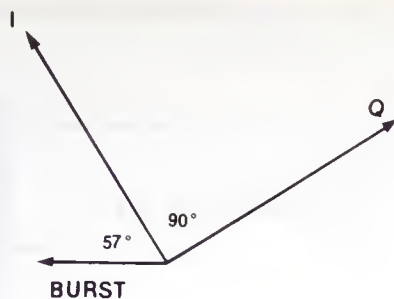


Figure 19. This vector diagram shows the phase relation of the I, Q and burst signals.

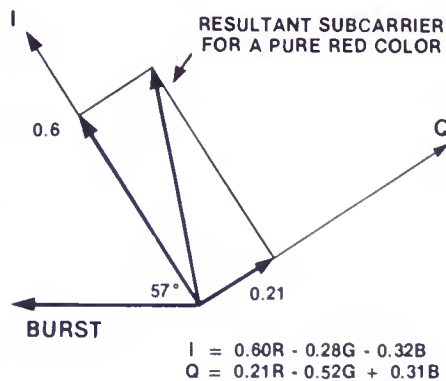


Figure 20. This vector diagram shows phase and amplitude relationship of the subcarrier for a pure red signal.

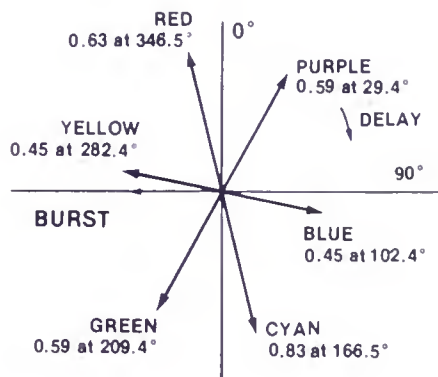


Figure 21. This is the composite vector diagram of subcarrier phase and amplitude for each of six video colors.

with their I and Q sidebands, fall within the 4.1 MHz video passband of the television channel (as shown in Figure 22), they are called subcarriers, and can be handled in many respects like unmodulated video signals. By use of frequency interlace, it is possible to add the several components of the chromi-

# OTARI MARK II BROADCAST RECORDER



A second generation recorder incorporating all the field-proven Otari features plus several new items of special interest to broadcasters. These include: modular transport and electronics for convenient console, rack or portable mounting, plug-in cards for ease of maintenance, splicing block, complete accessibility to all electronics adjustments for fast bias and record/reproduce alignment, variable speed ( $\pm 7\%$ ) dc capstan servo to precisely match program length to a specific time slot, and interface jack for dbx or Dolby noise reduction switching. Standard Otari features include true professional quality and reliability, motion sensing, selective reproduce on all channels, 19 dBm headroom, XLR connectors, edit and cue, and built-in test oscillator. Available in two-channel 1/4-inch or four-channel 1/2-inch models.

Compare features and benefits, compare performance, compare our track record for reliability. Call Ruth Pruett at 415/593-1648.

**PREFERRED  
BY PROFESSIONALS**

**OTARI**

**WORLDWIDE**

Otari Corporation  
981 Industrial Road  
San Carlos, California 94070  
415/593-1648 TWX 910-376-4890  
Circle (72) on Reply Card

**JSH** wants to fill your  
broadcasting  
tube needs

**JSH** is the FRANCHISED DIS-  
TRIBUTOR for the follow-  
ing **Electron Tube Manufac-  
turers.**

**Amperex**

**RCA**



**VARIAN ASSOCIATES**

We can also supply many other brands.  
For over 25 years **JSH** has been sup-  
plying and stocking tubes. Over 5,000  
line items of electron tubes and semi-  
conductors are stocked indepth in our  
huge warehouse ready for immediate  
shipment. We know your need for fast  
service. Your order will ship in 8  
hours... sooner if you need it!

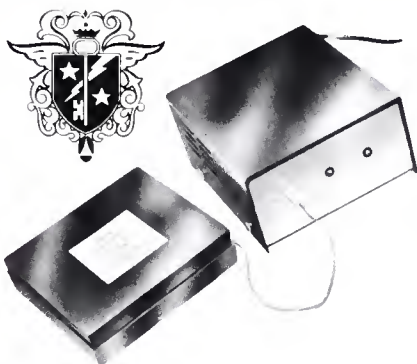
For our brand new catalog call  
Toll Free:  
800-421-0942 (outside Calif.)  
800-252-0030 (within Calif.)  
Or call our direct sales number  
(213) 559-5780



**JSH ELECTRONICS, INC.**  
A MEMBER COMPANY OF VSI ELECTRONICS  
8549 HIGUERA STREET P.O. BOX 2898  
CULVER CITY, CALIFORNIA 90230  
(213) 559-6900

Circle (167) on Reply Card

## NICKEL CADMIUM ENG. BATTERIES AND ONE HOUR AUTOMATIC CHARGERS



For **ALEXANDER** Nickel-  
Cadmium **REPLACEMENT  
BATTERIES** For...

**SONY (BP20) — JVC (PBP-1)  
AKAI (PACK) — etc.**

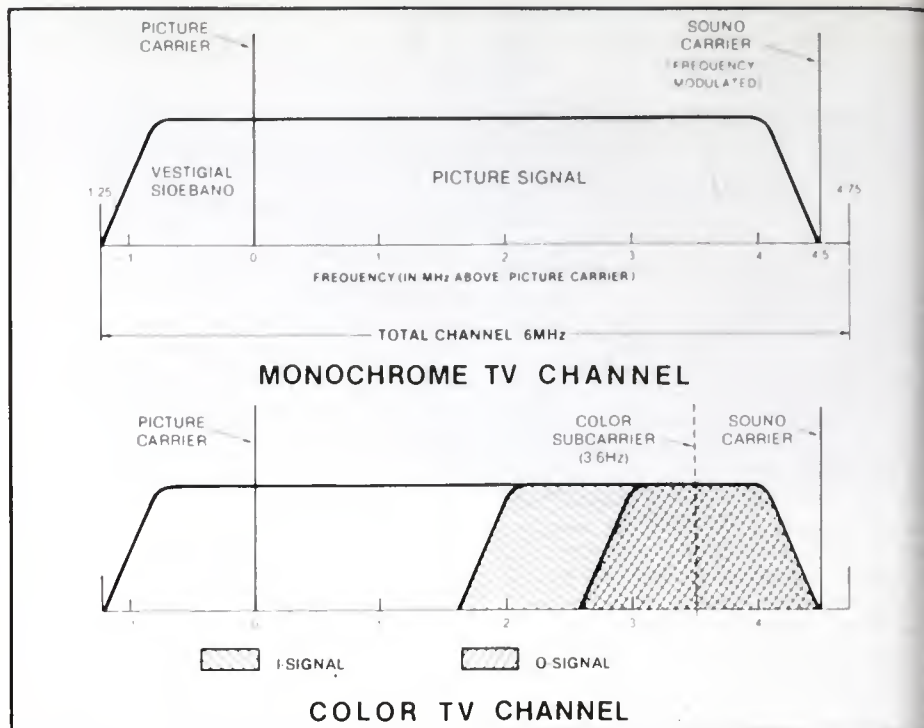
CHARGERS WILL AUTOMATICALLY  
CHARGE IN 1 TO 4 HRS. DEPENDING ON  
CAPACITY... (SWITCHES TO TRICKLE)

Write Wire or Phone

**ALEXANDER manufacturing co.**

Box 1645 Mason City, Iowa 50401  
Phone (515) 423-8955

Circle (168) on Reply Card



**Figure 22.** This diagram of the video channel shows portions occupied by monochrome and color signal components.

## Color television

nance and luminance signals together without causing objectionable mutual interference.

Waveforms derived from a simple color image illustrate the practical significance of the straightforward addition of signal components made possible by frequency interlace. Figure 23 shows M, I and Q signals after the latter two have been band-limited and modulated upon 3.6 MHz subcarriers. Note that both the I and Q modulated waves are at zero during the scanning of the white door, a neutral area. The degraded rise and fall times of the I and Q modulation envelopes result from the band-limiting process.

Figure 24 shows the vector sum of the I and Q signals, and also the complete compatible color signal formed by combining all the components, including synchronizing pulses and color synchronizing bursts. A significant point about this signal is that it is capable of providing good service to monochrome receivers, even though a relatively high-level modulated wave has been added to the monochrome signal component. Although the modulated wave is clearly a spurious signal with respect to the operation of the kinescope in a monochrome receiver, its interference effects are not objectionable because of the application of the frequency interlace principle.

The frequency interlace technique is based on two factors: a precise choice of the color subcarrier frequency, and the familiar persistence-of-vision effect. By making the color subcarrier frequency an odd multiple of one-half the line frequency, its apparent polarity can be made to reverse between successive

scans of the same area in the picture. Since the eye responds to the average stimulation after two or more scans, the interference effect of the color subcarrier tends to be self-canceling, due to the periodic polarity reversals, as illustrated by Figure 25. In practice, the cancellation is less than perfect because of nonlinearity in the transfer characteristic of the kinescope, but the residual effect consists of the relatively harmless superimposition of an image-correlated dot pattern with dimensions roughly comparable to those in the familiar scanning pattern (and thus difficult to resolve at normal viewing distances).

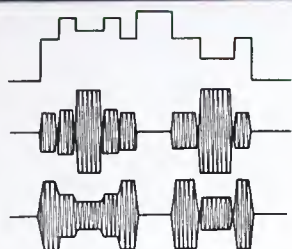
The relationships among the various frequencies used in an NTSC compatible color system are shown in the block diagram of Figure 26. The actual frequency of the color subcarrier, which has been referred to as 3.6 MHz up to this point, is specified in the FC standards as 3.579545 MHz, or exact 455 times one-half the line frequency (The allowed tolerance on the subcarrier frequency is  $\pm 10$  Hz.) For color TV purposes, the horizontal and vertical scanning frequencies are lowered 1.01% relative to the older monochrome standards; this minor adjustment was made to minimize the visibility of spurious patterns in home receivers resulting from beats between the color subcarrier and the sound carrier receiver RF or IF stages.

### Review of signal generation process

All major operations performed at the transmitting end of the system are shown in Figure 27. (For simplicity consider a single camera connected directly to a transmitter; in an actual



TYPICAL IMAGE

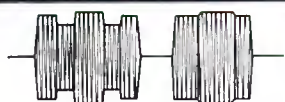


M SIGNAL

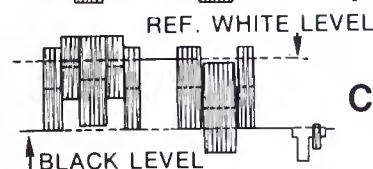
I SIGNAL  
(MODULATED)

Q SIGNAL  
(MODULATED)

Figure 23. The waveforms for the M signal and modulated I and Q signals are shown here for a model color image along the line indicated by the side arrows.



VECTOR SUM OF  
I AND Q SIGNALS

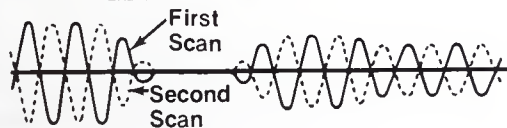


COMPLETE SIGNAL

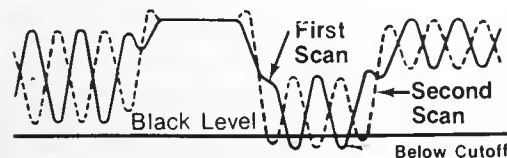
Figure 24. For the same color image as above, this sketch shows the vector sum of I and Q signals plus the composite waveform produced from the vector sum of all signal components.



MONOCHROME  
SIGNAL



MODULATED  
SUBCARRIER  
SIGNAL



COMPATIBLE  
COLOR SIGNAL



AVERAGE LIGHT  
OUTPUT AFTER  
TWO SCANS

Figure 25. Superposition of modulated subcarrier on the scanning signals, the compatible color signal, and the effect of the subcarrier on average light output results in these waveforms.

# OTARI MX-5050-B BROADCAST RECORDER



Otari's new MX-5050-B continues the proud heritage of the MX-5050 Series, a recorder now extensively used by television and radio broadcasters worldwide. The new version has all the proven features of the earlier pace setter, including front adjustable bias and record EQ, built-in test oscillator, edit and cue, splicing block, motion sensing, selective reproduce, and adds many new features all its own: ultra reliable TTL switching, noise free inserts, three speeds in field-selectable pairs of 15/7½ or 7½/3¾ ips, 24 dBm headroom with 28 dBm output into 600 ohms, dc capstan servo with ±7% speed control (to match program length to a time slot), peak reading LED plus standard full sized VU meters, return to zero memory, and LED function indicators, among others.

Add these features to a 66 dB S/N ratio and a frequency response from 30 to 22,000 Hz ± 2 dB at 15 ips and you have a machine that competes with those costing thousands of dollars more.

Compare features and benefits, compare performance, compare our track record for reliability. Call Ruth Pruett at 415/593-1648.

PREFERRED  
BY PROFESSIONALS

**OTARI**®

WORLDWIDE

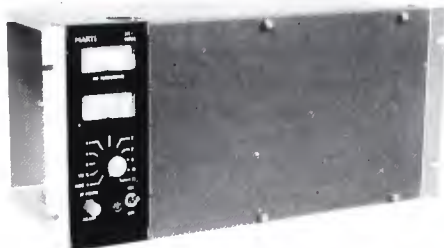
Otari Corporation  
981 Industrial Road  
San Carlos, California 94070  
415/593-1648 TWX 910-376-4890

Circle (74) on Reply Card

## Broadcasters

GET UN-HOOKED FROM  
THE TELEPHONE COMPANY  
— PROVIDE YOUR OWN  
"PROGRAM LINES" WITH  
**MARTI STL**

See Us at NAB Booth 349



**STL-8 TRANSMITTER** • All Solid State • Direct FM Modulator • Modular Construction • Test Meter Built In • Proven Reliability in hundreds of installations • Unsurpassed for Dual Channel Stereo STL, Single Channel AM STL or Inter City Relay.

### SPECIFICATIONS - STEREO

|                   |                      |
|-------------------|----------------------|
| Stereo Cross Talk | —65 DB               |
| Noise             | —65 DB or less       |
| Response          | ±0.5 DB 30-15000 Hz. |
| Distortion        | Less than 0.5%       |

**MARTI Electronics, Inc.**  
Box 661 • 1501 N. Main • Cleburne, TX 76031 • 817/645-9163

Circle (75) on Reply Card

## For the professionals in sound



VIF has complete automation systems, plus a wide range of audio equipment, high quality components, readily available spare parts, and a full line of accessories. Professional sound equipment for the professionals in sound.

**VIF INTERNATIONAL**  
P.O. Box 1555  
Mountain View, CA 94042  
(408) 739-9740

Circle (76) on Reply Card

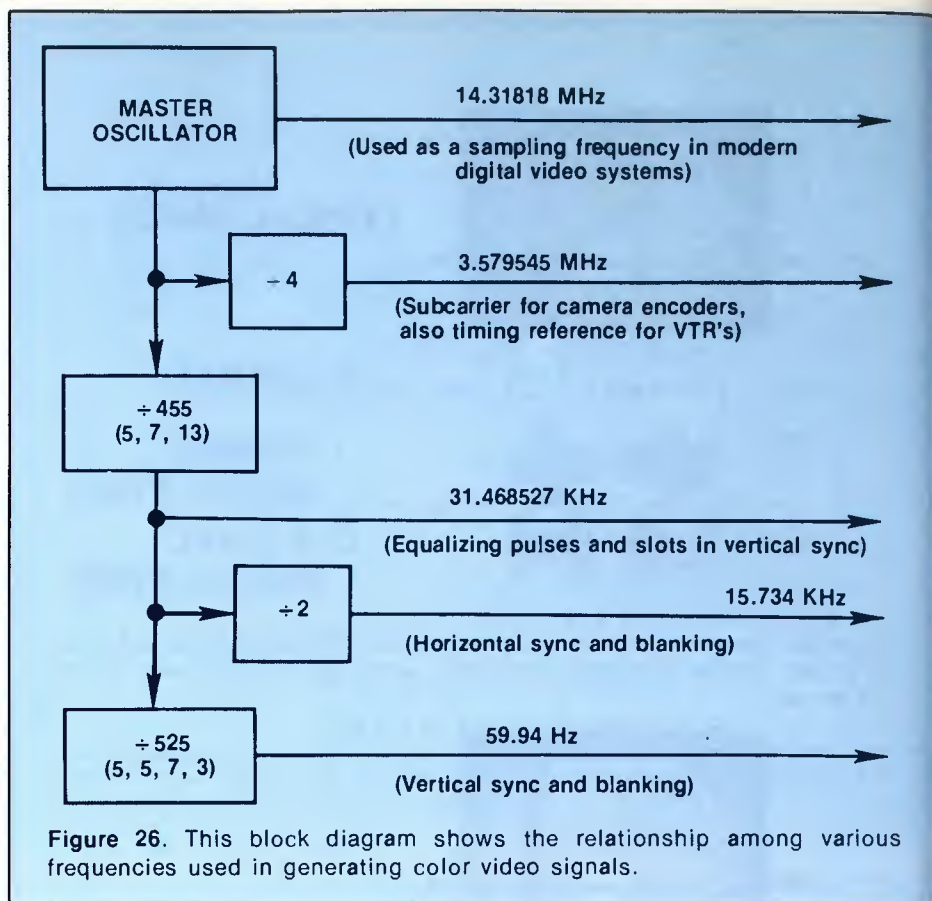


Figure 26. This block diagram shows the relationship among various frequencies used in generating color video signals.

## Color television

studio plant there obviously would be multiple cameras, telecine and videotape equipment, and one or more video switching systems.) The camera contains three pickup tubes or other transducing elements which provide electrical signals corresponding to the red, green and blue components of the scene to be televised. These signals are passed through nonlinear amplifier stages (the gamma correctors) which provide compensation for the nonlinearity of the kinescope elements at the receiving end of the system.

The gamma-corrected signals are then matrixed or cross-mixed to produce a luminance signal (M) and two color-difference or chrominance signals (I and Q). In this particular circuit, one phase inverter is saved by forming -I instead of +I.

In the filter section (Figure 27), the bandwidths of the M, I and Q signals are established. The 4.1 MHz filter for the luminance channel is shown in dotted lines because, in practice, it is not necessary to insert a special filter to achieve this band-shaping. The bandwidth of the luminance signal is usually determined either by the attenuation characteristics of a broadcast transmitter (which must, of course, confine its radiation to the assigned broadcast channel) or by the limited bandwidth of a videotape recorder.

The bandwidths of 1.5 MHz and 0.5 MHz shown for the I and Q channels, respectively, are nominal only. The

required frequency response characteristics are described in more detail in the complete FCC Signal Specifications. Delay compensation is needed in the filter section to assure that all signal components are transmitted in time coincidence. In general, the delay time for relatively simple filter circuits of a given type varies inversely with the bandwidth—the narrower the bandwidth the greater the delay. Consequently, a delay network must be inserted in the I channel to provide the same overall delay introduced by the narrower-band filter in the Q channel, and still more delay must be inserted in the wide-band M channel.

In the modulator section, the I and Q signals are modulated upon two subcarriers of the same frequency but 90° apart in phase. The modulators must be of the doubly-balanced type, so that both the carriers and the original I and Q signals are suppressed, leaving only the sidebands. Some sort of keying circuit must be provided to produce the color synchronizing bursts during the horizontal blanking intervals. To comply with the FCC Signal Specifications, the phase of the burst should be 57° ahead of the I component or 147° ahead of the Q component. In this particular circuit, the I carrier is delayed with respect to Q (instead of the other way around) to compensate for the matrix circuit producing -I instead of +I. The burst flag signal is usually derived in a color sync generator from a combination of hori-

horizontal and vertical pulses; the FCC standards require that burst signals be omitted for the 9-line period corresponding to equalizing pulses and vertical sync pulses.

In the mixer section, the M signal, the two subcarriers modulated by the I and chrominance signals, and the color synchronizing bursts are all added together. Provision also is made for the addition of standard synchronizing pulses, so that the output of the mixer section is a complete color television signal containing both picture and synchronizing information. This composite signal may then be put on-the-air through a conventional TV transmitter, though complex signal-handling systems are usually employed between the point of signal generation and the final transmitter.

#### Problems in handling color TV signals

The amount of handling which a color TV signal undergoes after leaving the colorplexer (or color encoder) depends upon the complexity of the broadcast or reproduction plant. In small operations, the signal may be sent only through a simple video switching system to a television tape recorder or transmitter. In more elaborate plants and in major networks, the signal must pass through a large number of distribution amplifiers, switchers, lengths of coaxial cable, stabilizing amplifiers, microwave delay links and possibly through several generations of video recording before it reaches the transmitter.

All of the equipment handling the color signal (including tape machines and transmitters) must be designed to operate within relatively narrow tolerance limits with respect to the following parameters:

**Amplitude versus frequency.** A change in response at the color subcarrier frequency relative to the lower frequencies causes an undesirable increase or decrease in the saturation of colors.

**Envelope delay versus frequency.** All signal components must arrive in time coincidence at the second detector of the receiver if certain edge effects or color smear effects are to be avoided. The FCC standards provide for envelope delay compensation at the transmitter or normal receiver errors in this respect.

**Differential gain** (subcarrier amplitude as a function of monochrome level). If an amplifier or other device compresses the signal in either the black or white region, there is a corresponding loss of color saturation in either the highlights or shadows.

**Differential phase** (subcarrier phase as a function of monochrome level). If subcarrier components transmitted near white level (corresponding to bright colors) are distorted in phase relative to those transmitted near black level (dark colors), there will be objectionable hue shifts as illumination conditions are varied in the televised scene.

**Time base stability** (a potential problem in tape machines). Because the color subcarrier system is phase-sensitive, jitter or other time-base instabili-

ties can lead to objectionable random variations in reproduced colors. As a practical matter, residual time-base errors must be reduced to about the 4-ns range.

• **Integrity of burst phase relative to chroma phase.** There are many types of processing amplifiers which regenerate the synchronizing portions of a composite color signal, including the color synchronizing bursts. It is essential that the phase of any regenerated burst be accurately re-established relative to the modulated I and Q signals, otherwise all colors are reproduced with improper hues.

The FCC standards do not specify performance requirements for each individual piece of studio equipment, but overall tolerance limits are placed on the signal as radiated. It is considered the manufacturer's responsibility to design equipment using no more than a fair share of the available tolerances.

During the early 1960s, much work was done in overseas laboratories to develop alternative techniques for encoding and decoding color television signals to reduce the requirements for extremely high fidelity in transmission and recording equipment, and two systems used in other parts of the world (known as PAL and SECAM systems) do incorporate some improvements in this respect. American experience has shown, however, that the problems of transmitting and recording NTSC color signals are not insoluble. The pioneering system of compatible color TV as utilized in the US continues to turn in a good account for itself even in comparison with the more-recently-developed alternative systems.

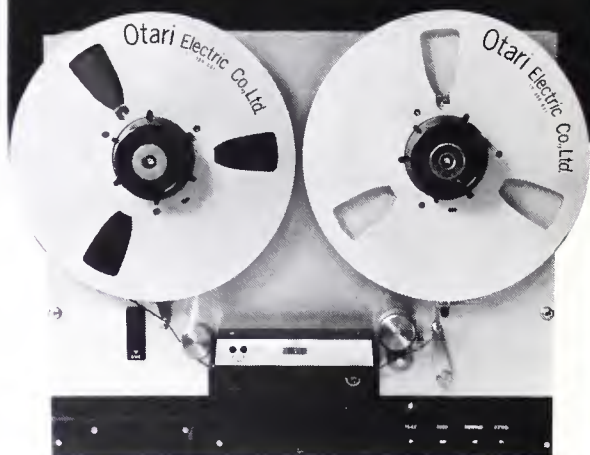
#### Decoding operations

A review of the decoding process used in color monitors and receivers to recover red, green and blue components from the composite color signal will complete this review. Consider a deluxe decoding arrangement designed to recover essentially all the information content of the signal; in practice, most monitors and receivers use simplified circuit arrangements which generally do not take advantage of the extra bandwidth of the I signal relative to the Q signal. A generalized block diagram for a deluxe color receiver is shown in Figure 28; a color monitor would use only that part of the circuit which follows the second detector.

In a compatible color TV receiver, the antenna, RF tuner, IF strip, audio channel and second detector serve the same functions as the corresponding components of a monochrome receiver. Up to the second detector the color receiver is no different from a monochrome receiver except that the tolerance limits on performance are somewhat tighter.

The signal from the second detector is utilized in four circuit branches. One circuit branch directs the complete signal toward the color kinescope, where it is used to control luminance by being applied to all kinescope guns in equal proportions. In the second channel, a band-pass filter passes only the

# ARS-1000 AUTOMATED RADIO STATION REPRODUCER



Widely used in leading automation systems. Specifically designed to meet their stringent requirements for highest audio performance, long term reliability and around-the-clock operation. Basically, the ARS-1000 is a work horse two-channel stereo reproducer with two tape speeds (7½ and 3¾ ips) and the following features: heavy duty 19-inch top plate, head mounted pre-amp to minimize hum, RFI and yield superior S/N, special long-life polyurethane pinch roller tire, friction reducing ball bearings, heavy duty motor and brake assemblies, and gold plated PCB connectors. It's easy to maintain with its plug-in PCB's and mother board configuration, easy-access flip-up head cover, and front adjustable output level and head azimuth (to minimize stereo phasing errors). Its operating features include removable Play and Stop, a ready light to indicate proper tape threading, head lifters for fast modes, a cue control for audible monitoring, and optional 25 Hz cue tone sensor. All connections are brought out to a single 25 pin Cinch connector.

Compare features and benefits, compare performance, compare our track record for reliability. Call Ruth Pruett at 415/593-1648.

**PREFERRED  
BY PROFESSIONALS**

**OTARI®**

**WORLDWIDE**

Otari Corporation  
981 Industrial Road  
San Carlos, California 94070  
415/593-1648 TWX 910-376-4890  
Circle (77) on Reply Card

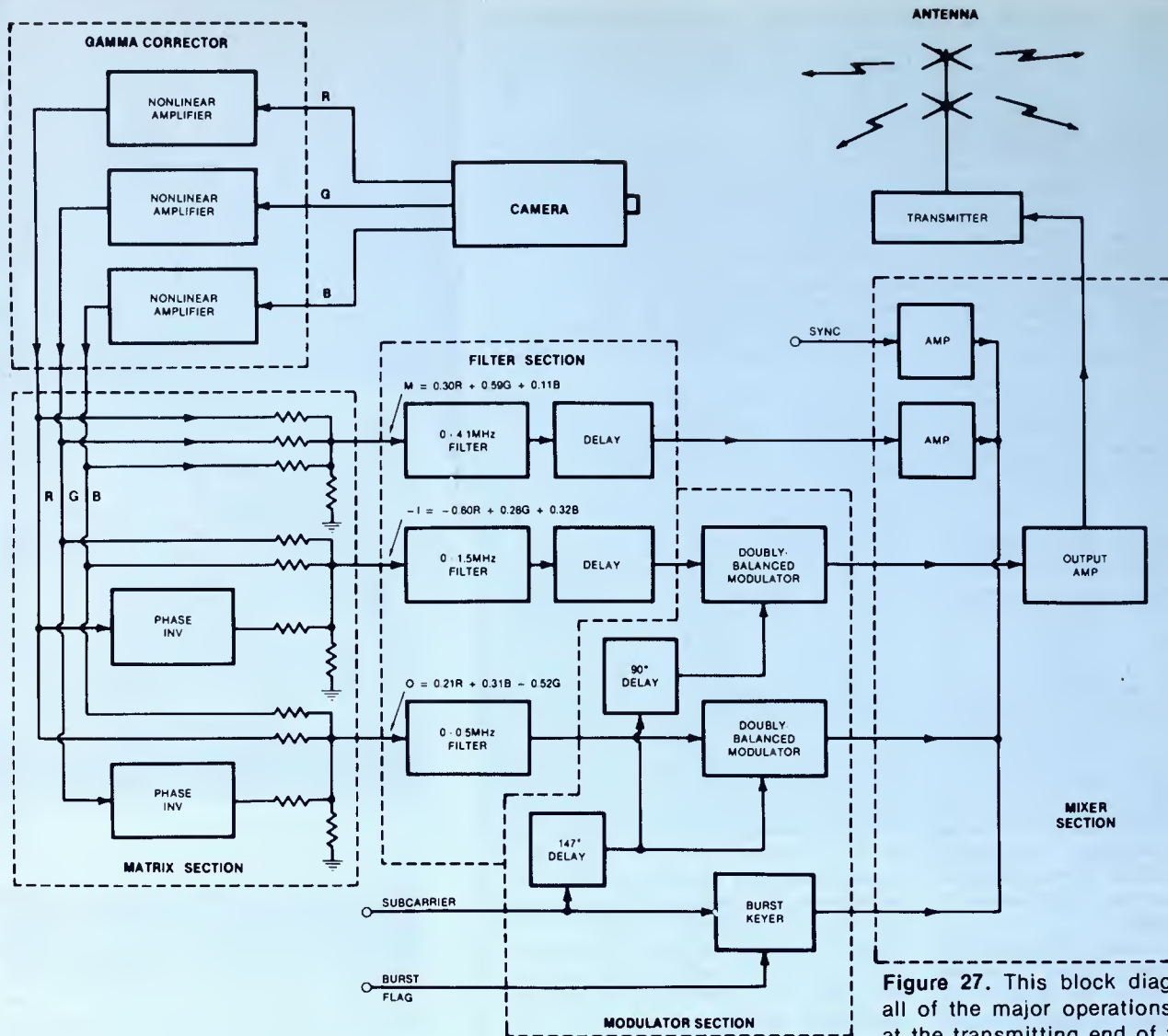


Figure 27. This block diagram shows all of the major operations performed at the transmitting end of the system.

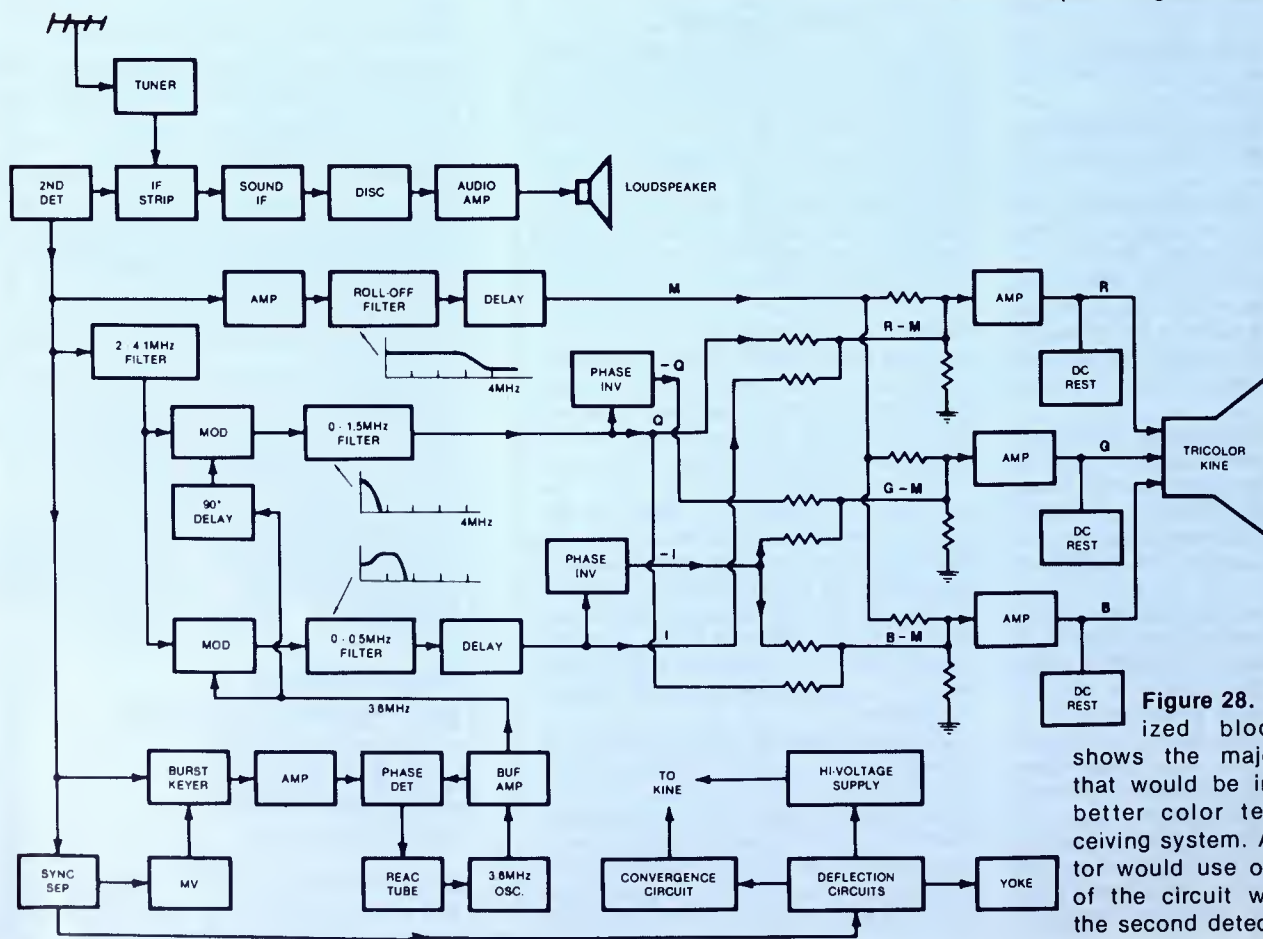


Figure 28. This generalized block diagram shows the major functions that would be included in a better color television receiving system. A color monitor would use only that part of the circuit which follows the second detector.

## Color television

high-frequency components of the signal (roughly 2.0 to 4.1 MHz), consisting primarily of the two-phase modulated subcarrier signal. This signal is applied to a pair of modulators which functions as synchronous detectors to recover the original I and Q signals.

It should be noted that those frequency components of the M signal falling between 2.0 and 4.1 MHz are also applied to the modulators, and are heterodyned down to lower frequencies. These frequency components do not cause objectionable interference, however, because they are frequency-interlaced and tend to cancel out through persistence of vision. It is quite possible, however, for high-frequency luminance patterns (such as might be encountered in tweed or striped fabrics) to produce false color effects.

The remaining two circuit branches at the output of the second detector make use of the timing or synchronizing information in the signal. A conventional sync separator is used to produce the pulses needed to control the horizontal and vertical deflection circuits, which are also conventional. The high voltage required to accelerate the beam in the kinescope is normally obtained from a fly-back supply associated with the horizontal deflection circuit. Many color kinescopes require convergence signals to enable the scanning beams to coincide at the screen in all parts of the picture area; the waveforms required for this purpose are readily derived from the deflection circuits.

The final branch at the output of the second detector is the burst gate, which is turned on only for a brief interval following each horizontal sync pulse by means of a keying pulse. This pulse may be derived either from a multivibrator controlled by sync pulses (Figure 28) or from the flyback pulse produced by the horizontal deflection circuit. The separated bursts are amplified and compared in a phase detector with the output of a local subcarrier oscillator. Any error voltage developed by the phase detector is applied to the oscillator through a suitable reactance control element, thus causing the local oscillator to pull into precise synchronism with the incoming bursts. The absolute phase of the 3.6 MHz signal from the buffer amplifier is normally made adjustable to provide a HUE control for the color monitor or receiver. The phase-locked oscillator provides the reference carriers for the two synchronous detectors; a 90° phase shifter is necessary to delay the phase of the carrier applied to the Q-modulator relative to that applied to the I-modulator.

There is a filter section in the color monitor or receiver, roughly comparable to the filter section of the original encoder or colorplexer. The M, I and Q signals must be passed through filters in order to separate the desired signals from other frequency components which, if unimpeded, might cause spurious effects. The I and Q signals are passed through low-pass filters of nominally 1.5

and 0.5 MHz, respectively, just as at the transmitting end. A step-type characteristic is theoretically required for the I filter, as indicated by the spectrum sketch in Figure 28, to compensate for the loss of one sideband for all frequency components above about 0.5 MHz.

Actually, failure to provide this step characteristic results only in a slight loss in sharpness in the I channel. (As a practical matter, many mass-produced color receivers use no more than 0.5 MHz bandwidth for either I or Q.) A roll-off filter is needed in the M channel to attenuate the subcarrier signal before it reaches the kinescope. The subcarrier would tend to dilute the colors on the screen if it were permitted to appear at full amplitude on the kinescope grids or cathodes. Delay networks are needed to compensate for the different inherent delays of the three filters, as explained previously.

Following the filter section, there is a matrix section in which the M, I and Q signals are cross-mixed to recreate red, green and blue signals. The RGB signals at the receiver are not identical to those at the input of the encoding matrix because the higher frequency components are mixed, and are common to all three channels. This mixing is justifiable because the eye cannot perceive the fine detail (conveyed by these high-frequency components) in color.

There are many possible types of matrixing circuits; the resistance mixers shown provide one simple and reliable approach. For ease of analysis, the matrix operations at the receiver may be considered in two stages. The I and Q signals are first cross-mixed to produce R-M, G-M and B-M signals, which are in turn added to M to produce R, G, and B. Note that negative I and Q signals are needed in some cases.

In the output section of the receiver, the signals are amplified to the level necessary to drive the kinescope, and the dc component is restored. The complete, full-color image is then produced on the screen of the tricolor kinescope.

The block diagram of Figure 28 is intended only to illustrate the principles used in color receivers, and does not represent any specific model now on the market. Color receiver design engineers have shown great ingenuity in developing feedback stabilization techniques, in simplifying circuits, in combining functions, and in devising subtle variations in the basic processes which have made significant cost reductions possible while maintaining excellent picture fidelity.

The principles of compatible color television are now firmly established and confirmed by some 25 years of successful operation, but design engineers concerned with cameras, signal-handling equipment, video recording equipment and receivers continue to find opportunities for further refinements and advances in the application of the basic principles. □

# How much better off would you be if you had your 1<sup>st</sup> Class FCC License?

Think about it. An FCC License is required for certain jobs in Broadcasting and communications. And, even when a 1st Class FCC "ticket" is not a legal requirement for a job, it is Government certification of specific skills and knowledge. That's bound to impress any employer of electronics personnel! That's why Cleveland Institute of Electronics offers you a choice of professional career courses designed to help you pass the government-administered FCC License exam.

## Learn from the specialists.

We know what the government examiners require. We aim to make sure you get it. In fact, close to 4 out of 5 CIE graduates who took the FCC exam got their licenses, according to our continuing surveys. Not surprising. CIE is the largest independent home-study school in the world specializing exclusively in electronics.

## Send for your FREE CIE Catalog

Get all the details on earning your FCC License. Fast! Mail the coupon right now for CIE's FREE school catalog — plus a complete package of independent home-study information. For your convenience, we'll try to have a CIE representative contact you to answer any questions you may have. All CIE career courses are approved for educational benefits under the G.I. Bill.

|                                                                                                                                                                     |                                  |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------|
| Print Name _____                                                                                                                                                    |                                  |           |
| Home Address _____ Apt. _____                                                                                                                                       |                                  |           |
| City _____                                                                                                                                                          | State _____                      | Zip _____ |
| Phone (Area Code) _____ / _____                                                                                                                                     |                                  |           |
| Check here for G.I. Bill information:                                                                                                                               |                                  |           |
| <input type="checkbox"/> Active Duty                                                                                                                                | <input type="checkbox"/> Veteran | BE-11     |
| <b>CIE</b> Cleveland Institute of Electronics, Inc.<br>1776 East 17th Street, Cleveland, Ohio 44114<br><small>Accredited Member National Home Study Council</small> |                                  |           |

**NOW... The leading magazine  
of broadcast technology,**

**BROADCAST**  
engineering

**brings you an important  
new technical tool...**

**DIRECTIONAL ANTENNA HANDBOOK**

*by Robert A. Jones, PE*

**ONLY \$12.95**

Based on the recent **Broadcast Engineering** series, this 104 page volume focuses on the essentials of directional antennas then expands to encompass the entire arena of design, from a two tower array through twelve tower systems. Chapters cover such important areas as:

- Design of nighttime directional antennas.
  - Calculating RMS efficiency.
  - The FCC's Standard Method of calculating directional antennas for submission with FCC applications.
- Additional sections review the basic math used in calculations and provide tips on using computers and hand calculators for computation.

Whether you use a consultant or design your own systems, this book is an absolute must. Order yours today!

*The Latest From The Leader In Broadcast Technology...*  
**Broadcast Engineering's Directional Antenna Handbook**  
**ONLY \$12.95**

**Directional Antenna Handbook**



**ORDER FORM**

**BROADCAST**  
engineering

P.O. Box 12901, Overland Park, KS 66212

Please send me \_\_\_\_\_ copies of the Directional Antenna Handbook at \$12.95 each. (Postage Included.)

☐ My check or money order is enclosed.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

# ILAS '79

## or map & agendas

Sharp Electronics Corporation,  
2400

Skirpan Lighting,  
2625

Skotel Corporation,  
2827

★ Sound Technology,  
2405

Stainless,  
2109

Studio Film & Tape,  
2704

TA & Track Audio,  
2712

TM Productions,  
2307

Tangent,  
2106

William B. Tanner Company,  
2206

Taybun Electronics,  
2502

Telegen,  
2221

Television Technology Corporation,  
2306

★ Terracom,  
2401

Thermodyne International Limited,  
2408

Thomson-CSF-Electron Tubes,  
2210

Times Wire & Cable Company,  
2519

Toshiba International Corporation,  
2701

Torbet Radio,  
2800A

Tuesday Productions,  
2205

Tweed Audio (USA),  
2207

US Tape & Label Corporation,  
2201

United Media,  
2711

United Press International,  
2300

★ Utah Scientific,  
2707

V & B Tower,  
2610

Van Ladder,  
2804

Versa Count,  
2120

★ Video Associates Labs,  
2809

Video Data Systems,  
2419

Videomagnetics,  
2705

★ Videomedia/Sed,  
2825

Videotek,  
2602

Vltex Division/Vital Industries,  
2219

Weathermaton,  
2615

Wang-Voice Communications,  
2112

The Webster Group,  
2621

★ The Winsted Corporation,  
2601

Zel-Mark Corporation,  
2521

If you're looking for a certain company, look them up in the exhibits roundup article (page 122). The exhibitors are listed alphabetically, and the information given includes the company's booth number and product line. (Or, use the alphabetical listing in this section.)

If you are looking for a particular product, look it up in the product directory (page 106). The products are listed alphabetically, with each company exhibiting that product listed underneath (along with booth numbers).

Suppose the company you're looking for is booth 2313. Fold out the exhibit floor plan and find Level II, aisle 2300. Then find the company on that aisle. Looking at the floor plan will give you an idea of where the company is located in the particular aisle. Mark the company, so when you use this guide in the Convention Center, you'll know just where to go.

The companies on the floor plan marked with a star (★) are exhibitors who advertised in this issue. As you read this issue, mark the exhibitors you'll want to see at the convention.

Mapping out your plan of attack now will save you time at the convention. And, with only four days to see over 320 exhibits, you'll want to plan to save as many steps as possible!

Material may not be reproduced or photocopied in any

# Convention Agenda

Monday, March 25

PM-5 PM—Opening Joint Engineering/Management Meeting (Entertainment)

Monday, March 25

PM-5 PM—Opening Joint Engineering/Management Meeting (Entertainment)

Monday, March 26

## RADIO ENGINEERING SESSIONS

M-10:30 AM—Workshop: Audio Processing, Test, Measurement and Monitoring

30 AM-NOON—Workshop: Engineering Principles of Communications Satellite Systems

30 PM-2:30 PM—Engineering Luncheon

0 PM-3 PM—Paper: Adapting AM Transmitters for Stereo Transmission

M-4 PM—Workshop: AM-FM Receivers: The Manufacturer's Viewpoint

M-5 PM—Workshop: AM Stereo Broadcasting

M-6 PM—Amateur Radio Operators Reception

## TELEVISION ENGINEERING SESSIONS

0 AM-10:30 AM—Workshop: 1-Inch Videotape

30 AM-NOON—Workshop: Teletext, Closed Captioning and Other Television Ancillary Signals

30 PM-2:30 PM—Engineering Luncheon

0 PM-4 PM—Workshop: Television Blanketing Progress Report

M-4:30 PM—Paper: The CBS Blanking Width Corrector

0 PM-5 PM—Paper: The TK-47 Auto-Camera

M-6 PM—Amateur Radio Operators Reception

## RADIO MANAGEMENT SESSIONS

30 AM-11:45 AM—Workshops:  
The New Breed, Retail Sales Developers:  
No More Back Room for Retail;  
The Co-optimist: Telling You How to Make  
Big in Coops, Even if Your Sales Staff  
Is Small;  
Next Time We Build One of These...  
That Automation Unit has More  
Personality Than My Morning DJ;"  
The 96th Congress and Radio

ON-1:15 PM—Workshops:  
New Rate Cards that Control Inventory  
and Maximize Revenue;  
The New ASCAP/BMI Per Program License

Option;  
Radio Research: You Can't Tell the  
Players Without a Scorecard;  
It Can't be 5 O'clock Already;  
"My FM Subcarrier Bills More Than My FM  
Station;"  
What's the FCC's 'Violation Hot Button'  
for Radio in 1979?

## TELEVISION MANAGEMENT SESSIONS

9:30 AM-11 AM—Workshop: Information Odyssey: Television '79

11:15 AM-12:15 PM—Workshops:  
Creative Selling in 100 Plus Markets;  
How to Use Research to Improve Your  
News;  
Living with Wage and Price Guidelines;  
Localism...Options for Tomorrow;  
The Retransmission Concept: Is it the  
Answer?

3 PM-3:30 PM—In the Box (debate):  
Resolved: Television Stations Should Not  
Pay Substantial Spectrum Fees

3:30 PM-4:30 PM—Workshop: More  
Effective Communication through TV  
Commercials

4:30 PM-5:30 PM—Workshops:  
Cable Copyright Royalties;  
How to Get Good Sales People, Train  
Them and Keep Them;  
The Role of the GM in Union  
Negotiations;  
Successful Personnel Recruiting and  
Selection within EEO Guidelines

Tuesday, March 27

## RADIO ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: Audiocassette,  
Cartridge and Reel-to-Reel Tape:  
Performance, Measurement and Standards

10:30 AM-11 AM—Paper: Microprocessor-  
Based Cartridge with Open Reel Quality

11 AM-NOON—Workshop: The Absence of  
Radiation Hazards in Broadcasting

12:30 PM-2:30 PM—Engineering Luncheon  
(1979 Engineering Achievement Award to  
be presented to Robert W. Flanders of  
McGraw-Hill Broadcasting Company)

## TELEVISION ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: Digital Editing  
and Special Effects for Television: 1979  
Update

10:30 AM-11 AM—Paper: Replacement of  
Slow Motion with 1-Inch Tape

11 AM-NOON—(see radio engineering  
session)

12:30 PM-2:30 PM—(see radio engineering  
note on luncheon)

## RADIO MANAGEMENT SESSIONS

9:30 AM-10 AM—Speech: State of the Sales

10 AM-11 AM—Speech: Saying it with  
Humor

11 AM-NOON—Panel: FCC

2:30 PM-3:45 PM—Workshops:  
Last Newspaper Declares Bankruptcy

Promoting 'The World's Greatest Radio  
Station' in the Small Market.  
Promoting 'The World's Greatest Radio  
Station' in the Medium/Large Markets;  
National Farm \$\$\$s in Small Markets?  
You Bet!  
Birth of a Radio Jingle, Part 1;

4 PM-5:15 PM—Workshops:  
Birth of a Radio Jingle, Part 2;  
"If Business is so Good, How Come  
There's Nothing in the Checking  
Account?";  
"Whatever Happened to Old What's-His-  
Name?";  
Formats—An Executive Session for Radio  
Managers Who Also Wear a Program  
Director's Hat:  
Community Involvement Can Increase Your  
Numbers

## TELEVISION MANAGEMENT SESSIONS

9 AM-11:30 AM—Workshop: UHF: The  
Quest for Parity and Second Class Status,  
First Class Results

9:30 AM-10:30 AM—Workshops:  
Update: FCC Rules and Policies You Must  
Know;  
Is There Room at the Top? A Second  
Look;  
The Managerial Woman

10:30 AM-11:30 AM—Workshops:  
The Use of Investigative Teams in TV  
News;  
The 96th Congress and TV;  
How Good are Television Ratings?

11:30 AM-NOON—In the Box (debate):  
Resolved: The FTC Should Regulate  
Children's Television Advertising

NOON-12:05 PM—Workshop: And What  
Do Parents Think?

12:05 PM-1:15 PM—Networks,  
Superstations and You

Wednesday, March 28

## RADIO ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: Building New  
Radio Studio Facilities: Planning,  
Contracting and Purchasing

10:30 AM-11 AM—Paper: A Fresh Look at  
Directional Antenna Phasors

11 AM-NOON—Joint meeting of Radio,  
Engineering and Television groups

NOON-2 PM—Closing joint Engineering/  
Management Luncheon (Entertainment)

## TELEVISION ENGINEERING SESSIONS

9 AM-10:30 AM—Workshop: Broadcast Tall  
Towers: An Aeronautical Hazard?

10:30 AM-11 AM—Paper: Engineering  
Preparations for the 1980 Olympics

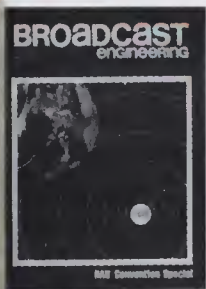
11 AM-NOON—Joint meeting of Radio,  
Engineering and Television groups

NOON-2 PM—Closing Joint Engineering/  
Management Luncheon (Entertainment)

## GENERAL SESSIONS

See Engineering sessions from 11 AM until  
closing

# NAB-DALLAS '79



## Texas hosts biggest & best show yet

Texans like to boast that their state produces the biggest and the best. The NAB show at the Dallas Convention Center March 25-28 promises to give full credence to that boast. Anticipation and excitement already are running at an all-time high, with more than 320 exhibitors and more than 2100 paid

### More than 320 exhibitors

pre-registered participants at presstime. And the count continues. All indicators point toward an outstanding 57th Annual Convention and International Exposition of the National Association of Broadcasters.

Again this year, the convention is divided into three sets of meetings: Radio (Management), Television (Management) and the Broadcast Engineering Conference. The meetings will run concurrently and registrants may attend any sessions. To make the choices even more difficult, the engineering conference workshops are divided into radio and television engineering (except where disciplines overlap). Obviously, some careful planning should be done before the convention to select the most critical workshops. (See *Planning convention strategy*, page 96.)

A joint opening session begins the convention Sunday with welcoming words by NAB board chairman Donald Thurston. The Distinguished Service Award will be presented (more on this later) and NAB

president Vince Wasilewski will speak on *Broadcasting: The Year Ahead*.

### Joint sessions

NAB executive vice president and general counsel Erwin Krawnow will moderate a joint session Tuesday called *Gomes Broadcasters Play*. Be there to find out what the FCC rules are on running promotions and contests.

The legendary *Roone Arledge*, ABC News and Sports president, will moderate a panel discussion Wednesday on *Sports and Broadcasting: Where are We Headed?* Baseball commissioner *Bowie Kuhn*, NFL commissioner *Pete Rozelle* and NBA commissioner *Lawrence F. O'Brien* are among the panelists who will examine the future of sports in radio and TV. They, along with other panelists to be announced later, are expected to field questions from the floor.

### More than 2100 paid pre-registered delegates

Also on Wednesday, Senator *Ernest Hollings*, chairman of the Senate Subcommittee on Communications, will share his ideas on renovating the Communications Act, rather than replacing it. He also will speak on other Washington issues affecting broadcasters.

*Charles D. Ferris*, chairman of the FCC, will be at the closing general assembly on Wednesday. He will

*(Photograph courtesy of Dallas Chamber of Commerce)*



address the convention, presenting not only a rare opportunity to see and hear the man who has so much influence over the industry, but to question him also. He will participate in a question and answer session with convention delegates.

A closing luncheon (Wednesday also) will feature comedian Bill Cosby and other top entertainers. Tickets for this event are expected to go fast.

Jack Anderson, investigative reporter and Washington bureau chief of *Parade* magazine, will address the radio luncheon on Tuesday. Anderson is noted for his news breaks concerning US military intervention in the Middle East and of major Watergate stories. He is heard daily on the Mutual Radio Network and does a daily commentary on *Good Morning America*.

### Electronic supermarket

Billed as the "biggest display of broadcasting equipment in the world," the exhibition area will contain acres upon acres of equipment (more than 140,000 sq ft). The foldout map on page 97 should aid travelers in finding their way through the maze. Exhibit hours are 10 AM to 6 PM Sunday through Tuesday; 10 AM to 5 PM Wednesday.

But don't stop with just noting the booths to visit.

### World's largest broadcast equipment display

Many suppliers have chosen to use hospitality suites instead of or in addition to booths for discussing their products and services. Insofar as possible, **BE** also has provided a guide to these suites under the section *NAB-Dallas '79: Exhibits roundup*, page 122. The

Hyatt Regency, Dallas Hilton and Fairmont have been designated radio hotels; the Loews Anatole and Marriott have been designated television hotels.

### Awards

The NAB's 1979 Distinguished Service Award, the industry's highest honor, will be presented to Jack Harris, president of KPRC and KPRC-TV of Houston, TX, and executive vice president of the Houston Post Company, at the opening session. The selection was made by the 1979 Convention Committee during the NAB's semi-annual Board of Directors' meeting.

As a leader of broadcast industry affairs on the national scene, Harris has served on NAB's board of directors, the Broadcast Advisory Board of the Armed Services, the Executive Reserve and was a member of the Advisory Board to the US Information Service. For five years he was chairman of NBC's Television Board of Delegates. He also has served as president of the Association of Maximum Service Telecasters.

The award, established in 1953, is presented to a broadcaster who has made "a significant and lasting contribution to the American system of broadcasting."

### Spouse special and tours

"The Mate's Place," a complete where-to-go, what-to-do information center, will be open daily during the convention. Special Monday and Tuesday morning sessions will be conducted so that spouses can participate in lively, broadcast-related sessions.

The Dallas Convention and Visitors Bureau has a packet of information available for those interested in tours. Contact the Dallas Chamber of Commerce, 1507 Pacific Ave., Dallas, TX 75201; (214) 651-1020. □

## Planning convention strategy

This year's NAB convention issue of **Broadcast Engineering** has been designed to make those few hours in Dallas profitable, fun and free of the anxiety of missing something. A little pre-planning never hurts efficiency, and these simple guidelines for using this issue will help in accomplishing the maximum in that minimum amount of time.

- First, turn to the foldout section *NAB-Dallas '79: Exhibitor map & session agendas* on page 97 for help in scheduling sessions and workshops in radio and television management and engineering. The offerings are excellent this year and the choices will be difficult.

- Next, map out a plan of attack to the exhibit booths. Check the section *NAB-Dallas '79: Product directory* on page 106 for equipment categories to be exhibited. Each category is followed by a list of organizations (and their booth numbers) which are showing products in that category.

- The next section, *NAB-Dallas '79: Exhibits roundup*, on page 122, lists each exhibiting company alphabetically, followed by product categories to be shown, booth number, hospitality suite (if the information is available at press-time) and on what page the company is advertising in this issue. If the company is an advertiser, the ad almost certainly will give more information on the product(s) the company is exhibiting.

- For even more information on the newest technology and equipment being exhibited, turn to *NAB-Dallas '79: Innovative products* on page 176. This section previews products to be introduced from manufacturer-supplied data. For more information on any of these items, circle the appropriate number on the tear-out Reader Service Card in the back of the magazine. (Of course, many companies chose to keep

their newest products a secret until the convention. Look for descriptions of these in the June, 1979, issue of **Broadcast Engineering**.)

- With all of this information in hand (the booth numbers and hospitality suite hotels to visit, the equipment to be seen), turn back to the foldout exhibit floor plan of the Dallas Convention Center. Booths 300-400-500- are on Level III; booths numbered in the 2000-range are on Level II. Mark the companies on the map and take it to the convention center. It will then be possible to whiz around the convention with such efficiency that other less-prepared registrants will gaze on in envy and wonder.

But alas, even the best-laid pre-planning sometimes goes awry. So, extra copies of this issue will be available at the convention (for those who left theirs at home), as well as plenty of up-dated exhibit maps. □

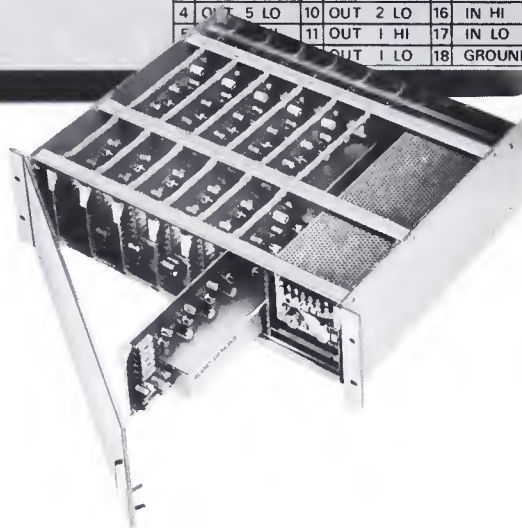
**AUDIO DESIGNS**  
and Manufacturing Inc.

DA-16A

**PIN FUNCTIONS**

|   |          |    |          |    |           |
|---|----------|----|----------|----|-----------|
| 1 | OUT 6 HI | 7  | OUT 3 HI | 13 | CENT. TAP |
| 2 | OUT 6 LO | 8  | OUT 3 LO | 14 | +20       |
| 3 | OUT 5 HI | 9  | OUT 2 HI | 15 | -20       |
| 4 | OUT 5 LO | 10 | OUT 2 LO | 16 | IN HI     |
| 5 | OUT 4 HI | 11 | OUT 1 HI | 17 | IN LO     |
| 6 | OUT 4 LO | 12 | OUT 1 LO | 18 | GROUND    |

# The ultimate audio distribution system. ADM<sup>®</sup> quality throughout.



The DA16/CH20 is the broadcaster's answer to audio distribution. It offers a *unique* and *versatile* solution to this age-old problem.

- Each amplifier is a one-input, six-output plug-in card with +24 DBM input and output capability.
- The input is transformer coupled and each of the six outputs is individually transformer-isolated.
- Amplifiers have individual front panel gain

adjustments and individual test points for both power and audio.

- The CH20 rack frame has redundant power supplies with automatic changeover.
- The DA16/CH20 system is designed and built to demanding Audio Designs and Manufacturing quality standards.

There are many more features. For complete information, contact us today.

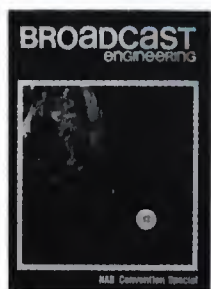
AUDIO DESIGNS AND MANUFACTURING, INC.

SEE US AT BOOTH 414

**ADM** *The  
Audio  
Company*

6005 Sturgeon, Roseville, Michigan 48066 • Phone: (313) 778-8400, Cable: AUDEX TLX-23-1114

DISTRIBUTED OUTSIDE U.S.A. BY **AMPEX** INTERNATIONAL OPERATIONS, INC.



## Product directory

This section of this special convention issue is new this year. It is a directory of products to be exhibited and is designed to help the NAB participant even more.

Each product category (drawn from manufacturers' data and the September **BE** Buyers Guide) is followed by companies exhibiting that product along with their booth numbers. Because information from several companies was not available at presstime, this directory cannot claim to be comprehensive. But it will give you a good start on planning your exhibit booth visits.

Suppose, for example, that your station is in the market for a new routing switcher. Just look up "Switchers, routing" in the directory and you will find a list of companies exhibiting that product and their booth numbers. If you will mark the booth numbers of interest on the Exhibit Map in this issue, you'll be certain not to miss any companies exhibiting products you want to see.

### Amplifiers, pre-amps

American Data, 312  
Audio Designs & Mfg., 414  
Audio & Design Rec, 2215  
Automated Processes, 373  
Channelmatic, 2517  
Coherent Comm., 2115  
Crosspoint Latch, 2801  
Datametrics, 2813  
Di-Tech, 2403  
Dynair Elec., 368  
Dynasciences, 497  
Edco Products, 359  
Grass Valley, 308  
Gregg Lab., 2118  
Inovonics, 2103  
LPB, 383  
Leitch Video, 561  
Logitek, 2111  
Marconi Elec., 322  
Marti Elec., 349  
Micro-Trak, 391  
McCurdy, 321  
McMartin, 317  
QRK, 389  
QSI, 2800  
Ramko, 409  
Russco Electronics, 427  
Shure, 371  
Technics-Panasonic, 481  
Telemation, 342  
Telemet, 333  
Television Technology, 2306  
Telex Comm., 357  
United Research, 375

Versa-Count, 2120  
Video Aids of CO, 553  
Ward-Beck, 489

### Analyzers, audio & video

Glentronix, 2609  
Inovonics, 2103  
Marconi Elec., 322  
Philips, 314  
Potomac, 377

### Animation (equip., facilities)

Computer Image, 457  
Eigen Video, 557  
Interand, 2703

### Antenna systems & hardware

Allen Gordon Ent., 2501  
Andrew Corp., 360  
Bogner, 2202  
Cablewave, 381  
CSP, 542  
Cetec Brdcast., 307  
Delta Electronics, 365  
Farinon, 374  
Jampro-Cetec, 499  
Harris Corp., 303  
Micro Communication, 513  
Micro-Trak Corp., 391

Nurad, 533  
Phelps Dodge, 353  
RCA, 300  
Rockwell Interntl., 2800

### Antennas (earth station & equip.)

Andrews Corp., 360  
Channelmatic, 2517  
RCA, 300B  
Scientific-Atlanta, 477

### ATS & equip.

CCA, 305  
Delta Electronics, 365  
Logitek, 2111  
Marti Elec., 349  
Micro Control Assoc., 311A  
Potomac, 377  
QEI, 435

### Automation equipment, audio

Automated Brdcast., 311  
Automated Processes, 373  
Broadcast Elec., 309  
Consolidated Elec., 311  
Cetec Brdcast., 307  
Channelmatic, 2517  
Data Comm., 339

Hallikainen & Friends, 2312  
Harris, 303  
IGM/NTI, 343  
Interntl. Tapetronics, 319  
MCI, 401  
Sono-Mag, 397  
Vital, 316

### Automation equipment, video

Automated Brdcast., 311  
Channelmatic, 2517  
Dynair Elec., 368  
Grass Valley, 308  
Hallikainen & Friends, 2312  
Vital, 316

### Automation systems, business

Automated Brdcast., 311  
Automated Business Concepts, 545  
Automation Elec., 2208  
Bloomington Brdcastg., 2308  
Bonneville Data, 2206A  
Broadcast Elec., 309  
Data Comm. Corp., 339  
Hallikainen & Friends, 2312  
IGM/NTI, 343  
QSI, 2800  
Station Business Sys., 327  
Vital, 316

See us at  
Booth 2411  
NAB

# WHEN YOU THINK OF THE LEGENDARY AMPEX VR-1200's AND VR-2000's THINK OF AFA...

## We're keeping the legend alive!

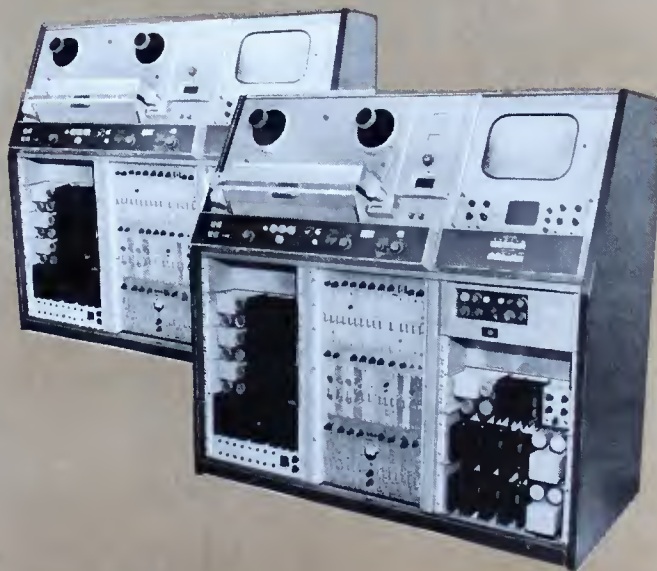
AMPEX VR-2000's and VR-1200's are the stuff legends are made of... they're the best. So if you can't afford a New VTR... consider owning a "pre-owned" legendary AMPEX VTR instead.

Our customers, including TV Stations, Manufacturers, Institutions, TV and Film Production facilities have purchased \$8 million in AMPEX VR-2000's; VR-1200's AVR-1's, HS-200's and paid only half that price. They know they're still getting the best in VTR's.

AFA VTR's are fully rebuilt and good as new... even better! These "legends" are in a class of their own... and at prices that are becoming legendary in their own rights.

And when the New AMPEX VTR's become legend... AFA will be there to keep them "alive" too.

Who knows... some day someone will have to keep our legend alive.



AFA...the largest rebuilder of the best VTR's in the world.

# AFA

A.F. ASSOCIATES, INC.

100 Stonehurst Court, Northvale, NJ 07647

2465 E. Bayshore, Suite 301, Palo Alto, CA 94303

Circle (79) on Reply Card

**201-767-1000**  
**415-856-1060**

[www.americanradiohistory.com](http://www.americanradiohistory.com)

# Schneider

## TV Lenses all over the world



### TV Lenses for 1 1/4" Plumbicon Cameras

|                   |             |
|-------------------|-------------|
| TV 11× Studio/OB  | 2.1/18-200  |
| TV 13× Studio     | 2.1/18-235  |
| TV 15× Wide Angle | 2.1/16-240  |
| TV 30× Standard   | 2.1/20-600  |
| TV 30× Wide Angle | 2.1/16-480  |
| TV 30× Tele/OB    | 2.1/33-1000 |

### TV Lenses for 1" Plumbicon Cameras

|                   |              |
|-------------------|--------------|
| TV 10× Studio     | 2 /17-170    |
| TV 11× Studio/OB  | 1.7/14-150   |
| TV 13× Studio     | 1.7/14.5-190 |
| TV 15× Wide Angle | 1.7/12.5-190 |
| TV 20× Special    | 2 /17-340    |
| TV 30× Standard   | 1.7/16-480   |
| TV 30× Wide Angle | 1.7/12.5-375 |
| TV 30× Tele/OB    | 1.7/26-800   |

### TV Lenses for ENG/EFP Cameras

|                           |              |
|---------------------------|--------------|
| TV 10× Standard ENG/EFP   | 1.8/10-100   |
| TV 15× Wide Angle ENG/EFP | 1.7/8.5-125  |
| TV 15× Tele ENG/EFP       | 1.7/16-240   |
| TV 20× Standard EFP       | 1.4/12-240   |
| TV 30× Standard EFP       | 1.4/11-330   |
| TV 30× Wide Angle EFP     | 1.4/8.7-260  |
| TV 30× Tele EFP           | 1.4/18.5-550 |

Jos. Schneider GmbH & Co.  
Optische Werke  
D-6550 Bad Kreuznach  
Fed. Rep. Germany  
Telefon (06 71) 60 11, P.O. Box 947  
Telex 0422 800



## Product directory: Ba-Ch

### Battery packs & chargers

Anton/Bauer, 2121  
Christie Elec., 2600  
Cine 60, 2700  
Frezzolini Elec., 2415  
Perrott, 2704

### Broadcast loggers

Broadcast Elec., 309  
Cetec Brdcast., 307  
Dynair Elec., 368  
Hallikainen & Friends, 2312  
IGM/NTI, 343  
QSI, 2800  
Scully, 355  
T & FT, 341

### Cabinets, cases & racks

Anvil Cases, 2507  
Cases, 2105  
Fidelipac, 351  
Research Tech., 539  
Winsted, 2601

### Cable (coaxial & audio)

Andrew, 360  
Cablewave Systems, 381  
Comrex Corp., 541  
Phelps Dodge, 353  
SWR, 2702  
Telemet, 333  
Trompeter, 511

### Camera dollies, stands, tripods, heads

Camera Mart, 555  
Innovative Television Equip., 388  
Listec, 465  
O'Connor Eng., 2500  
Quick-Set, 495  
Television Products, 465

### Camera stabilizing systems

Cinema Products, 2217

### Cameras, color ENG/EFP

Ampex, 301  
Asaca, 2502  
Bosch Fernseh, 330  
Camera Mart, 555  
Cinema Products, 2217  
Commercial Elec., 398  
IVC, 346  
Ikegami, 406  
JVC, 408  
Marconi, 322  
NEC America, 2404  
Panasonic, 483  
Phillips, 314  
RCA, 300  
Sharp, 2400  
Sony, 380  
Thomson-CSF, 324  
Victor Duncan, 2515

### Cameras, film chain

Ikegami, 406  
Marconi, 322

### Cameras, film cine

Cinema Products, 2217  
Frezzolini, 2415  
Ikegami, 406  
Marconi, 322  
TeleMation, 342

### Cameras, studio

Ampex, 301  
Bosch Fernseh, 330  
Camera Mart, 555  
Commercial Elec., 398  
Harris, 303  
Hitachi, 334  
Ikegami, 406  
Interntl. Video, 346  
JVC, 408  
Marconi, 322  
Panasonic, 483  
Philips, 314  
RCA, 300

### Cartridge machines

Ampro, 369  
Broadcast Elec., 309  
Cetec Broadcast, 307  
Harris, 303  
IGM/NTI, 343  
Interntl. Tapetronics, 319  
RCA, 300  
Telex Comm., 357  
Track Audio, 2211  
UMC, 407

### Cartridges & accessories

Broadcast Cartridge Serv., 2304  
Capitol Magnetic, 361  
Fidelipac, 351  
David Lint, 447  
3M, 439

### Carts, equipment

Coherent Comm., 2115  
E-N-G Corp., 2402  
Micro-Trak, 391  
Winsted, 2601

### Catalogs, equipment

Bill Daniels, 2417  
Storeel, 469

### Character generators & titles

Beston Elec., 376  
Broadcast Video Sys., 282  
Camera Mart, 555  
Chyron, 382

# The First Frame Store We'd Put Our Name On



From the industry's first standalone Time Base Corrector through the innovative 2020 Series Signal Processor, MICROTIME has combined its highly creative design capability with advanced technology to provide the highest quality products for the Video Industry. MICROTIME's goal has always been simplicity, reliability, and low cost, while maintaining the best performance standards available. For that reason, the 2525 Video Signal Synchronizer is the first Frame Store we'd put our name on.

The 2525 includes:

- Line Error Detection
- A new RS-170A Sync Generator for improved lock-up and easy interfacing with any switcher
- Field 1, Field 2, or Frame Freeze for digital video effects applications
- Auto Freeze or Black selectable
- H Phasing for output timing control
- Output H Sync and Burst Level Control
- Unique HETROCOLOR™ Processing for optimum performance for color under signals

The 2525 will correct VTR signals from no-lock or V/H lock, synchronous or non referenced, direct or

heterodyne, 1/2" helical through 2" quad. It passes VITS with the same processing as active video, can be remotely controlled, and is transparent to input signals from any source—and all with MICROTIME's proven reliability and ease of operation.

Find out more about the 2525 Video Signal Synchronizer. Write or call today to arrange for a demonstration.

**See us at NAB**

*Available through MICROTIME's worldwide distributor network.*

## MICROTIME

Microtime, Inc.  
1280 Blue Hills Avenue  
Bloomfield, Conn. 06002  
(203) 242-0761 TWX 710-425-1165

Circle (82) on Reply Card

## STL Offers The Most Complete Selection

Of Test Tapes

Available Anywhere

STL can serve all your needs with tapes in 2", 1", 1/2", 1/4", cartridges for broadcast and 8-track and cassette sizes. The most accurate reference possible in all popular test formats... Alignment, Sweep, Pink Noise, Level Set, Azimuth, and Flutter and Speed.

*Write or phone for fast delivery.*

*Write for free catalog.*



**STL STANDARD TAPE LABORATORY, Inc.**  
26120 Eden Landing Road #5 • Hayward, CA 94545  
(415) 786-3546

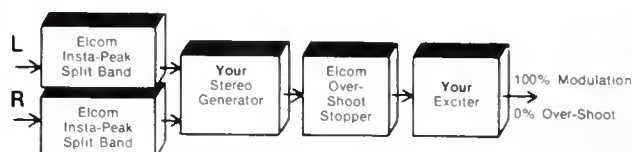
Circle (83) on Reply Card

## CONDOLENCE FROM THE STAFF AND MANAGEMENT OF ELCOM



To those who spent over fourteen hundred dollars to try to achieve the loudest sound in town.

We respectfully suggest that you sell or shelve that \$3000 wonder box and buy the unbeatable Elcom system for crystal clear loudness. You will see the modulation meter rock between 95% and 100% but you will think that the peak flasher is burned out. Just try that with any other system!!!



All for less than \$1400

### Elcom Engineering Company

Post Office Box 10432  
Santa Ana, California 92711  
(714) 544-5760

Circle (84) on Reply Card

## Product directory: Ch-Ex

Datametrics, 2813  
Knox Video, 2706  
Laird, 537  
Listec, 465  
3M, 302  
MPB Technologies, 2815  
Shintron, 410  
Systems Concepts, 517  
Thomson-CSF, 324  
Video Data, 2703

### Consoles (audio, TV, portable, editing, production)

Ampro, 369  
Audio Design & Mfg., 414  
Auditronics, 379  
Autogram, 2114  
Automated Processes, 373  
Bayly Eng., 425  
Broadcast Elec., 309  
CCA, 305  
Cetec Broadcast, 307  
Cinema Products, 2217  
Coherent Comm., 2115  
Crosspoint Latch, 2801  
CSI, 337  
Harris, 303  
Hitachi, 334  
LPB, 383  
Listec, 465  
Logitek, 2111  
MCI, 401  
McCurdy, 321  
McMartin, 317  
Rupert Neve, 507  
Pacific Recorder, 401  
QRK, 389  
Ramko, 409  
Research Tech., 539  
Rockwell Interntl., 2600  
Russco, 427  
Shure, 371  
Studer Revox, 453  
UMC, 407  
Ward-Beck, 489  
Winsted, 2601

### Decoders

Yves Faroudja, 412  
Rohde & Schwarz, 386  
Telemet, 333

### Delay systems (audio & video)

Asaca, 2502  
Allen Avionics, 2615A  
Broadcast Video, 2823  
Cablewave Sys., 381  
Listec, 465  
MicMix Audio Pds., 421  
Orban Assoc., 429  
Telemet, 333  
Television Equip., 364

### Duplicators (equip., facilities)

Audi-Cord, 419

David Lint, 447  
Garner Ind., 415

### Editors, film

Cinema Products, 2217

### Editors, videotape

American Data, 312  
Ampex, 301  
Bosch Fernseh, 330  
CMX, 477  
Camera Mart, 555  
Consolidated Video  
Sys., 1662  
Convergence, 378  
Datatron, 491  
Dynasciences, 497  
Hitachi, 334  
Shintron, 410  
Video Aids of CO, 25

### Election reporting systems

Chyron, 382  
Data Comm., 339

### Encoders, color video

Cohu, 471  
Shintron, 410  
TeleMation, 342

### Encoders, tone and EBS

Channelmatic, 2517  
Logitek, 2111  
Marti Elec., 349  
McMartin, 317

### Engineering services

David Lint, 447  
Soll, 505

### Enhancers, video image

Cohu, 471  
Consolidated Video  
Sys., 1662  
Yves Faroudja, 412  
QSI, 2800

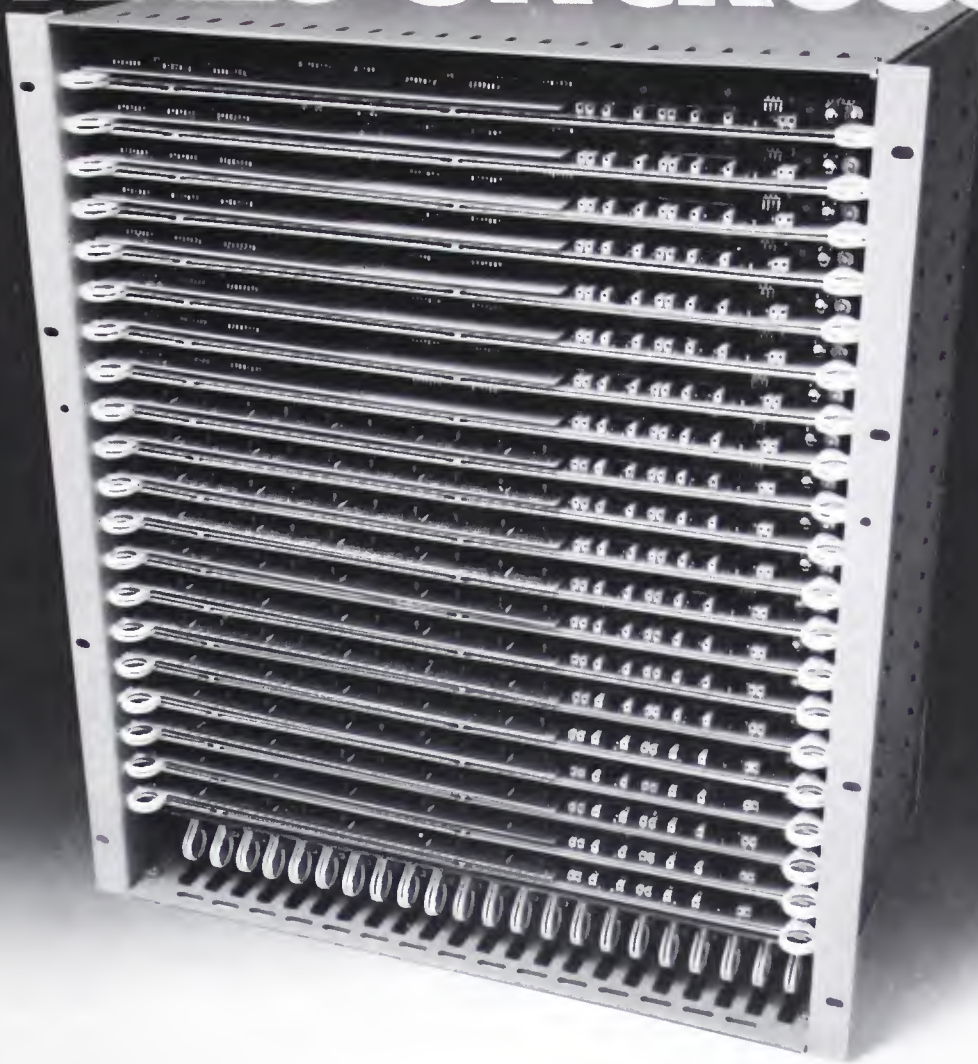
### Exciters (AM, FM, SCA)

Harris, 303  
McMartin, 317  
Philips, 314  
QEI, 435  
Rockwell Interntl., 2600  
Versa-Count, 2120

### Extenders, audio & LF

Comrex, 541  
IGM/NIT, 343

# GET YOUR SIGNALS UNCROSSED.



No matter how complicated your studio operation is, we can unsnarl your signals and send them on their way, with one of our nine off-the-shelf Switcher series.

For example, many broadcasters use our lower cost 15X or RX Series Switchers to switch input signals to their VTR machines. By providing instant access to signals at the touch of a button, difficult editing jobs are accomplished on the spot and, during the Vertical Interval.

And to minimize system downtime we've designed our Series 20X and 40X Switchers for optimum reliability and capability. Most units have a microprocessor in every channel to eliminate total system failure if the logic system malfunctions. And you can replace a channel

module without shutting down the entire system.

For audio use, our solid-state Series AX Switchers make the old fashioned patch panel a thing of the past.

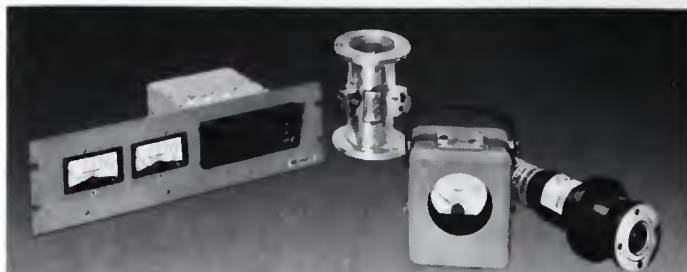
All 3M Routing Switchers can be built to nearly any input/output capability, with vertical interval switching and can be operated by many types of controls.

Studio operation is getting more complex every day. You can't fight it, so why not switch? Switch to 3M Routing Systems.

Circle the reader service card number at the back of the book for more information or call 205-883-7370 for system design assistance. 3M Video Systems. Watch us in action.

Circle (85) on Reply Card

# 3M



## New THRULINE® Wattmeters

to accommodate 15, 30, and 60kW transmitters and for 110% measurement of 10, 25 and 50kW transmitters. Start at 250 watts.

New Econoload™ Line Terminations and self-cooled Load Systems — low cost and field repairable.

HighSpeed WATTCHEER® RF Power Monitor/Alarms — see these and more at our NAB Booth #519 or ask for our Broadcaster's Catalog.

Who else but

# BIRD

30303 AURORA RD SOLON OH 44139

Circle (86) on Reply Card

## The fastfit™ 8281 Connector\*

Just Trim & Twist!

fastfit ... for a fast connection.



See Our  
Demonstration  
at the **NAB  
SHOW**  
March 25-28



\* Also available in BNC and UHF in other wire sizes

**Cambridge Products Corporation**

A Subsidiary of HIG Corporation

MANUFACTURERS OF COMMUNICATIONS CONNECTORS

244 WOODLAND AVENUE • BLOOMFIELD CONNECTICUT 06002  
(203) 243-1761 • (800) 243-8814

Circle (87) on Reply Card

## Product directory: Ex-In

### Fiber optics/optical links

Flash Tech., 547  
Telemet, 30A

### Film & processing services

Agfa-Gevaert, 2821  
L-W Interntl., 338  
Lipsner-Smith, 539

### Film chain (systems/equipment)

Beston Elec., 376  
L-W Interntl., 338  
Rank, 348

### Frame storers & synchronizers

Arvin/Echo, 390  
Bosch Fernseh, 330  
Camera Mart, 555  
Colorado Video, 523  
Consolidated Video  
Sys., 1662  
Digital Video Sys., 2709  
EECO, 301  
Micro Consultants, 404  
Microtime, 2305  
NEC America, 2404  
Video Assoc., 2809  
Vital, 316

### Generators (FM, SCA, AM, stereo)

Belar Labs, 367  
Harris, 303  
Marti Elec., 349  
McMartin, 317  
Moseley Assoc., 329  
QEI, 435  
Versa-Count, 2120

### Generators (time code & readers)

BTX, 2409  
CMX, 477  
Convergence, 378  
Datametrics, 2813  
Datatron, 491  
E&O Systems, 2803  
Listec, 465  
MCI, 401  
QSI, 2800  
Skotel, 2827

### Generators (video special effects)

Arvin/Echo, 390  
Asaca, 2502  
Bosch Fernseh, 330  
Broadcast Video Sys., 2823

Computer Image, 457  
Convergence, 378  
Grass Valley Group, 308  
3M, 302  
MicMix Audio, 421  
Micro Consultants, 404  
NEC/America, 2404  
Panasonic, 483  
Shark, 2400

### Generators (video, sync, burst, pattern)

Adda, 2104  
Asaca, 2502  
Crosspoint Latch, 2801  
Datatek, 521  
Datatron, 491  
Dynair, 368  
Leitch Video, 561  
Lenco, 372  
Micro Consultants, 404  
Philips, 314  
QSI, 2800  
Sharp, 2400  
TeleMation, 342  
Video Aids of CO, 553

### Head alignment gauge

Fidelipac, 351  
Memorex, 485

### Heads & reconditioning services, audio

Accurate Sound, 2103  
Computer Magnetics, 529  
David Lint Assoc., 447  
Nortronics, 345  
UMC, 407

### Heads & reconditioning services, video

A.F. Assoc., 2411  
Computer Magnetics, 529  
Nortronics, 345  
Spin Physics, 473  
Taber, 459  
Videomat, 459

### Headphones

Setcom, with various  
exhibitors  
Stanton Magnetics, 363  
Technics-Panasonic, 481  
Television Equip., 364  
Telex Comm., 357

### Intercoms

Audio Design & Mfg., 414  
Automated Processes, 373  
McCurdy, 321  
RTS Systems, 2115  
Television Equip., 364

# SWITCHERS DON'T MAKE MISTAKES...PEOPLE DO

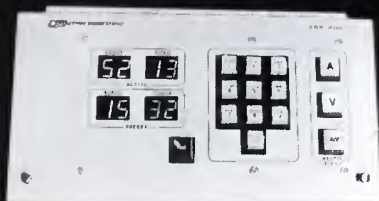
**That's why we've designed a whole new series of human-engineered control panels that are setting new standards for goof-proof switching.**

Once you've designed audio and video routing switcher matrices as transparent and reliable as ours, there's not much room for further improvement at that end. However, there has been a need for improvement in the control end--particularly where operators must make accurate, quick-decision source selections. The panels described below are designed to eliminate the confusion too often associated with routing switcher control, while providing the control flexibility so important to present-day signal routing requirements.

For installation simplicity, each of these new panels connects directly to the system party line via loop-through coax connections. They provide continuous status readout and can be encoded to permit each input (or output) to be addressed by its name (VTR-2, CAM-4, etc.) rather than by an arbitrary matrix number.

We are also prepared to supply custom variations of these panels to suit your exact requirements.

## CSP-200



Permits audio and/or video selection--including simultaneous A/V switching from different sources--on a single output bus. Available in recessed mount, one unit per rack panel and two units per rack panel versions

## CSP-200 Custom



Custom variation of the CSP-200 panel built for Opryland Productions permits single keystroke takes on two preselected audio/video sources as well as normal touchpad entry.

## CSP-300/R



Full Matrix Control Panel. Permits audio and/or video switching on any selected bus. Encoded version can be restricted to switch only on specific pre-assigned busses. Available in either recessed or rackmount versions.

## CSP-10

Controls ten randomly assigned busses providing continuous status readout on each bus. Touchpad data entry with numeric readout permits error-free switching on any of the ten busses. (Availability, February 1979.)

## CSP-20/CX-20

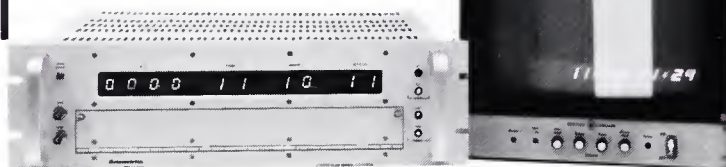
Permits button-per-source input selection on assigned bus. Basic panel accommodates 20 inputs. Expansion in 20-button increments is provided by adding slave panels. Permits fast single-stroke selection of any input. Button lamps provide continuous status indication from refresh memory. (Availability, March 1979.)

**UTAH SCIENTIFIC**  
2276 South 2700 West ■ Salt Lake City, Utah 84119 ■ Phone: 801-973-6840

For Literature Only Circle (88) on Reply Card.  
For Salesman Call Circle (89) on Reply Card.

# Generator - Reader - Video Generator

**Datametrics Model SP-722 Generates / Translates SMPTE Code and Displays Time on Video Monitor along with Subject Matter.**



#### Generate

- Time Code/User Bits
- Video Synchronization
- Jam Synchronization

#### Translate

- 0.25 to 10 Volt Sensitivity
- 1/4 to 40 Times Speed
- BCD Outputs

#### Time Display

- Infinitely Positionable
- Size and Style Selectable
- Intensity Variable



**datametrics**

Datametrics Inc.

340 Fordham Road, Wilmington, Mass. 01887  
Tel. (617) 658-5410 TWX 710-347-7672

Circle (96) on Reply Card

## Product directory: In-Mo

Ward-Beck, 489  
World Video, 501

#### Lasers (links, transmssn.)

Bosch Fernseh, 330

#### Lenses & lens repair

Angenieux, 318  
Canon, 493  
Cinema Products, 2217  
Fujinon, 515  
Rank, 348  
Tele-Cine, 392

#### Lighting systems

Bardwell & McAlister, 559  
Berkey Colortran, 370  
Christie Electric, 2600  
Cine 60, 2700  
Electro Controls, 2302  
General Electric, 2509  
GTE Sylvania, 320  
Great American Mkt., 2708  
Kliegl Bros., 366  
Lowel-Light, 2506  
Rosco Labs, 2211  
Strand, 475  
Victor Duncan, 2515

#### Lightning protectors, protection systems

Lighting Elimination  
Assoc., 437  
CPS, 542  
Wilkinson, 347

#### Limiters/compressors/ equalizers/filters

Allen Avionics, 2615A  
Audio Designs & Mfg., 414  
Audio & Design Rec., 2215  
Datek, 54  
Inovonics, 2103  
LPB, 383  
McCurdy, 321  
Orange County Elect., 2107  
Orban, 429  
Ramko, 409  
Track Audio, 2211

#### Meters

A.F. Associates, 2411  
Asaca, 2502  
Audio & Design Rec., 2215  
Bird Electronics, 519  
Bald Mtn. Labs., 309  
Bayly Eng., 425  
Comark, 2203  
Delta Elec., 365  
Dielectric Comm., 509  
Electro Impulse, 417  
Fidellpac, 351  
Gotham Audio, 423  
Lenco, 372

MicMix Audio Pdts., 421  
Micro Comm., 513  
Marconi, 322  
Potomac, 377  
Technics-Panasonic, 481  
Track Audio, 2211  
Video Aids of CO, 553  
Wilkinson, 347

#### Microphones, stands, accessories

Cetec Brdcast., 307  
Coherent Comm., 2115  
Comrex, 541  
Electro-Voice, 2504  
Alan Gordon Ent., 2501  
Gotham Audio, 423  
HM Elec., 2604  
Panasonic, 483  
Shure, 371  
Sony, 380

#### Microwave systems (ENG, STL, and MDS)

Andrew, 360  
Cablewave Sys., 381  
EMC, 328  
Farinon Elec., 374  
Marti Elec., 349  
RCA, 300B  
Rockwell Internatl., 2600  
Telegen, 2221

#### Modulators & demodulators video

Comark Ind., 2203  
Dynair Elec., 368  
Philips, 314  
Rohde & Schwarz, 386  
Scientific Elec., 477  
Tektronix, 306  
Telemet, 333  
Videotek, 2602

#### Monitors & receivers

Asaca, 2502  
Belar, 367  
Bosch Fernseh, 330  
CSI, 337  
Camera Mart, 555  
Cetec Brdcast., 307  
Cohu, 471  
Comrex, 541  
Conrac Corp., 304  
E & O Systems, 2803  
Electrohome, 535  
Hitachi, 334  
Ikegami, 406  
JBL, 2623  
JVC, 408  
Lenco, 372  
Panasonic, 483  
Rohde & Schwarz, 386  
Sharp, 2400  
Sony, 380  
Television Equip., 364  
TerraCom, 2401  
T & FT, 341

# Winsted



## EDITING CONSOLE

Holds  
all sizes of  
**ENG/  
VTR**  
equipment!

MODEL 900A

This totally modular console has every feature for editing efficiency—shelves that adjust on 1" increments, sliding pullouts for added working space and easy maintenance, total access to VTR's, editors, monitors and equipment. Rolls easily on large casters—even into a van to create a mobile unit! For full-line catalog of video consoles, tape and film trucks, film / videotape storage systems, call or write

THE WINSTED CORPORATION 8127 Pleasant Ave. So., Minneapolis, MN 55420  
(612) 888 1957 Toll Free Number 800 328 2962

# Winsted

See us in  
NAB Booth  
#2601

Circle (97) on Reply Card



Fuji quality is now available in 1"

**FUJI**

Magnetic Tape Division of Fuji Photo Film U.S.A., Inc., 350 Fifth Avenue, New York, New York 10001

See us at NAB booth 402.

Circle (92) on Reply Card

# REMOTE MONITORING & CONTROL



of transmitters, receivers, antennas, switches, and most anything else is simple with our Series 1100 Time Division Multiplex FSK telemetry equipment. It features:

- 12 to 96 channels
- Analog monitoring
- Relay outputs on receivers
- Transient protected inputs
- Voice plus monitor & control on voice grade circuit
- Special units available for unique applications

For a data sheet and price list contact Karl Kreeb at Ext. 7416  
Sylvania Technical Systems, Inc. 100 First Avenue.  
Waltham, MA 02154 • Tel 617-890-9200

## SYLVANIA

GTE

Circle (93) on Reply Card

**Some things  
you can't get from the Biggest.  
Only from the Best.**

**capstan idler assemblies**

AMPEX

with

Scully

AUTOTEC ML 6

**ELECTRO-SOUND**

**FOR MOST PROFESSIONAL RECORDERS  
THE ALMOST INDESTRUCTIBLE COATING  
THAT TAKES THE LOAD OFF THE DRIVE  
MOTOR BEARINGS**

**NOW with  
Self aligning ball bearing**

**proven dependability from**



SEE US AT NAB-DALLAS  
BOOTH 375

**United Research Laboratory Corp.**

681 FIFTH AVENUE • NEW YORK, N.Y. 10022  
(212) 751-4663 • TWX 710-581-3622  
SERVICE AND SHOWROOM - 16 EAST 52nd STREET  
N.Y.C. 10022

Circle (94) on Reply Card

## Product directory: Mo-T

Versa-Count, 2120  
Videotek, 46  
World Video, 501

### Music libraries & sound effects

DeWolf Music Lib., 2605

### Noise reduction systems

Asaca, 2502  
Audio Designs & Mfg., 414  
Audio & Design Rec., 2215  
Consolidated Video Systems, 1662  
Dolby Lab., 385  
Yves Faroudja, 412  
Gotham Audio, 423  
Allen Gordon Ent., 2501  
Inovonics, 2103  
Micro Consultants, 404  
Philips, 314  
TeleMation, 342

### Patch panels, jacks & plugs

Audio Designs & Mfg., 414  
Bayly Eng., 425  
Cambridge Prod., 2802  
Potomac, 377  
Trompeter, 511

### Pickup tubes, TV

Amperex, 310  
Calvert, 2117  
Ceco Comm., 431  
EEV, 326  
RCA, 300

### Processing equip.

Audio & Design Rec., 2215  
Automated Processes, 373  
Bald Mtn. Labs, 309  
Bayly Eng., 425  
Coherent Comm., 2115  
Computer Magnetism, 529  
Dynasciences, 497  
Edco, 359  
Yves Faroudja, 412  
Grass Valley, 308  
Gregg Lab., 2118  
Harris, 303  
Inovonics, 2103  
LPB, 383  
Leitch Video, 561  
Marti Electronics, 349  
Microtime, 2305  
Orange Co., 2107  
Orban, 429  
QEI, 435  
QRK, 389  
Research Tech., 539  
Russco, 427  
Shure, 371

Track Audio, 2211  
Thomson-CSF, 324

### Program services

Mutual Brdcastg., 2200  
Video Tape Co., 527

### Projectors, TV large screen/telecine

L-W Internatl., 338  
Panasonic, 483

### Prompter systems

Listec, 465  
Q-TV Systems, 322  
Telescript, 356

### Recorders (audio, cartridge)

Ampro, 369  
Audi-Cord, 419  
Broadcast Elec., 309  
Cetec Brdcast, 307  
Fidelipac, 351  
Allen Gordon Ent., 2501  
Harris, 303  
IGM/NTI, 343  
International Tapetronics, 319  
David Lint, 447  
3M, 439  
Panasonic, 483  
Telex Comm., 357  
UMC, 407

### Recorders (audio, reel & cassette)

Ampex Corp., 301  
Bosch Fernseh, 330  
Cetec Brdcast., 307  
Alan Gordon Ent., 2501  
International Tapetronics, 319  
David Lint, 447  
MCI, 401  
Nagra, 525  
Rupert Neve, 507  
Otari, 405  
Panasonic, 483  
Scully, 355  
Studer ReVox, 453  
Technics-Panasonic, 481  
Telex Comm., 357

### Recorders (videodisc & slow motion, replay)

Arvin/Echo, 390  
Bosch Fernseh, 330  
Camera Mart, 555  
Eigen Video, 557  
Gotham Audio, 423  
Oktel, 2125  
Panasonic, 483

#### Recorders (videotape, videocassette)

A.F. Assoc., 2411  
Ampex, 301  
Bosch Fernesh, 330  
Camera Mart, 555  
Cinema Products, 2217  
Hitachi, 334  
QVC, 346  
RVC, 408  
Marconi, 322  
Merlin Eng., 412  
Micro Control Assoc., 311A  
Moseley Assoc., 329  
Philips, 314  
RCA, 300  
Recortec, 336  
Sony, 380  
Victor Duncan, 2515

#### Remote control systems, links

Coherent Comm., 2115  
Delta Elec., 365  
Dynair Elec., 368  
Hitachi, 334  
QVC, 408  
Logitek, 2111  
Marti Elec., 349  
Micro-Trak, 391  
Moseley Assoc., 329  
McMartin, 317  
Nurad, 533  
T&FT, 341

#### Satellite communications

Mutual Brcdstg., 2728  
RCA, 300B  
Rockwell Interntl., 2600  
Scientific-Atlant., 477

#### Sequence controller

Automated Brcdst., 311  
Channelmatic, 2517  
Christie Elec., 2600  
Data Comm., 339  
Sono-Mag, 397  
Videomedia, 2825

#### Speakers & enclosures

Electro-Voice, 2504  
BL, 2623  
Technics-Panasonic, 481

#### Standards convertor, video

Broadcast Video Sys., 2823  
Marconi, 322  
Micro Consultants, 404

#### STL equipment

Marti Elec., 349  
Micro Control Assoc., 311A  
Moseley Assoc., 329  
Orange Co., 2107  
T&FT, 341

#### Studio equipment, misc.

LPB, 383  
Micro-Trak, 391  
NEC America, 2404  
QRK, 389  
Research Tech., 539  
Soll, 505  
Storeel, 469  
Video Aids of CO, 553

#### Switchers, audio

American Data, 312  
Automated Processes, 373  
Channelmatic, 2517  
Convergence, 378  
Industrial Sciences, 531  
McCurdy, 321  
TeleMation, 342

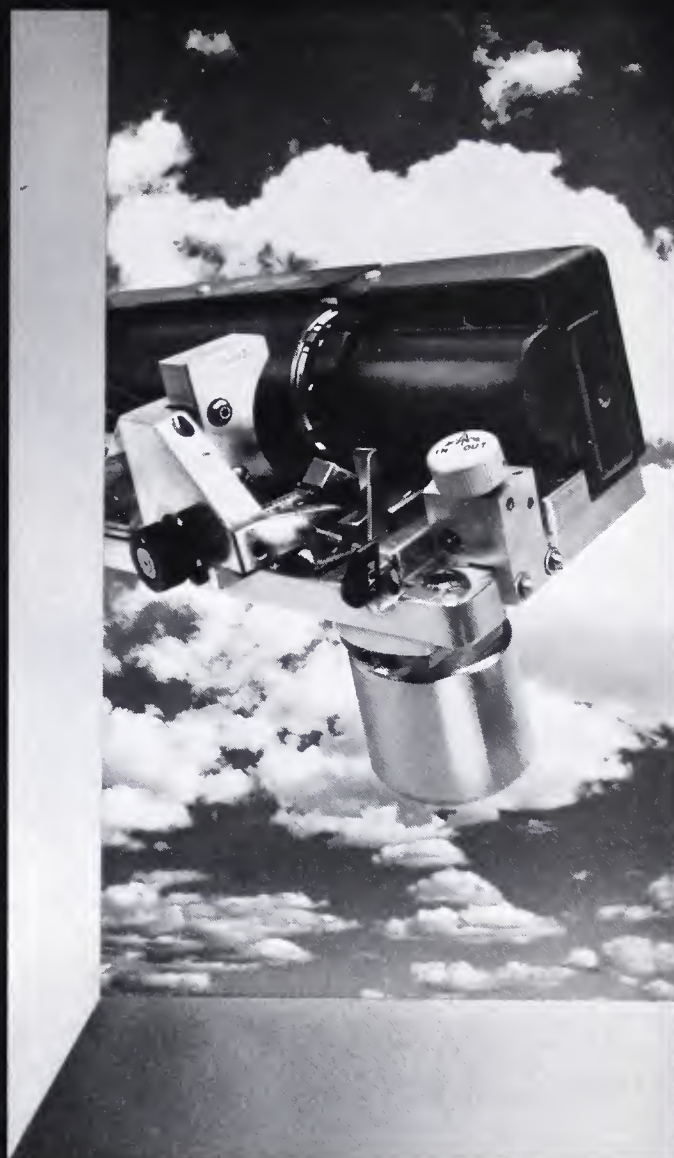
#### Switchers, routing

Automated Processes, 373  
American Data, 312  
Asaca, 2502  
Channelmatic, 2517  
Datatek, 512  
Di-Tech, 2403  
Dynair Elec., 368  
Dytek, 2301  
Grass Valley, 308  
Industrial Sciences, 531  
3M, 302  
Ramko, 409  
Ross Video, 2508  
TeleMation, 342  
Utah Scientific, 2707  
Vital, 316

#### Switchers (video, production, editing)

American Data, 312  
Ampex, 301  
Asaca, 2502  
Channelmatic, 2517  
Computer Image, 457  
Convergence, 378  
Crosspoint Latch, 2801  
Glentronix, 2609  
Grass Valley, 308  
Ikegami, 406  
Industrial Sciences, 531  
3M, 302  
Marconi, 322  
McCurdy, 321  
Rupert Neve, 507  
Shintron, 410  
Vital, 316

## not quite immortal

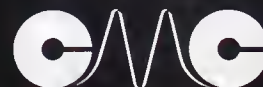


## value engineering puts new life in old heads

All VTR heads received by CMC are refurbished to the original design of the manufacturer. CMC refurbishing practices have been optimized to a consistency of electro/mechanical performance superior to all other refurbishers. CMC refurbishes Ampex Mark 3, 10, 15, 20, RCA Hi & Lo-Band Video Heads. Mark 10, 15 and RCA HiBand are available in hot-pressed Mn-Zn ferrite with the CMC exclusive extended warranty\*. In emergencies, we expedite. Write or phone CMC for product specifications.

\* Broadcast 600—over two years in development. Engineered and priced for maximum value: Superior quality @ lowest cost per-hour.

**NORTH AMERICA/COMPUTER MAGNETICS CORPORATION**  
125 W. Providencia Ave., Burbank, Ca. 91502 (213) 843-6674  
**EUROPE/CMC TECHNOLOGY CORPORATION**  
733 N. Pastoria Ave., Sunnyvale, Ca. 94086 (408) 245-3342



Circle (100) on Reply Card

# free the mark 10



## convert your idle Mark X video heads into busy Mark XV's

Fully compatible with AVR2 & AVR3 VTR's. Identical performance durability. Call or write for prices and delivery schedule.

**North America/Computer Magnetics Corp.**  
125 W. Providencia Ave., Burbank, Ca. 91502 (213) 843-6674  
**Europe/CMC Technology Corp.**  
733 N. Pastoria Ave., Sunnyvale, Ca. 94086 (408) 245-3342



Circle (91) on Reply Card

## Product directory: T-Te

### TBCs, time code equipment

Ampex, 310  
BTX, 2409  
CMX, 477  
Channelmatic, 2517  
Consolidated Video  
Sys., 1662  
Convergence, 378  
Datametrics, 2813  
Datatron, 491  
Digital Video, 2709  
Edutron, 2603  
E&O Systems, 2803  
Glentronix, 2609  
Hitachi, 334  
Listec, 465  
MCI, 401  
Microtime, 2305  
NEC America, 2404  
Skotel, 2827  
Sony, 380

### Tape evaluators/cleaners/ gauges

Chyron Corp., 382  
Fidelipac, 351  
Inovonics, 2103  
Internatl. Tapetronics, 319  
Recortec, 336  
Research Tech., 539  
Television Equip., 364  
Tentel, 395

### Tape, magnetic recording (audio)

Agfa-Gevaert, 2821  
Ampex, 301  
Broadcast Cartridge  
Service, 2304  
Capitol Magnetic, 361  
Fidelipac, 351  
Gothan Audio, 423  
3M, 302  
Memorex, 485

### Tape erasers

Fidelipac, 351  
Garner Ind., 415  
Internatl. Tapetronics, 319  
Taber, 459

### Tape, magnetic recording (video)

Agfa-Gevaert, 2821  
Ampex, 301

## To make an impression that lasts use GE large screen TV projection

The new General Electric PJ5000 Color Video Projector introduces major advances in simplicity, reliability and performance in large screen television projection for business.

This solid-state, high brightness, light valve video projector is engineered for remote control operation, with improved picture quality, new power efficiency and increased ease of operation, maintenance and service.

The GE exclusive single gun, single optical path system projects bright, natural color pictures with inherent color registration, on screens from 2 feet to 20 feet wide, for front or rear projection.

In addition to projecting information from all standard video sources, the PJ5000 can be coupled to your computer facilities through suitable interface equipment. It can project Alpha-numeric data, graphic displays and computer generated images, in real time, for instant review and analysis. Its compact, self-contained Control unit can be removed from the Projector for remote set-up and operating control at distances up to 200 feet, with the addition of an accessory control cable. Excellent power efficiency is achieved with the PJ5000's advanced electronic

circuitry which permits operation with low line voltages of 105 v. without affecting picture quality. Normal input power required is low... 1,170 watts compared with 1,750 watts, or higher, for other professional television projectors.

The handsome PJ5000 is easily transportable and ready to move from your boardroom, to your training center, to your auditorium for intimate or large audiences. And, it operates from standard 120v/20 amp appliance outlets.

The PJ5000 Projector is warranted to be free of defective materials and workmanship for one year. The single gun light valve is warranted for 2,000 operating hours or one year on a prorated basis.

For more information call (315) 456-2562 today or write to:

Video Display Equipment Operation  
General Electric Company  
Electronics Park, 6-206  
Syracuse, New York 13201



**GE large screen  
color TV projector  
PJ5000**

**GENERAL  ELECTRIC**

Circle (101) on Reply Card

uji Magnetic Tape, 402  
M, 302  
Memorex, 485

#### Test equip., monitors & meters (audio)

Audio & Design Rec., 2215  
Automated Processes, 373  
Bald Mountain Lab, 309  
E-Tech, 2403  
Edelpac, 351  
Ecmix Audio, 421  
Ectomac, 377  
EI, 435  
Fund Tech., 2405  
Tektronix, 306  
Tmet, 333

#### Test equip., monitors & meters (video)

AF. Assoc., 2411  
Aaca, 2502  
Broadcast Video Sys., 2823  
Comark Ind., 2203  
Datatek, 521  
EO Systems, 2803  
E.C., 408

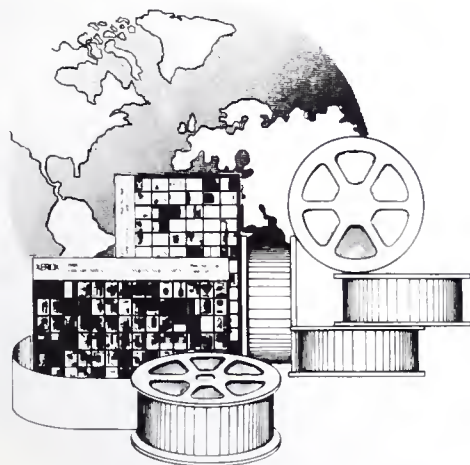
Leitch Video, 561  
Lenco, 372  
Marconi, 322  
Micro Comm., 513  
Micro Control Assoc., 311A  
Panasonic, 483  
Philips, 314  
QSI, 2800  
Rohde & Schwarz, 386  
Sony, 380  
Sharp, 2400  
Tektronix, 306  
Television Equip., 364  
T&FT, 341

#### Test equipment, RF

Bird Elec., 519  
Coherent Comm., 2115  
Electro Impulse, 417  
Tektronix, 306  
TeleMation, 333

#### Telemetry Equip.

Farinon, 374  
Hallikainen & Friends, 2312  
Marti Elec., 349  
Moseley Assoc., 329



## BROADCAST engineering is Available in MICROFORM

FOR INFORMATION WRITE:

### University Microfilms International

300 North Zeeb Road  
Ann Arbor, Mich. 48106  
U.S.A.

18 Bedford Row  
London, WC1R 4EJ  
England

## clean up your act



## more value engineering from CMC

### 1 VELOCITY ERROR CORRECTOR

Applies velocity error correction to all active lines of a head pass. □Plug compatible with VR1200 & VR2000 □Improves interchange playback signal of standard and non-standard recordings.

### 2 AUTO EQUALIZER

CMC AE1200 & AE2000 correct all lines of saturation banding. □Plug compatible with VR1200 & VR2000 VTR's □Facilitates reproduction of material recorded with non-standard chroma level and non-standard female guide position. □Improves head life by eliminating necessity of readjusting female guide when recording with low-tip-projection-head.

### 3 DG CHANNEL AMPLIFIER

The CMC model DG1200 is plug compatible with all VR1200 NTSC/PAL VTR's. □Individual channel RF automatic gain control. □Minimizes noise and 2nd harmonic distortion. □Extended burn-in under power reduces component failure. □Write or phone CMC for product specifications.

**NORTH AMERICA/COMPUTER MAGNETICS CORPORATION**  
125 W. Providencia Ave., Burbank, Ca. 91502 (213) 843-6674

**EUROPE/CMC TECHNOLOGY CORPORATION**  
733 N. Pastoria Ave., Sunnyvale, Ca. 94086 (408) 245-3342

Circle (102) on Reply Card



## AT NAB



**See the finest  
generator available  
for remote testing.**

- 10 dB, 1 dB and 0.1 dB precision attenuators
- High +26 dBm output
- .001% distortion
- Intermodulation test signals

**Visit us at Booth 2405**

**S<sup>®</sup> T SOUND TECHNOLOGY**  
1400 DELL AVENUE  
CAMPBELL, CALIFORNIA 95008  
(408) 378-6540

Circle (80) on Reply Card

**BEI**  
**DATA-PROMPTER**

**THE FIRST REAL ADVANCE  
IN TELEVISION PROMPTING  
IN YEARS...SEE THE  
PROMPTER WITH A BRAIN  
NAB • BOOTH #376**

BEI, P.O. BOX 106-A, OLATHE, KANSAS 66061 • OR CALL (913) 764-1900

Circle (81) on Reply Card

## Product directory: Te-Z

Nurad, 533  
Rohde & Schwarz, 386  
TerraCom, 2401

### Test patterns, charts

Telecommunications  
Inc., 449

### Timers & clocks (program)

Convergence, 378  
Dytek, 2301  
ESE, 401  
Glentronix, 2609  
Gotham Audio, 423  
Leitch Video, 561  
Logitek, 2111  
Marconi, 322  
Pacific Recorder, 416  
QRK, 389  
QSI, 2800  
Ramko, 409  
Recortec, 336  
Research Tech., 539

### Towers & tower equip.,

EG & G, 2302  
Flash Tech., 547  
Fred Nudd, 2310  
Stainless, 2109  
Unarco-Rohn, 373A  
Utility Tower, 323

### Transmitter switchers/ controllers/detectors

CCA, 305  
Comark, 2207  
Delta Elec., 365  
Dielectric Comm., 509  
Marti Elec., 349

### Transmitters (AM & FM)

Bayly Eng., 425  
CCA, 305  
CSI, 337  
Cetec Brdcast., 307  
Continental Elec. Mfg., 331  
Harris, 303  
LPB, 383  
McMartin, 317  
NEC America, 2404  
RCA, 300  
Rockwell Interntl., 2600  
Sintronics, 73  
Versa-Count, 2120

### Transmitters, ENG

Marti Elec., 349  
Rohde & Schwarz, 386  
Wilkinson, 347

### Transmitters (TV and translators)

Acrodyne Ind., 479  
Bogner, 2202  
CCA, 305  
Comark Ind., 2203  
EMC, 328  
Harris, 303  
Marconi Elec., 322  
NEC America, 2404  
Philips, 314  
RCA, 300  
Television Tech., 2306  
Thomson-CSF, 324  
Versa-Count, 2120

### Turntables, tone arms & phono cartridges

LPB, 383  
Micro-Trak, 391  
McCurdy, 321  
QRK, 389  
RCA, 300  
Ramko, 409  
Russco Elec., 427  
Shure, 371  
Stanton Magnetics, 363  
Technics-Panasonic, 481

### Vacuum tubes (video cameras)

Amperex, 310  
Calvert Elec., 2117  
Ceco Comm., 431  
EEV, 326  
RCA, 300A

### Vacuum tubes (transmitting TWTs)

Amperex, 310  
Ceco Comm., 431  
EEV, 326  
RCA, 300  
Varian, 487

### Vans and accessories

E-N-G Corp., 2402  
Van Ladder, 2804  
Wolf Coach, 503

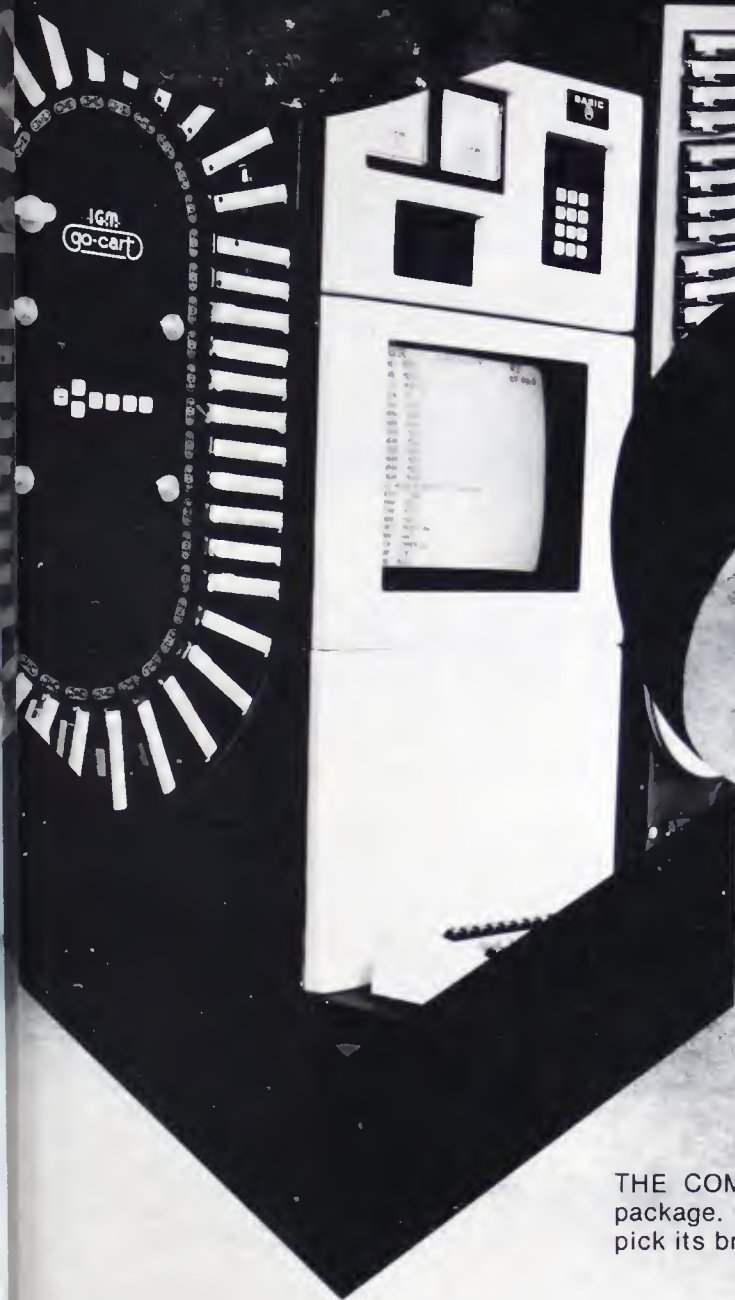
### Waveguides

Cablewave, 381  
Dielectric Comm., 509

### Weather radar systems

Arvin/Echo, 390  
Technology Serv., 467  
Video Data Sys., 2703

# Ingenuity and Good Manufacturing



- 1st to use IBM card systems
  - 1st digital logic control
  - 1st MOS memory systems
  - 1st INSTANT random access cart unit
  - 1st to use minicomputers & VDT'S
  - 1st microprocessor in cartridge playback
  - 1st microprocessors in system control
  - 1st with color display system
- with

## BASIC A

**CULMINATION OF 25 YEARS AS THE LEADER  
IN RADIO BROADCAST AUTOMATION EQUIPMENT**

THE COMPLETE ONE! BASIC A has ALL its marbles in one package. Nothing else to buy. Just sit down at the keyboard and pick its brains (based on 3 Intel 8085 microprocessors).

Both 343 NAB '79

You're a HUMAN — tell it in ENGLISH. BASIC A will carry out your commands.

IS BASIC-ALLY BETTER.

See what you're programming, what's on air too,  
on CRT — black & white or color.

Push one button to operate LIVE ASSIST.

Programming live commercials or PSA's? BASIC gives you 20  
programmable descriptions to automatically log them.

Ideal for syndicated formats, because of modular  
programming concept.

Give search & delete commands without interfering with  
programming.

FREE education for operator. FREE system installation.

STAY WITH THE FIRST FAMILY.

**ICM**  
A DIVISION OF N.T.I. 4041 HOME ROAD, BELLINGHAM, WA 98225 [206] 733-4567

Circle (95) on Reply Card

# NAB-DALLAS '79



## Exhibits roundup

This section of this special convention issue is a roundup of exhibiting manufacturers and a preview of the products they will have on display in the exhibition area of the Dallas Convention Center.

Along with the products to be shown, some companies are listing new products. These are products that will be shown for the first time at the NAB convention. A quick scan of the exhibitors will give you an idea of the variety of new products that will be on display.

If you're not going to the convention this year, this section will make the trip for you. Put this together with our *Innovative Products* section, and you'll be up-to-date on what's new.

This section can be especially helpful. Circle the booth numbers of companies showing new products you'd like to see for yourself. If the manufacturer advertised in this issue, there will be a color line running under the product information that says "See ad on page \_\_\_\_\_." If you'll take the time to turn to the ad, you probably will have a good idea of whether or not the product will be interesting enough to warrant a trip to his booth in the exhibition area. And, if you'll mark these booth numbers on the *Exhibit Map* in this issue, you'll be sure not to miss anything.

### Exhibitors

#### A. F. Associates

Refurbished VTRs (525/625 NTSC PAL), 10-minute videotape presentation on Panasonic TV projection system. **New:** Blanking meter (V & H) with digital readout and optional video monitor character display, 525 NTSC 3M color dropout compensator. **Booth 2411.**

see ad on pages 25, 107

#### AMCO Engineering Company Booth 393

#### Accurate Sound Corporation

**New:** 24-track 2-inch Saki ferrite heads. **Booth 2103.**

#### Acrodyne Industries

1 kW UHF translator. **New:** 2.5/5 kW FCC type-accepted VHF transmitter, 10 kW VHF transmitter, 10 kW UHF transmitter. **Booth 479.** Hospitality Suite: Hyatt Regency.

#### Adda Corporation Booth 2104

#### Agfa-Gevaert

2-inch quadruplex videotape, 3/4-inch bulk videotape, magnetic film 16mm and 35mm polyester, mastering tape, high density cassette tape, high output cassette tape, 1/4-inch duplicating tape, Videochrome 1/2-inch VCR cassettes, bin tape. **Booth 2821.**

#### Aim Limiter Booth 2108

#### Allen Avionics

Video and pulse delay lines, filters. **New:** Video delay line. **Booth 2615A.**

see ad on page 211

#### Allied Tower Company Booth 2100

#### Allotrope Booth 2108

#### Amber Electro Design Booth 2108

#### American Data Corporation Video production system with Quan-

tel DPE, video production systems, production switchers, modular amplifiers, audio/video distribution switchers, master control system. **New:** Video production system, ENG/EFP production switcher. **Booth 312.** Hospitality Suite: Dallas Hilton.

#### American Telegraph and Telephone Booth 2511

#### Amperex Electronic Corporation

Sivicon silicon diode array, intensified Sivicon, vidicons, RF power tubes, industrial tubes, rectifier stacks, circulators, viewfinder CRTs. **New:** 3/4-inch diode gun Plumbicon, 1-inch diode gun Plumbicon. **Booth 310.**

see ad on page 47

#### Ampex Corporation

Quadruplex VTRs, helical VTR time base correctors, broadcast cameras, portable cameras, editing systems, production switchers, digital video production systems, audio equipment, transport control equipment, magnetic tape production. **Booth 301.** Hospitality Suite: Loew Anatole.

see ad on page 9

# "Quad" Quality in 3/4" Format



**HBU**

is now available  
for delivery

## HI-BAND U-format VTR

The model HBU-2860 (Hi-Band U-format video cassette recorder) is a modified SONY VO-2860 with Recortec electronics mounted on top of the unit. The modification provides direct hi-band video recording made possible by tripling the scanner speed and the linear tape speed. HBU is not a kit, but a complete VTR.

**QUALITY**—At the 1200 ips head-to-tape speed the HBU video quality is as good as the "quad" or the new one-inch format. Significantly improved audio quality is also obtained with this modification.

**CONVENIENCE**—Standard and widely available 3/4-inch video cassettes for the HBU allow for simple loading, handling and storage.

**DEPENDABILITY**—The HBU does not alter the U-type recording format and thus takes advantage of the established interchangeability of the U-type recorders.

**ECONOMY**—Lowest cost in equipment, media and operations for any Hi-Band VTR.

**RECORTEC, INC.** 777 PALOMAR AVE., SUNNYVALE, CA 94086. TEL: (408) 735-8821

## Exhibit roundup: Am-Be

### Ampro Broadcasting

Broadcast cartridge machines, audio consoles, Monomax, tri-deck cartridge machine. **New:** Microtouch consoles. **Booth 369.**

[see ad on page 24](#)

### Amtron Corporation

**Booth 412A**

### Andrew Corporation

Heliac coaxial cable, STL microwave antenna systems, earth station antennas, transmitting antennas, UHF-TV. **New:** 12 m earth station antenna, 1 5/8-inch low-loss foam-dielectric heliac coaxial cable. **Booth 360.**

### Angenieux Corporation

10x14.5 wide angle lens, 12x lens, 15x and 42x lens for studio and outside broadcasting, 42x telephoto lens for sports and outside broadcasting, 15x9.5 system for 2/3-inch cameras. **Booth 318.**

### Anton/Bauer

Battery modules, holders and chargers; video belts and chargers. **New:** 12 Ah batter, silver charger, 13 V Nicad battery. **Booth 2121.**

### Anvil Cases

EIA rack cases, video camera cases, VTR cases, combo camera/VTR cases, monitor cases, HMI lighting cases, tool cases (technician oriented), pullover clamping-lid style EIA rack case for special shock mounting, filmbase camera cases, audio-visual product cases. **New:** Shock-mounted rack cases. **Booth 2507.**

### Arvin/Echo Science Corporation

Slo-Mo 1, EFS-1A, Tel-Weather—TW-1. **New:** Special controller. **Booth 390.**

### Asaca Corporation

Portable color camera, noise meter, envelope delay, video sweep generators, digital pattern generator, 20-inch color monitor, 14-inch color monitor, color bar generator. **New:** Portable switcher for EFP, registration meter, MPX TV sound genera-

tor, 10-inch color monitor for EFP, test signal generator. **Booth 2503.**

[see ad on page 7](#)

### Audi-Cord Corporation

Tape cartridge reproducers and record-reproducers. **Booth 419.**

[see ad on page 136](#)

### Audio Designs & Manufacturing

Audio consoles for TV, intercom systems for broadcasting, distribution amplifiers, limiters, noise suppressors, patchbays. **New:** FM and AM stereo production consoles, FM and AM on-air consoles. **Booth 414.**

[see ad on page 5, 105](#)

### Audio & Design Recording, Ltd.

Vocal stresser, compex-limiter, sweep equalizers, stereo broadcast limiter, music/voice ratio limiter, compressor-limiter, parametric equalizer, hi- and low-pass dynamic noise filter/gates, octave equalizer, distribution amplifier, PPM/VU LED level indicators, dual noise gate, expander/gate. **New:** Compressor-limiter, paragraphic equalizer, time shape module (analog delay), pan effects module (programmable panning). **Booth 2215.**

### Auditronics

Audio console. **New:** Audio console. **Booth 379.**

[see ad on page 169](#)

### Autogram Corporation

6-channel audio console, 10-channel audio console. **New:** 8-channel audio console. **Booth 2114.**

### Automated Broadcast Controls

Complete automation systems. **New:** 1600S sequential controller for back programming. **Booth 311.**

### Automated Business Concepts

Computer-based management system. **New:** Audience data system. **Booth 545.**

### Automated Processes

Automated audio consoles, broadcast audio consoles, post-production audio consoles, audio routing systems, audio monitoring systems, audio processing modules, audio amplifiers, audio DAs. **New:** Audio console/desk, digitally programmable Intercom. **Booth 373.**

### Automation Electronics (Autotron Systems)

Business automation system, Honeywell Level 6 minicomputer options. **New:** Options for business automation system. **Booth 2208.**

### Avab America

**Booth 2712A**

### B & B Towers

**Booth 2124**

### The BTX Corporation

SMPTE time code generator, SMPTE time code reader, SMPTE time code video display, SMPTE time code synchronizer. **New:** SMPTE tape controller. **Booth 2409.**

[see ad on page 172](#)

### Bald Mountain Lab

**New:** Audio step generator, auto-ranging dB meter. **Booth 309.**

### Bardwell & McAlister

300 W - 5 kW spotlights, 650 W - 2000 W quartz lights, cyc strip lights, mounting and hanging equipment, lighting accessories. **New:** Century stands, grip heads, grip stands, other grip equipment. **Booth 559.**

### Bayly Engineering, Ltd.

Solid-state FM transmitters, audio mixer, digital stereo program channels, digital mono program channels, analog mono program channels, analog stereo program channels, coaxial load resistors, alarm wattmeters, audio patch panels. **New:** PDM broadcast transmitters, 2-way radio equipment. **Booth 425.**

### Beaveronics

**Booth 369A**

### Belar Electronics

AM/FM monitors, TV monitors. **New:** FM stereo monitor, AM stereo monitors. **Booth 367.**

[see ad on page 139](#)

### Berkey Colortran

Channel track, pantographs, ellipsoids, portable dimmer pack, meter control pack, Fresnels (1, 2, 3 kW), ¼ kW softlight, portable kit. **New:** 1 kW and 2 kW scoop. **Booth 373.**

## **QUAD PANEL REFURBISHING SERVICE**

# **Be calculating.**

Choose the state-of-the-art high technology hot-pressed ferrite quad video heads from Spin Physics. Superior picture and longer head life — from 3 to 5 times longer life than you get from ordinary heads — that's the reward for the Spin Physics customer.

Bring your quad machines into the new generation, the ferrite generation. Let Spin Physics show you how to save from 25 to 40 per cent and more of your quad refurbishing costs for Mark X, Mark XV or RCA High Band.

Contact the Spin Physics Regional Manager serving your area, listed below, for more information. Or contact David Franssens, Video Products Manager, in San Diego.

**You'll like the numbers!**



**SPIN PHYSICS, INC.**  
A KODAK COMPANY

**3099 Science Park Road, San Diego, California 92121**  
**Telephone 714-453-5410 TWX 910-332-1737 Cable: SPINEX SANDIEGO**

**EASTERN REGION: R. Kent White 301-839-3218 • CENTRAL REGION: Leroy Koonsman 214-245-1816**  
**PACIFIC REGION: Ken Thompson 415-961-7794 • SOUTHWEST REGION: Ed Gehle 805-964-3316**  
**EUROPEAN REGION: Bill Kroon, Putten, The Netherlands (03418) 3689 or Telex (844) 47589**

## Exhibit roundup: Be-C

370.

see ad on page 10

### Beston Electronics (BEI)

Auto-light controls for film, titler/character generators. **New:** Data-Prompter Character generator system. **Booth 376.**

see ad on page 120

### Bird Electronic Corporation

Traditional ThruLine RF Wattmeters

to 250 kW, self-cooled and water cooled RF load resistors, low pass filters to 50 kW, digital RF calorimeter, remote-reset RF Power Monitor/Alarm. **New:** RF Terminations, ThruLine directional wattmeters, absorption wattmeters. **Booth 519.**

see ad on page 112

### Bloomington Broadcasting

Computer system for radio sales, traffic, billing, general accounting, payroll and management information. **New:** Enhanced software for system. **Booth 2308. Hospitality Suite:** Dallas Hilton.

### Bogner Broadcast Equipment Corporation

220 kW UHF TV transmitting antenna, circularly polarized TV transmitting antenna, VHF dipole transmitting antenna, VHF slot type transmitting antenna. **Booth 2202.**

### Bonneville Broadcast Consultants Booth 563

### Bonneville Data Systems

Computerized traffic and accounting system for radio and TV. **New:** Smaller version of business automation system. **Booth 2206A.**

### Bosch Fernseh

VTR, portable VTR, digital video effects, slide store VTR, precision color monitors, studio cameras, portable cameras, EFP system. **New:** Slow motion programmer for BCI VTR, laser video transmission, VCR editing system, color camera. **Booth 330. Hospitality Suite:** Fairmont North Tower.

see ad on page 179

### Boston Insulated Wire & Cable Booth 358

### Broadcast Cartridge Service

Broadcast cartridges and accessories. **Booth 2304.**

see ad on page 170

### Broadcast Electronics

Automation system, cartridge tap machines, audio control console, studio accessories. **New:** Econo program automation system, high speed program logger. **Booth 309.**

### Broadcast Programming International Booth 411

### Broadcast Video Systems, Ltd.

NTSC PAL M transcoder, downstream caption inserter with border generator and color fill, video delimiters, safe area generator. **New:** Plug-in rotary wipe unit, VTR leader clock and clapboard, color corrector, waveform and vector monitor. **Booth 2823.**

see ad on page 170

### CCA Electronics Corporation

## Introducing The Galaxy

Our 12-C became the first broadcast standard turntable. We've bred this to become the second.



- Variable Speed Control
  - Slip Cueing
  - D.C. Motor
- Back Cue (no motor drag)
  - Instant Start
- Direct Speed Read-out on LED
  - Solid State Circuitry
  - Remote Start/Stop



QRK Electronic Products, Inc.

**CALL TOLL FREE (800) 344-2181**

Californians call collect (209) 251-4213

1568 North Sierra Vista  
Fresno, California 93703

Circle (99) on Reply Card

# Five and Feisty!



CSI is now in its fifth year of offering commercial AM and FM transmitters to the broadcast industry. We'll be showing our wares at NAB in Dallas. Stop by Booth 337 and find how feisty a five-year-old can be!

**CSI** ELECTRONICS INC.

3800 South Congress Street • Boynton Beach, Florida 33435 • Phone 305/732-0300 • Telex 513458

In CANADA contact Peter MacFarlane, CSI Electronics, Pointe Claire P Q Phone 514-695-8130 or 514-484-6601

Circle (137) on Reply Card

March 1979 *Broadcast Engineering* 127

## Exhibit roundup: C-Ce

AM, FM, UHF and VHF transmitters; mono and stereo consoles, FM Optimod, automatic power control, automatic transmitter switcher, VSWR protector, exciter switches. **Booth 305.**

### CMX Systems (Orrox)

Videotape editing equipment, Videola system, time code reader/displays, time code generators. **New:** Editing keyboard. **Booth 477.**

### CSI Electronics

AM/FM broadcast equipment, modulation monitors, consoles, transmitters. **Booth 327.**

*see ad on page 127*

### CSP

RF contactors, fixed inductors, variable inductors, dummy loads, sampling loops, isolation coils, lighting chokes, static drain choker, jacks and counters, horn gaps, bowl assemblies. **New:** Antenna phasing

equipment, ATU units, detuning units. **Booth 542.**

### Cablewave Systems

Microwave parabolic antennas, elliptical waveguide and assemblies, semi-flexible coaxial cable, delay lines, pressurization equipment, coaxial connectors. **New:** 4 1/8-inch Flexwell copper corrugated air dielectric coaxial cable. **Booth 381.**

*see ad on page 33*

### Calvert Electronics

Electro optic devices and power tubes. **New:** Camera tubes. **Booth 2117. Hospitality Suite:** Sheraton Dallas.

### Cambridge Products

BNC connectors. **New:** BNC coaxial connector for 8281. **Booth 2802.**

*see ad on page 112*

### The Camera Mart

Cameras, VTRs, slow motion units, frame store, camera pedestals, monitors, character generators, video production center. **New:** Ulti-

matte compositing system. **Booth 555.**

*see ad on page 4*

### Canon USA

Camera lenses, accessories. **New:** Zoom lens with pattern projector, lens with built-in 2x extender. **Booth 493.**

*see ad on page 1*

### Capitol Magnetic Products

Broadcast cartridges. **New:** Broadcast cartridge. **Booth 361. Hospitality Suite:** Dallas Hilton.

*see ad on page 171*

### Cases

Cases for video recorders, audio recorders, ENG, microphones and cameras. **Booth 2105.**

### Ceco Communications

Transmitting tubes, camera tubes microwave tubes. **Booth 431.**

### Central Dynamics

# INSTRUCTIONAL TV

Solve communication problems by means of electronic "still" picture transmission over conventional audio circuits. Use leased lines, the dial-up telephone network, microwave channels, or FM radio subcarriers. Colorado Video Scan Converters provide an interface to standard TV cameras and monitors to achieve a high degree of technical flexibility. Program production is far simpler and less costly than "real time".

Please write to us, or call, for equipment specifications and applications literature.



## COLORADO VIDEO, INCORPORATED

Box 928 • Boulder CO 80306 USA • 303/444-3972 • TWX 910-940-3248 (COLO VIDEO BDR)

Circle (104) on Reply Card

# For the best in ENG action, get the new LEAD-FREE $\frac{2}{3}$ " SATICON<sup>®</sup> from RCA.



Now RCA offers you a new  $\frac{2}{3}$ " SATICON tube with a 7-pin base that equals or exceeds lead oxide performance in every way. The new BC 4390 SATICON provides the best picture quality available for ENG cameras. With the new RCA LEAD-FREE tube you get:

- Better resolution.
- Longer life expectancy.
- Uniformly high sensitivity.
- Low lag.
- Excellent temperature stability.

For more information on how you can get better ENG action with the new LEAD-FREE BC 4390, see your RCA Distributor. Or, contact: Camera Tube Marketing, RCA Electro Optics and Devices, Lancaster, Pa. 17604.

**RCA**  
**Electro Optics  
and Devices**

## Exhibit roundup: Ce-Col

**Booth 344**

**Centro**  
**Booth 2406**

**Century 21 Productions**  
**Booth 371A**

**Cetec Broadcast Group** (see also Jampro-Cetec)  
Wireless microphone antennas and accessories; radio transmitters; receivers; FM CP antennas; stereo consoles; radio automation with verified English logging/printing, multicart systems, Autocue, reel-to-reel and cartridge equipment. **New:** Wireless microphone system, firmware for radio automation. **Booth 307.**

see ad on page 17

**Channelmatic**  
VCR sequencers, VCR controllers, earth station automation, video distribution amplifier, audio distribu-

tion amplifier, time-channel identifier, tone generator. **New:** Real-time controller, tone control equipment, audio-video switching and distribution equipment, videocassette automation. **Booth 2517.**

**Christie Electric Corporation**  
Sequencer, 20-minute charger, battery packs. **New:** Xenon follow spot, 50th anniversary. **Booth 2600.**

**Chyron Corporation**  
Graphics and titling generators, election reporting system, cassette cleaner and evaluator for ¾-inch videocassette tape. **New:** Election reporting system. **Booth 382.**

see ad on page 58

**Cine 60**  
Powerbelts, powerpacks, sun-guns, sun-gun kits, shoulder pods, snaplocks, battery power cables, fast chargers, quartz lights. **New:** Fast-charge batteries, AC adapter/fast charger. **Booth 2700.**

**Cinema Products Corporation**

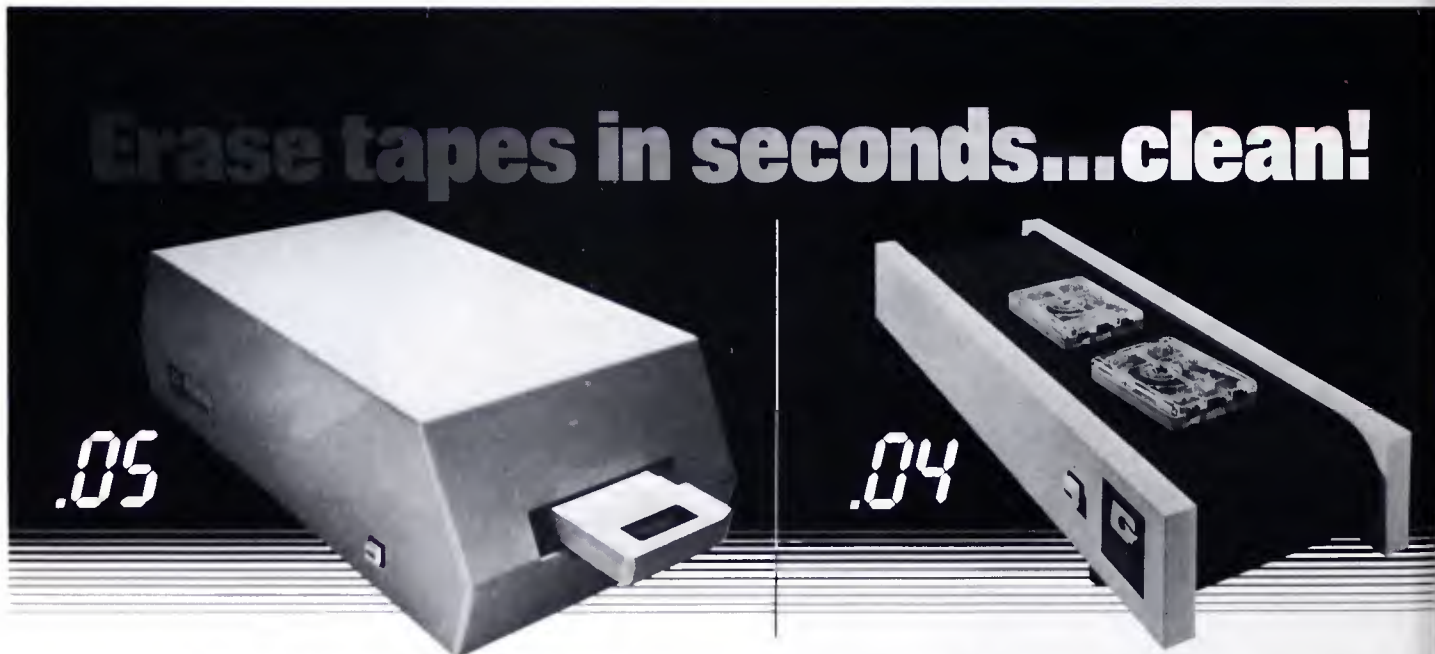
ENG/EFP video camera, reflex camera system, lenses for 16mm cameras. **New:** Lightweight 1-inch cartridge VTR, film-to-tape transfer, production system with CCU, portable editing console, 16mm cameras, camera stabilizing system. **Booth 2217.**

see ad on pages 12, 13

**Coherent Communications**  
Surrey frequency shifters for audio feedback reduction, Q-Aid induction receiver, CineKart portable and collapsible equipment cart, PS-1 condenser mic power supply, Rycote mic windscreens and shockmounts, Auto-Bloop, sync and remote control for motion picture cameras, OSC-1 precision oscillator with switchable 50, 59.94 and Hz sync outputs. **New:** Mini-Mic line of electret microphones, Artech radio microphones, audio developments portable audio mixers, Wilson Mini-Com miniature VHF/UHF walkie-talkie. **Booth 2115.**

**Cohu**  
**New:** Monochrome monitors, telecine system. **Booth 471.**

see ad on page 168



### GARNER'S NEW VIDEO'RASER

In less than five seconds, get video tape erasure depth that exceeds professional standards. Garner's compact Video'Raser Unit completely automates your video cassette erasing in a simple one-step, in-and-out operation...perfect tape erasure in one pass.

### GARNER'S AUDIO ERASING UNITS

In four seconds, our audio erasing units deliver a clean, "no-whump" erasure that meets the most stringent recording standards. Just hit the power button and drop any reel or cassette up to 16" on endless belt. You'll save valuable man-hours and do a better job.



Look to Garner for quality electronic audio and video products, including the Garner high speed tape duplicator. For more information, write or call:

**GARNER INDUSTRIES** Dept. BE-3, 4200 N. 48th St., Lincoln, NE 68504 Phone 402-464-5911

Circle (106) on Reply Card

# What shock absorbers do for cars...



## ...new, Electro-Voice shock-mounted microphones do for sound.

**DO56 Omni** – The DO56 shock-mounted omnidirectional microphone is virtually impervious to mechanical abuse. Its isolated capsule eliminates the possibility of capsule/case collision, making the DO56 the ideal microphone whenever there is lots of action. The excellent “G-factor” margin makes this new microphone less susceptible to the bell-like clang typically heard from other shock-mounted microphones when they are accelerated or decelerated rapidly. Plus, a built-in blast filter reduces “P-popping” dramatically to keep your audio clean.

The DO56 also offers attractive styling, making it ideal for broadcast applications where visual appeal is a necessity. The memraflex grille resists denting, keeping the DO56 looking like new indefinitely.

**RE18 Super Cardioid** – Where ambient noise rejection is mandatory, the companion RE18 super cardioid combines the best performance features of the famous RE15 and RE16 with superb mechanical noise isolation. Acoustic performance is the same as an RE15, while a refined small-profile blast filter resists “P-popping” as much as the larger RE16.

Unlike “multi-port” directional mikes, E-V’s exclusive Variable-D® design insures uniform frequency response at all angles, for uncolored pickup on and off axis. And Variable-D reduces the bass-boosting proximity effect found in Single-D cardioids, for consistent sound quality at any working distance.

**Electro-Voice Warranty** – Both microphones are covered by Electro-Voice’s unique two-year unconditional professional microphone warranty. For two years E-V will replace or repair these microphones, when returned to Electro-Voice for service, at no charge – no matter what caused the damage.

These are microphones to depend on, in the studio or in the field. If they weren’t, E-V couldn’t offer this warranty. When your application calls for a shock-mounted microphone, test one of these at your E-V professional microphone dealer.



**Electro-Voice®**  
a gulton company

600 Cecil Street, Buchanan, Michigan 49107

# NEW BROADCAST STUDIO FURNITURE FROM RUSLANG



If you're building or remodeling, add the elegant look of expensive furniture for much less than you would expect. We build electronic racks in various heights, consoles for any size tape deck, and control stations that put you on top of things. All are constructed of quality materials, including high pressure laminates, making them sturdy as well as attractive. They are available in either wood grain finish or various solid colors. Send for literature showing dimensions, etc.

## THE RUSLANG CORPORATION

247 Ash Street, Bridgeport, CT 06605 Tel: 203 384 1266

Circle (108) on Reply Card

## Exhibit roundup: Col-Con

### Colorado Video

New: Video from store. **Booth 523.**

[see ad on page 128](#)

### Comark Industries

Diplexers, couplers, filters, power dividers, demodulators, peak detectors, sound notches. New: Portable VSWR meters, UHF and VHF transmitters. **Booth 2203.**

### Commercial Electronics

310 Camera. New: 330 camera studio color. **Booth 398. Hospitality Suite: Ramada Inn.**

[see ad on page 71](#)

### Compact & Video Sales

**Booth 2126, 2127**

### Compucan

**Booth 2617**

### New: Electronic animation. **Booth**

**457. Hospitality Suite: Hyatt Regency.**

### Computer Magnetics Corporation

Refurbished video and audio heads, videodiscs and heads, auto equalizer, differential gain adjustment, velocity error corrector. **Booth 529.**

[see ad on page 117, 118, 119](#)

### Computer Management Systems

**Booth 2212**

### Comrex Corporation

Cue systems for ENG, pocket TV aural monitors, wireless microphone systems. New: Low frequency extenders, 1 W transmitter, pocket transmitter, camera-mount receiver, portable diversity receiving system, cables, connectors. **Booth 541.**

### Comsearch

### **Booth 2110**

### Conrac Corporation

19-inch color monitor and comb filter; 13-inch color monitor for VTR mounting; 19-inch color monitor; 15-inch monochrome monitor; 17-inch high resolution monochrome monitor; 9-, 14-, 17- and 23-inch monochrome monitors. **Booth 304.**

### Consolidated Electronic Industries

Cue-rac automation system. **Booth 311.**

### Consolidated Video Systems

ENG TBC, all-purpose TBC, CCT TBC, PAL/SECAM TBC, PAL-M TBC, enhancer/noise reducer, phase accessory, computer-aided editor. New: Digital frame synchronizer, 520-16 H window. **Booth 400.**

[see ad on pages 59, 62](#)

### Computer Image Corporation

### Continental Electronics Manufactur



Built-in 2X Extender  
9mm to 306mm

**Introducing the world's lightest,  
longest, widest ENG/EFP zoom lens.**

## **FUJINON'S new F/1.7 17 x 9 ... the One and Only.**

The new FUJINON 17 x 9 ENG/EFP zoom is the **only** lens to meet all of these qualifications:

**The longest:** 306mm without attachments, 560 with the optional front extender.

**The widest:** 9mm without attachments, 7mm with the optional adaptor.

**The lightest:** 2.5kg

Which makes the F/1.7 17 x 9 the **one** lens for every assignment. Simply put, it outperforms anything else on the market.

It's at home at any range. Normal zoom is 9mm to 153mm. Flip the built-in 2X extender, an exclusive FUJINON feature, and the range is 18mm to 306mm. The optional extender and adaptor give you even greater range.

Zoom and iris are servo controlled, or you can use the manual override. Adjustable back focus gives you faster lens changing and eliminates making internal camera adjustments. And to make the new 17 x 9 an even better investment, FUJINON offers a full list of accessories for studio conversion.

More information or a demonstration of any FUJINON lens, including the new "one and only", is yours for the asking.

For your new cameras, for your existing cameras...specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

**FUJINON**

Fujinon Optical Inc.  
672 White Plains Road  
Scarsdale, New York 10583  
(914) 472-9800 Telex: 131-642

West Coast Distributor: F.P. Optical Inc.,  
3333 Bowers Avenue, Santa Clara, California 95051  
(408) 727-2757, Telex: 171-200

## Exhibit roundup: Con-Di

ing 5,000, 10,000 and 50,000 W AM transmitters. **Booth 331. Hospitality Suite:** Ramada Inn Convention Center.

see ad on page 58

### Convergence Corporation

Editing systems, search module, program computer, dual digital tape time, Lip lock, animate remote control, CUT/LAP, automatic dialogue replacement, edit decision lister, time code reader, status display generator, audio-video switcher, switcher effects. **New:** 1-inch type C interface for editing control systems. **Booth 378.**

### Crosspoint Latch Corporation

Portable video console, production switchers, sync generator, low light level amplifier. **New:** Video dissolve unit, production switcher. **Booth 2801.**

### Bill Daniels Company

### Booth 2417

### Data Communications Corporation

Automatic switching, sales/traffic/accounts receivable package. **New:** Micro-computer, commercial inventory, electron system, radio automation. **Booth 339. Hospitality Suite:** Dallas Hilton.

### Datametrics

Time code reader, time code generator, time code reader/generator and character generator. **New:** Compact time code/user bit reader. **Booth 2813.**

see ad on page 114

### Datatek Corporation

Video and audio routing switchers; TV transmitter color phase equalizers; video sweep generators; envelope delay test set; video, audio and pulse DAs. **New:** Video and audio switching units. **Booth 521.**

see ad on page 39

### Datatron

Editors, SMPTE code generators and

readers, jam-sync generators, SMPTE reader/character ins, coincidence comparator, editor/edit lister. **Booth 491.**

see ad on page 23

### Delta Electronics

Operating impedance bridges, remote control system, amplitude modulation controller, automatic power controller, digital panel meter, ammeter systems, analog antenna monitors, toroidal current transformers. **Booth 365.**

see ad on page 54

### Delta Group

**Booth 2606**

### De Wolf Music Library

**Booth 2605**

### Dielectric Communications

RF switchers, RF loads, RF wattmeters, FR waveguide. **Booth 509.**

### Digital Video Systems

Time base corrector, framestores,

# Split Second Time Machine

The Telex/Magnecord 1400 recorder. Split second time machine. A grid of 524 lines passing a quartz crystal coil, senses the capstan revolution. This senses, and controls the speed of the DC servo drive some 4000 times per second\*. Speed with only so accurate the National Weather and the Environmental Services selected Telex/Magnecord 1400s over all others to record meteorological display data.

Of course, broadcasters also favor the 1400 for the rugged stability of the die cast main frame, DTL logic and exceptionally clean electronics.

Compare our speed, specs, and price. We invite you to make a split second decision.

\*At 7½ ips, adjustable ± 1% to compensate for tape thicknesses and mechanical wear.

**TELEX**  
COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.  
Europe: 22 rue de la Legion d'honneur, 93200 St. Denis, France  
Canada: Telak Electronics, Ltd., Scarborough, Ontario

Circle (110) on Reply Card



**Introducing the first ultra high resolution zoom lens for computerized cameras.**

## **FUJINON presents the Over Achiever.**

Ultra-high resolution — 40% higher than other tv lenses — sets a new standard in quality productions. And gives you the finest first generation tapes you've ever seen. A built-in test pattern projector provides for even faster, more accurate computerized camera set up. These are two of the achievements of FUJINON's new 1 1/4 inch format P14X16.5 Ultra High Resolution Zoom Lens. Here are more of its unprecedented performance characteristics:



**P14X12.5 Ultra High Resolution Zoom Lens 1-Inch format**

- Ultra high resolution (1300 tv lines) for incredible sharpness and detail at all focal lengths.
- Unique lens

design (taking lens moves with the zoom) delivers precise color convergence at all times.

- Constant F/2.1 aperture in all ranges for zooming and focusing.
- MTF exceeds 90% — not only in green, but in red and blue, as well.

If you're out to improve your image, see what FUJINON's new 14X Ultra High Resolution Zoom Lenses can do for you. For your new cameras, for your existing cameras...specify FUJINON. In studio, field, ENG/EFP lenses and optical systems, FUJINON is light years ahead.

**FUJINON**

Fujinon Optical Inc.  
672 White Plains Road  
Scarsdale, New York 10583  
(914) 472-9800 Telex: 131-642

West Coast Distributor: F.P. Optical Inc.,  
3333 Bowers Avenue, Santa Clara, California 95051  
(408) 727-2757, Telex: 171-200

See the over achievers at the NAB Annual Convention, in Dallas. Booth 515.

Circle (111) on Reply Card

[www.americanradiohistory.com](http://www.americanradiohistory.com)

## Exhibit roundup: Di-E

synchronizers. **New:** Framestore and oblique time base corrector/oblique synchronizer. **Booth 2700.**

*see ad inside front cover*

### DI-Tech

Audio, video and pulse DAs; video DA with clamper and equalizer; video presence detectors; audio/video routing switchers; touch-tone control systems; audio monitoring amplifier; video source identifiers. **Booth 2403.**

### Dolby Laboratories

Audio noise reduction for VTRs, 334 Dolby FM broadcast unit, noise reduction for broadcast use. **Booth 385.**

*see ad on page 147*

**Drake-Chenault Enterprises**  
**Booth 2123**

**Victor Duncan**

Video cameras, 1-inch portable VTR, support equipment, HMI and conventional lighting. **New:** Metal halogen lamps and lighting equipment. **Booth 2515. Hospitality Suite:** Hyatt Regency.

### Dynair Electronics

Routing switchers, distribution and sync equipment, demodulator. **New:** Automatic logging, time code switching, tally switching, telephone line remote control. **Booth 368.**

**Dynametrics**  
**Booth 2627**

### Dynasciences

Model 9048 graphic system, VTR editors, chroma keyer, processing system. **New:** Video DA with loss of video detector. **Booth 497.**

### Dytek Industries

Editing switchers, production switchers, routing switchers, digital timers. **Booth 2301.**

### EICO

Synchronizers: an Ampex VPR-2 locking with sound to an Ampex ATR-100 and a MM1200. **Booth 301 (with Ampex).**

*see ad on page 174*

### EEV

Camera tubes, power triodes and tetrodes, character display tubes, vacuum capacitors, traveling wave tubes. **New:** High efficiency Klystrons, water cooled vacuum capacitors, alpha numerics character displays. **Booth 326.**

### EG&G

High intensity obstruction lighting, lightweight 300mm beacon. **New:** Rack-mounted controller. **Booth 2302.**

### FMS

**Booth 2722**

**ENG Corporation**  
**Booth 2313**

## AT AUDI-CORD VALUE IS NOT EXPENSIVE

We applied cost conscious design to our Modu-Cart 100 Series Cartridge Machines. Consistently improved over our 2½ years in production and yet, we've been able to maintain our costs, resulting in increasingly higher value to our customers.

**THERE HAS NEVER BEEN A BETTER TIME TO BUY  
MODU-CART! — WE INVITE YOUR COMPARISON.**

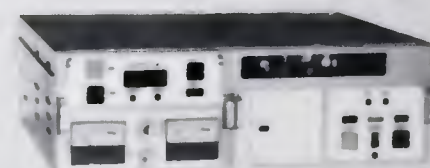
### look at the features:

- 100% Modern Solid State Electronics
- Replay Lock-Out Circuit — Prevents Double Airing
- Front Access Controls — Removable Desk Covers
- Heavy Duty Inverted Head Mountings
- Rugged Mechanical Design — Cool and Quiet
- Optional Digital Recording Timer
- Internal Record Response Test System
- Six Position Auto-Switched Meter
- + 18 dBm Audio Output — Wide Headroom
- Desk or Rack Mount Optional
- 24 Model Variations For Your Needs



**AUDI-CORD CORPORATION**

1845 W. Hovey Ave., P.O. Box 611 Normal, Ill. 61761



**RECORD-PLAY**



**PLAYBACK**

**Tomorrow's Design Today —  
At Yesterday's Prices**

**Booth #419 NAB**

Circle (112) on Reply Card

# **PHILIPS**

*the company that made  
INNOVATION the key word  
in broadcast technology  
invites you to FOCUS on the  
integrated design of the cameras  
and camera systems that have  
always made Philips the leader in  
the industry. You'll see the many  
breakthroughs in the new LDK-14  
ENG/EP/Studio portable; the renowned  
LDK-25 camera family with diode-gun tube;  
the extremely flexible VIDEO 80 camera  
and production system; why our UHF/VHF  
Transmitters and Exciters have been so  
successful; our new 1" VTRs, and a host of  
other Philips innovations. We've put it all  
together at NAB Booth 314 and we call it:*

# **FOCUS ON TECHNOLOGY**

*You'll call it the clearest picture ever on why  
Philips technology has earned us the reputation  
INNOVATIVE LEADER IN WORLD TELEVISION*

**Philips Broadcast Equipment Corp.**

A NORTH AMERICAN PHILIPS COMPANY  
91 McKee Drive, Mahwah, N.J. 07430



**PHILIPS®**  
TM N.V. Philips of Holland

## Exhibit roundup: E-Fa

### E-N-G Corporation

Van, EFP carts, EFP cars. **Booth 2402.**

### ESE

Digital clocks and timers, time programmers and stopwatches. **Booth 403.**

see ad on pages 207, 209

**Eastman Kodak Company**  
**Booth 473**

### Edco Products

Broadcast audio cassette equipment, stereo phase enhancer, audio/video/pulse preamps. **Booth 359.**

### Edutron

Ccd-ih time base corrector. **New:** Ccd-2h time base corrector, ccd-16h time base corrector. **Booth 2603.**

### Eigen Video

Sports controller for instant replay.

animation controller with live demos. **New:** High-band color disc recorder. **Booth 557.**

### Electro & Optical Systems

Portable SMPTE time code generator, SMPTE time code readers, SMPTE time code generators, vectorscope, waveform monitors, peak program meters. **New:** Color monitors, color receiver monitors, monochrome monitors. **Booth 2803. Hospitality Suite:** Marriott.

### Electro Controls

**New:** Plexus 1000, Parellipspheres, 14- and 18-inch scoop. **Booth 2303. Hospitality Suite:** Sheraton-Dallas.

### Electrohome, Ltd.

9-, 11-, 14-, 17- and 23-inch single and rack-mount monochrome monitors; 19- and 25-inch color video monitors. **New:** 9-inch monochrome monitor for tape editing. **Booth 535. Hospitality Suite:** Marriott.

see ad on page 40

### Electro Impulse Laboratories

Loads, calorimeters, wattmeters, attenuators. **Booth 417.**

### Electronics, Missiles & Communications

UHF transmitter, UHF translators, VHF translator, MDS transmitter, MDS amplifier. **New:** VHF transmitter, VHF amplifier. **Booth 328.**

see ad on page 167

### Electro-Voice

Microphones and accessories. **New:** D056 shock-mounted dynamic omni, RE18 dynamic shock-mounted variable D supercardioid microphone, 313A shock-mount microphone clamp, AC24 power supply for condenser microphones. **Booth 2504.**

see ad on page 131

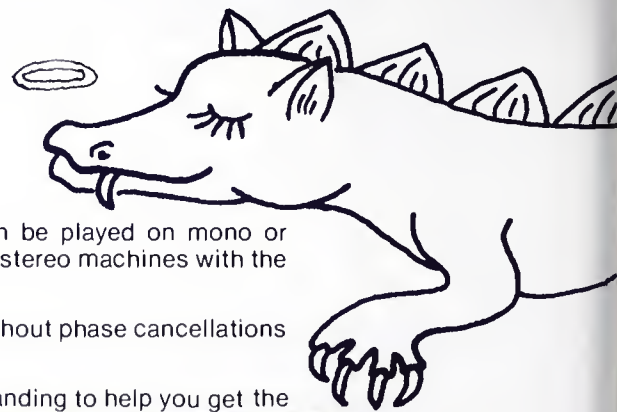
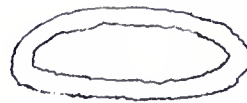
**Enterprise Electronics**  
**Booth 2710**

### Farinon Electric

Frequency-agile portable microwave transmission systems in 2-, 7- and 13-GHz bands; studio-transmitter link, FM transmission channel system. **New:** Low-noise 21-channel 2



- \* cart compatibility—cartridges made using the Monstermat can be played on mono or stereo machines, and your old mono carts can now be played on stereo machines with the full mono signal on both channels
- \* full fidelity—your mono listeners will receive your broadcasts without phase cancellations which result in muddy monaural sound
- \* super signal-to-noise ratio—the Monstermat employs dbx companding to help you get the best out of your system



Taking up only 1 3/4" of rack space, the Monstermat solves the problem of broadcasting in stereo to a predominantly mono audience. By putting your all-important L + R mono signal safely on to one cart track, it eliminates the possibility of phase shifts due to machine misalignment or tape warp. The second track carries the difference, L - R, signal. Full stereo is restored on playback and dematrixing. No special cartridges are necessary for stereo use.

The use of the dbx noise reduction system ensures the best possible signal-to-noise ratio and dynamic range from your equipment. Switching of the dbx circuitry is automatic, so dbx-encoded and non-encoded carts may be mixed.

# Eventide

the next step

Monstermat is a trademark of Eventide Clockworks, Inc.

EVENTIDE CLOCKWORKS, INC. • 265 WEST 54TH STREET • NEW YORK, N.Y. 10019 • 212-581-9290

Circle (114) on Reply Card

# BELAR presents 1989.



## Today.

1989's broadcast equipment is on the way NOW. Ten years before its time.

Belar Electronics, recognized throughout the industry as the pacesetter in advanced engineering, is readying equipment that may very well be state-of-the-art a decade from now.

Completely redesigned lines of AM and FM equipment—all ahead of their time—make Belar a better buy.

And, as always, Belar equipment does more than you expect. Incorporating all of today's standard industry features, plus the Belar touch: Tomorrow's Technology—Today.

For more information on how you can be more than just "up-to-date" call or write Arno Meyer today.

See us at booth **367** at NAB

**BELAR****ELECTRONICS LABORATORY, INC.**

LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 826 • (215) 687-5550

Where Accuracy Counts . . . Count on Belar

Circle (115) on Reply Card

March 1979 *Broadcast Engineering* 139

[www.americanradiohistory.com](http://www.americanradiohistory.com)

## Exhibit roundup: Fa-Go

GHz ENG/EJ receiver. **Booth 374.**

[see ad on page 145](#)

### Yves Faroudja

Comb filter decoder, record booster in rack, portable Crisp-Matic. **New:** Crisp-Matic with ringing suppression, combination enhancer/decoder. **Booth 412B.**

### Fidelipac

Master cartridges, cartridges, cartridge racks, studio on-air light, wow and flutter meter, height gauge, head insertion gauge, right angle zenith gauge, splicing tape and blocks, standard lubricated cartridge tape, cartridge labels, delay cartridges. **New:** Gold standard alignment tapes, bulk tape eraser, foreign on-air lights. **Booth 351.**

[see ad on page 14](#)

Filmways Productions  
**Booth 2423**

Flash Technology

High intensity tower lighting system, optical link, controller. **New:** dc operated beacons. **Booth 547.**

### Frezzolini Electronics

Light power packs and belt packs, dc/ac inverter for portable field operation of TV equipment, belts. **New:** Belts for video cameras with built-in line isolated charger, 16mm camera for documentary. **Booth 2415.**

### Fuji Magnetic Tape

2-inch broadcast videotape, hi-density videotape, ¾-inch videocassette, VHS and Beta videocassettes. **New:** 1-inch videotape, ½-inch videocassettes. **Booth 402. Hospitality Suite:** Marriott.

[see ad on page 115](#)

### Fujinon Optical

Camera lenses, teleconverter, wide angle converter. **New:** High resolution studio camera lenses, lens with 2x extender, lens. **Booth 515. Hospitality Suite:** Fairmont.

[see ad on pages 133, 135](#)

### GTE Sylvania

Tungsten halogen lamps for studio

and theater lighting. **Booth 320.**

[see ad on page 116](#)

Gardiner Communications  
**Booth 2116**

### Garner Industries

High speed reel-to-reel tape duplicator for ¼-inch tape, conveyor belt audiotape erasers, conveyor belt videocassette tape eraser. **New:** Bulk eraser for 2-inch quad videotape with conveyor belt design. **Booth 415.**

[see ad on page 130](#)

### General Electric

Stage studio lamps. **Booth 2509.**

[see ad on page 118](#)

### Glentronix

Video production switcher, routing switcher, logic analyzer, side band analyzer, time code equipment, clock systems. **Booth 2609. Hospitality Suite:** Marriott Hotel, Room 321.

### Alan Gordon Enterprises

Stereo cassette recorder with sync resolver, master system, windscreen

## CREATIVE RELIEF FOR PRODUCTION HEADACHES

Broadcast/Recording  
Equipment from  
**MICMIX**

CAUTION: Use of MICMIX equipment  
can be habit forming.

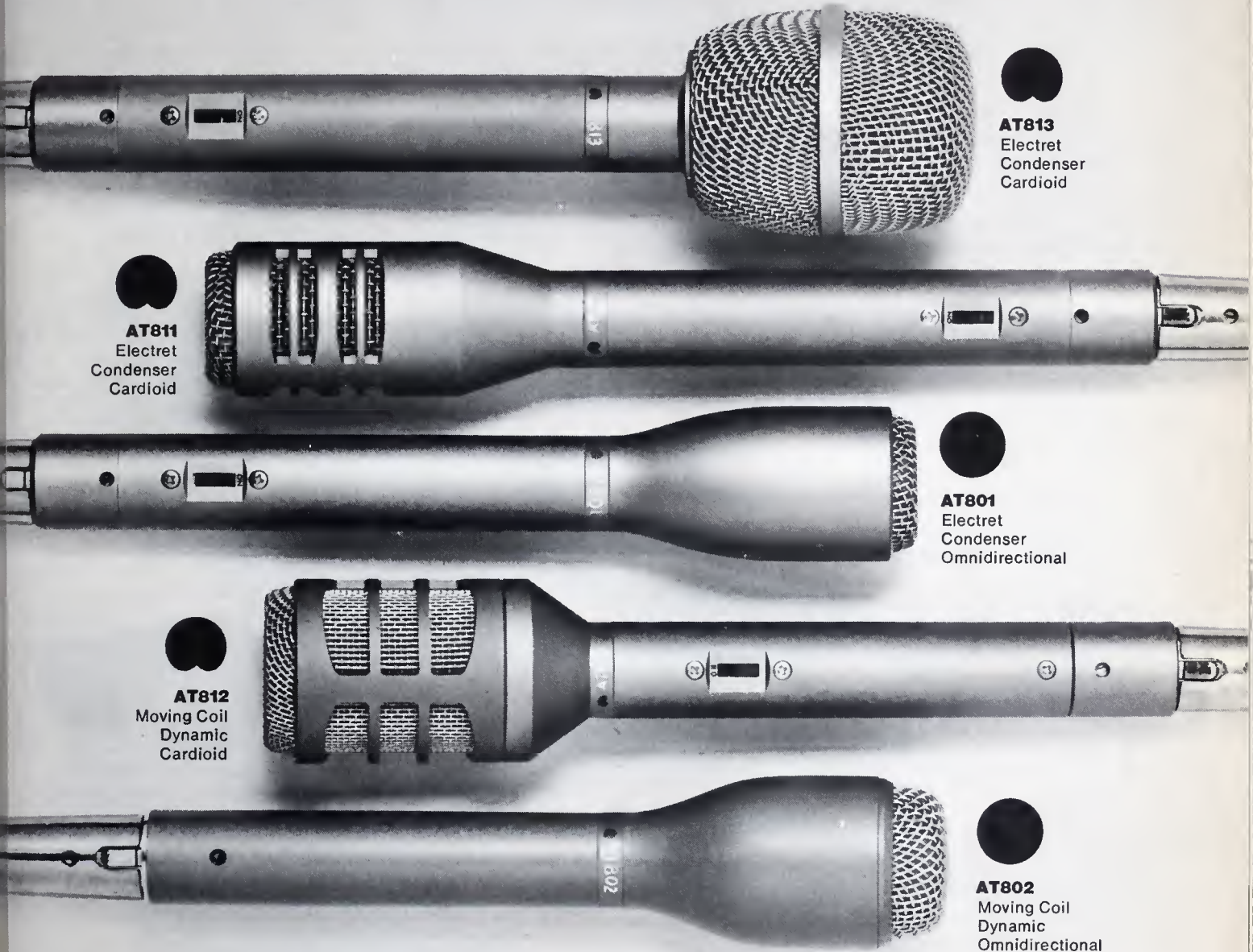
**MICMIX** Audio  
Products, Inc.

2995 Ladybird  
Dallas, TX 75220

(214) 352-3811

Circle (116) on Reply Card

# Audio-Technica introduces five new microphones... and a pleasant surprise.



Take a close look at these new Audio-Technica microphones. Three electret condensers and two dynamics. Plus two clip-on miniature electrets (not shown). All are superbly finished. Carefully thought out in every detail. With the right "heft" and feel. Professional A3M Switchcraft output connectors, of course.

Then listen in your studio. Full-range, peak-free, clean and crisp. With

no distortion even when used close-up to high-level performers. And the balanced, phased Lo-Z (600 Ohm) output matches pro and semi-pro mixers alike.

Now for the surprise. The price. Both omnis are nationally advertised at just \$60, for either dynamic or electret condenser element. The two basic cardioids are just \$80, while the AT813

electret condenser with integral wind-screen is pegged at \$95. All complete with full one-year warranty.

Once you've seen and tried these new Audio-Technica microphones we think you'll welcome them. Not just because they cost so little...but because they do so much. Available now from your Audio-Technica Professional Products dealer.

 **audio-technica.** *Great sound, right from the start!*

## Exhibit roundup: Go-lk

and shock mount, noise cancelling system, mic booms, director's viewfinder. **New:** Wireless mic systems, antenna systems, communicator system, microphones for use with company's transmitters. **Booth 2501.**

### Gotham Audio Corporation

Microphones, disc playback system, noise reduction system, tape recorders, tape timers, audio level meters. **New:** Shotgun condenser microphone. **Booth 423.**

### The Grass Valley Group

Production switchers, modular automation system, routing switchers, video processing system, distribution equipment, digital video effects system. **Booth 308.**

see ad on page 3

### The Great American Market

Scene machine, projector patterns, special effects, Fresnel lights. **New:** HMI lights, strobe light. **Booth 2708.**  
**Hospitality Suite:** Marriott.

### Gregg Laboratories

Audio processing equipment. **New:** Tri-band processing amplifier. **Booth 2118.**

see ad on page 78

### Groton Computer

**Booth 2204**

### HM Electronics

Wireless microphone, triple diversity system, wireless hand-held mic, receiver rack. **New:** Flat pack portable receiver, wireless mic with dynamic expander. **Booth 2604.**

### Hallikainen & Friends

Program logging system; TV audio system with output module, mixer module, digital telemetry, time announce. **New:** Digital telemetry, local display option. **Booth 2312.**

see ad on page 178

### Harris Corporation

AM transmitter in an operating AM stereo demo, FM transmitter, VHF high band color TV transmitter, TV antennas, FM antennas, color TV

camera with triax, color TV camera, FM exciter/audio processor demo rack, audio processor demo rack, program control demo, facilities control demo, stereo consoles, cartridge equipment. **New:** Medium wave transmitter, FM transmitter, solid-state transmitter. **Booth 303.**

see ad on page 11

### Hitachi

Time base correctors, editing systems, console package. **New:** Portable recorders, Type C recording equipment, monitors, ENG camera, studio/field camera. **Booth 334.**

see ad on pages 29, 31

### IGM/NTI

Automation system with logging, multiple cart playback, micro floppy disc dump load. **New:** Off-air income expander method. **Booth 343.**

see ad on page 121

### Ikegami Electronics (USA)

Film camera with auto color balance, ENG camera switcher, color monitors. **New:** ENG/EFP camera with multicore cable CCU, ENG/EFP camera with triax cable CCU, Studio/field camera with diode gun

## If you sell or service audio tape equipment, you can GET THIS NEW \$2.00 TAPE EDITING GUIDE FOR ONLY 50¢.

Joel Tall, the inventor of modern tape splicing blocks, now gives you the secrets of undetectable tape editing. 32 pages. 25 pictures illustrating tape editing equipment and how to use it.

Chapters on: How to find where to cut the tape... Learning to recognize sound... Listening in reverse to recognize sound... Speech characteristics... The limits of hearing and how to employ them in editing... and much more!

If you are in the "trade," send this coupon with 50¢ (check, m.o. or two quarters) for your sample copy of Joel Tall's instructive book. Money back if you don't think it's great! Elpa Marketing Industries, Inc.

Limited offer. No order accepted without this coupon.



Elpa Marketing Industries, Inc.  
Box 1050, New Hyde Park, NY 11040

BE279

Gentlemen: Please send me a copy of "Tape Editing." I am enclosing 50¢ to cover postage and handling.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Circle (118) on Reply Card

# If you're hung up on zoom ratios, how about... 52:1?

- **VAROTAL MRL**—It's the smallest production TV zoom lens in the world, yet its versatility delivers a range of angles of view from 10:1 to 52:1.

**MRL**—It means multi-role lens. Here's the kind of image quality, flexibility, and economy that engineers, cameramen, and directors can agree on for: 1. brilliant image, 2. portability inside or outside, and 3. close-ups (less than 5 feet from cameraman to subject).

MRL has snap-on front elements—one for studio, one for outside broadcast, and one for those, compromise, all-around shots. Lens interchange is instantaneous and

requires no adjustment or re-registration.

Why buy a zoom ratio when what you really need is the world's most economical, flexible TV lens?

With MRL you can think in terms of angles of view.

Discover the quick-change artistry of Varotal, by Taylor-Hobson.

*Send for 12-page Bulletin MRL*



**RANK OPTICS  
TAYLOR-HOBSON**



**RANK PRECISION** INDUSTRIES, INC.

260 North Route 303 West Nyack, NY 10994 (914) 358-4450

**BOOTH 348 National Association of Broadcasters**

RO-179

Circle (119) on Reply Card

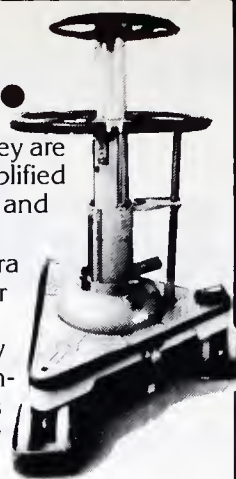
March 1979 *Broadcast Engineering* 143

# Outstanding...

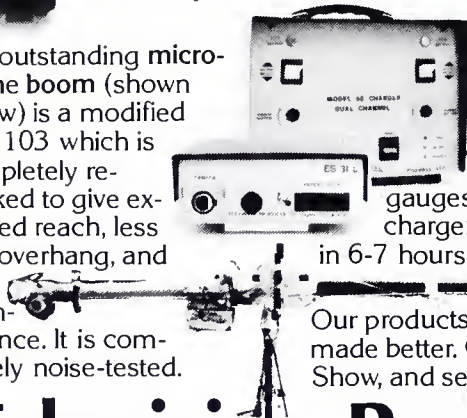


Our products are outstanding in the way they are manufactured...superb engineering and simplified design make them virtually maintenance-free and give many years of dependable service.

With 5 to choose from, we have a camera pedestal for every need, ranging from our P-20 to our heavyweight, the P-50. The P-20 (shown on left), which weighs only 160 lbs., will operate with 300 lbs. of camera weight. The P-50 (shown on right) has unsurpassed stability with extreme versatility and heavy camera weight capability.



Our outstanding micro-phone boom (shown below) is a modified M-R 103 which is completely re-worked to give extended reach, less rear overhang, and low maintenance. It is completely noise-tested.



Our outstanding silverpower battery system (shown on left) includes the ES-31 10 amp hour battery pack in 3 configurations (ENG, VTR, and lighting), all with LED energy gauges; and the Model #98 dual pack charger, which fully charges silvercells in 6-7 hours, and will not boil batteries.

Our products work better because they are made better. Check us out at the NAB Show, and see for yourself.

## Television Products Co.

9016 Aviation Blvd., Inglewood, CA 90301 Phone: (213) 776-3276

Circle (120) on Reply Card

## Last year, America invested in two programs to help the hard-core unemployed.



### One of them paid a terrific return on investment.

Although public assistance programs are necessary, they are also expensive. Last year they cost \$24 billion. And brought back no tax dollars in return.

The National Alliance of Businessmen, on the other hand, costs comparatively very little, \$8.5 million, last year. Yet by working with business people like yourself to find jobs for the unemployed poor, Vietnam-era veterans, needy youth, and ex-offenders, the National Alliance of Businessmen reduced welfare payments and created brand-new tax revenue totaling several hundred million dollars.

This year we're also trying to bring business people together with educators, to develop work-study programs that will give our youngsters the skills they'll need when they graduate.

If you're a business person who is willing to work to help curb steadily rising welfare costs, please call the National Alliance of Businessmen. We're in the white pages of your telephone book.

**Help America work.**



**The National Alliance of Businessmen**

**Ad Council** A Public Service of This Publication & The Advertising Council

## Exhibit roundup: Ik-J

Plumbicon, ENG camera, studio camera with triax cable, portable production camera. **Booth 406. Hospitality Suite: Ramada Inn, 1121.**

see ad on pages 41, 42, 43

**Image Transform**  
**Booth 2309**

**Image Video Limited**  
**Booth 2819**

**Industrial Sciences (ISI)**  
Video production switchers, master control, routing switcher. **New: Rotary wipes, audio mixer. Booth 531.**

**Innovative Television Equipment**  
**New: Counter balance studio pedestal, hydro head for counter balancing cameras, ENG tripods. Booth 388.**

**Inovonics**  
Limiter, audio optimizer, noise suppressor, tape electronics, tape reproduce amp, tape tensioning kit, acoustic analyzer. **New: Multiband AM audio processor, automation reproduce amplifier. Booth 2103.**

**Interand**  
Multi-page Telestrator system with digital scan converter and "scratch-proof" graphics input tablet, Telestrator demonstration videotapes illustrating capabilities of Telestrator systems, model 600 Telestrator with Mark II Symbol Generator. **New: Telestrator programmable animation system, Telestrator pointer-tracker, unitized model 600U Telestrator. Booth 2703.**

**International Tapetronics Corporation**  
Cartridge machine line with delay units, economy cart units, eraser/splice locator, reel-to-reel recorders and reproducers. **New: Tape cartridge machine, cartridge system. Booth 319.**

see ad on page 20

**International Video Corporation**  
2-inch VTR, 1-inch VTR, BCN 1-inch VTR. **New: Studio camera, portable production camera. Booth 346.**

# Our new receiver couldn't care less where your ENG crew goes.

With Farinon's new FV2CR Central Receiver, you can now send your ENG crew to wherever the action is. And minimize the problems of weak signals and distortion. That's because this outstanding receiver has an unsurpassed 82-dB dynamic range. When signal strengths vary due to different transmission distances, the FV2CR compensates automatically to assure optimum performance.

For transmissions as far away as 300 miles, the FV2CR can operate with a minimum system fade margin of 20 dB. And with the ENG crew as close as 1/8 of a mile, the receiver's front end won't overload and cause distortion like other receivers.

The FV2CR provides 21 synthesized channels in the 2-GHz band. By instantaneous phase-lock loop, the channel you select (manually or remotely) is the channel you get. And the receiver's unique, extremely sharp IF SAW filter provides excellent selectivity of at least -45 dB with maximum half-channel rejection. Also its noise figure of only 3 dB is tops in the industry.

Now you'll have a new degree of freedom in news coverage. So you can send your ENG crew where-



ever the action is. And Farinon's new FV2CR Central Receiver couldn't care less where they go.

Farinon Video also offers portable and mini-portable video transmission systems, STL microwave radios, FM transmission channel systems, as well as video baseband treatment units and ancillary equipment.

For information, contact Farinon Video today.



A Farinon Company

Main Office: 1680 Bayport Ave.,  
San Carlos, CA 94070; Telex: 34-8491  
Domestic, Phone: (415) 595-3500  
Export, Phone: (415) 592-4120

Canada: 657 Orly Ave., Dorval, PQ H9P 1G1  
Phone: (514) 636-0974; Telex: 05-82-1893;  
TWX: 610-422-4122

See Farinon's new FV2CR Central Receiver and other ENG video equipment at NAB, booth 374.

Circle (121) on Reply Card

March 1979 **Broadcast Engineering** 145

# Get it from a reliable source

That's ROH.

For years we've been making communication-grade audio equipment designed for superior performance and we'll match our reputation for quality with anyone. If you're in the market for signal distribution, routing, monitoring, or intercom equipment which will provide years of maintenance-free service, let us be your source.

For more information, please write or call Jim Godwin at (404) 449-0873



**roh corporation**

4313 NORTHEAST EXPRESSWAY ATLANTA, GA 30340



## Go anywhere SMPTE Edit Code Generator and Companion Reader that will give you an instant shot list.



**The only portable SMPTE Code Generator. Shintron Model 640 SMPTE Edit Code Generator.**

- Goes anywhere with your ENG crew.
- Light and rugged. It attaches to your VTR and produces accurate edit code as you shoot important scenes.
- You cannot enjoy full advantages of ENG unless you have the 640 SMPTE Edit Code Generator.
- EBU European Standard version available.



### Model 644 Edit Code Reader

When Shintron builds a new product, we think of our customers' convenience first. Good Edit Code Readers are a dime a dozen today, but which one can generate an instant shot list? The only one is Model 644 Edit Code Reader / Raster Display and Shot List printer.

**SHINTRON**

Worldwide

Cambridge, MA 02142 USA  
(617) 491-8700 / telex: 921497

Circle (123) on Reply Card

## Exhibit roundup: J-L

**JAM-Creative Productions**  
Booth 2510

### US JVC Corporation

AAP44 AC adapter, CR 8500 editing, 7860 VM color TV monitor, G-71 color camera, HR 4100 battery operated VTR, CR 4400 portable VCR, CY 88-0 ENG color camera, CR6060 remote controllable color VCR. **Booth 408.**

see ad on pages 18, 19

### Jampro (Cetec Antenna Company)

Spiral omnidirectional CP antenna, ring-panel CP antenna, zig-zag and batwing TV transmitting antennas, FM antenna, compendium of CP/TV test and performance data. **Booth 499.**

**Jefferson Data Systems**  
Booth 551

**Kaman Sciences Corporation/BCS**  
Booth 325

**Keeline**  
Booth 2107A

**Kings Electronics Company**  
Booth 394

### Kliegl Brothers

Memory lighting control console with option packages, portable dimming system, HMI TV booster, softlights, HMI lighting, CSI lighting, Fresnel fixtures. **Booth 366.**

see ad on page 168

### Knox Video Products

Titling systems, disc memory system. **New:** Microprocessor-controlled disc memory system. **Booth 2706.**

see ad on page 38

### LPB

Audio consoles, equalizer/preamps, distribution amplifiers, compressor/limiters, studio furniture systems, turntable systems, AM transmitters. **New:** Audio consoles, FM transmitter, turntables. **Booth 383.**

see ad on page 46

## With the Dolby system, the sound can match the picture.

A great deal is happening these days to improve the quality of television audio. New distribution methods such as diplexing, new post-production techniques for laying down sound-tracks without having to re-record them repeatedly on VTRs, the reality of stereo TV audio in some countries — these factors and more are combining with the growing audience sensitivity to good sound to put a new

emphasis on television sound quality.

However, a major bottleneck remains: noise. The better the rest of the studio and distribution chain becomes, the more the noise from the audio tracks of VTRs limits the ultimate fidelity of television sound. The audio signal-to-noise ratio of 2" quad machines is typically worse than 50 dB, while the specs for the new generation 1" machines are typically 52-56 dB. That kind of performance is not as good as many consumer audio tape recorders, and unless improved, may always keep television sound in second place to the high fidelity color picture.

Dolby noise reduction is the proven way to break the noise bottleneck, here and now. It provides 10 dB of noise reduction (rising to 15 dB at

Dolby noise reduction can improve the audio performance of virtually any VTR.

higher frequencies), without audible degradation of the original signal. It reduces hiss, hum, rumble, the effects of multiple-generation re-recording — *all* noise not part of the original signal. It reduces print-through, even years later. It can reduce distortion by permitting the use of lower record levels. And Dolby noise reduction is the key to taking full advantage of the wider frequency range now increasingly being provided in the rest of the TV audio chain.

Since its introduction 13 years ago, Dolby noise reduction has become universally accepted for quality audio tape recording, both professional and consumer. It is also regularly used to improve the audio quality of VTRs in several European countries. Just ask any professional audio recording engineer about the benefits of the Dolby system, or contact us for full technical information. Let us help you in your efforts to provide television sound which matches the television picture.

**Visit Dolby Laboratories at Booth 385, NAB, Dallas, March 25-28.**



**Dolby Laboratories Inc**

'Dolby', Dolbyized and the double-D symbol are trademarks of Dolby Laboratories

731 Sansome Street  
San Francisco CA 94111  
Telephone (415) 392-0300  
Telex 34409

346 Clapham Road  
London SW9  
Telephone 01-720 1111  
Telex 919109

S79/1597

Circle (124) on Reply Card

# Need it in a hurry?

We ship most catalog items from stock the same day an order is received.

Fast service and dependability is our standard. Request our free catalog of equipment and components.

We have 15 years of experience in serving the broadcaster's equipment requirements.

*Broadcast Equipment & Supply Co.*

P.O. BOX 3141  
BRISTOL, TENNESSEE 37620  
(615) 878-2531

Circle (125) on Reply Card

## Camera Titling Made Easy



### WITH THE NEW VIDEO RETICLE GENERATOR VR-116

- Independent control of Safe Title and Safe Action reticles
- Unrestricted selection of limits both horizontally and vertically
- Remote control switching of Safe Title, Safe Action and cross-hairs
- Continuous brightness control from 0 to 100% luminance value
- Joy-stick control of Safe Action reticle from dead-center to edge of blanking area

Call or write:

**GRAY ENGINEERING LABS, INC.**

504 W. Chapman Ave.  
Orange, Ca. 92668  
714-997-4151

Circle (126) on Reply Card

## Exhibit roundup: L-Li

### L-W International

Telecine slow motion freeze-frame projectors. **Booth 338.**

[see ad on page 152](#)

### Laird Telemedia

**Booth 537**

[see ad on page 160](#)

### James B. Lansing Sound (JBL)

Studio monitors amplified monitor. **New: Studio monitor. Booth 2623.**

[see ad on page 155](#)

### Leitch Video, Ltd.

Master sync generator, source or slave generator, sync source generator, video processing amp, distribution amps, color test generators, automatic changeover, PAL sync generator. **New: PAL video processing amplifier, 8-inch digital clock with sweep indication. Booth 561.**

[see ad on page 53](#)

### Lenco

Terminal equipment, video noise meter. **New: High resolution color monitors, broadcast waveform monitors and vector scopes. Booth 372. Hospitality Suite: Loew's Anatole.**

[see ad on page 55](#)

### Lightning Elimination Associates

Lightning dissipation arrays, power line surge eliminators, transient eliminators for data and phone lines, lightning warning systems, grounding systems. **New: Electronic filtering systems, surge generators, guy charge dissipation chokes, transient eliminators ranging to 1 GHz. Booth 437.**

[see ad on page 84](#)

### David Lint Associates

Professional recorders, broadcast and studio recorder heads, motor repair service, head relapping/replacement, cartridges, in-cassette duplicator, complete turnkey AM/FM broadcast stations. **New: Recorder heads. Booth 447.**

### Lipsner-Smith

**New: Film cleaning/conditioning system. Booth 539.**

### Listec Television Equipment

# You get only one chance at a live feed. So put a TerraCom TCM-7 "Miniwave" at the scene.

The TCM-7 is the best performance ENG microwave available anywhere — and the easiest to set up and operate. Field tune to any channel. No reported failures on the first one hundred links delivered. Available in 2, 7 and 13 GHz — as well as all other bands.

That's it — fine reliability, high performance, easy to use, all bands, and tunable frequency. Best price too.

For more information or a demonstration, call Bob Boulio or Stan Sievers at TerraCom (714) 278-4100 9020 Balboa Avenue, San Diego, CA 92123

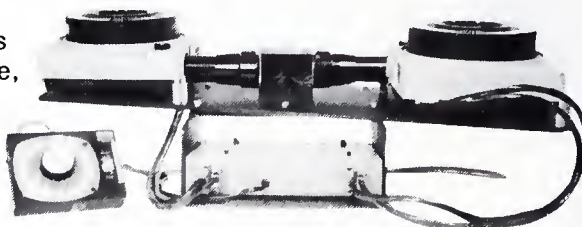


**LORAL** Corporation  
Circle (127) on Reply Card



**If you are using  
Standard Kodak  
Slide Projectors  
in your TV filmchain,  
you can now convert  
to Random Access  
Projectors, easily.**

Mast Series 137 Random Access Slide Projectors are dimensionally and optically identical to Kodak Ektagraphic Series Projectors. Many dissolve, programming and control options allow easy adaptation to broadcast use. Ask us about the extraordinary slide projectors from Mast.



Call Dave McAndrews for immediate information. (319) 326-0141.

**MAST** DEVELOPMENT CO.  
2212 E. 12th St., Davenport, IA 52803

Circle (128) on Reply Card



**Equipto  
Enclosures**  
... the highest quality  
electronic cabinets  
you can buy!

Here's why:

1. Designs are handsome and functional
2. Cabinetry is durable, rugged
3. Service — prompt and dependable

Whatever you're looking for in cabinetry or desk systems, we have several lines of modular enclosures available to effectively display and protect your instrumentation. Or, we'll custom design enclosures to suit your individual needs. Choice of color at no extra charge.

Ask about our Engineering  
Evaluation program.

**WRITE FOR  
FREE CATALOG**



*Equipto For Quality*  
**EQUIPTO ELECTRONICS CORPORATION**  
403 Woodlawn Ave. • Aurora, Illinois 60507  
Phone: 312/897-4691

Circle (129) on Reply Card

## Exhibit roundup: Li-M

Camera mountings, prompters, audio consoles, time code generator, titler, delay lines, safe area generator. **New:** 3-stage portable pedestal and crabbing base, fluid cam head with tilt compensation, post head for ENG cameras. **Booth 465. Hospitality Suite: Marriott.**

[see ad on page 170](#)

**Live Sound  
Booth 2714**

**Logitek Electronic Systems**  
Audio consoles, balanced-input turntable preamp, EBS equipment, game show scoreboards and accessories. **New:** Transmitter remote control, digital clocks and timers, audio power amps. **Booth 2111.**

[see ad on page 209](#)

**Lowel-Light Manufacturing**  
Omnilight system, lighting systems, softlights, reflectors, link location grip system. **Booth 2506.**

**MBH Enterprises  
Booth 2523**

**MCI**  
2- and 4-track recorders, 8-track recorder, broadcast recorder, 24-track recorder, automation control center for multitrack recorders. **New:** SMPTE/EBU generator/reader/synchronizer, automated console. **Booth 401.**

**3M (A/V Products & Mincom)**  
1-inch videotape, quad videotape, videocassettes, audible range tapes, magnetic film, production switchers, video routing switchers, character generators, video effects generators. **New:** Dual microprocessor graphics generator system, character generator, microprocessor routing equipment, digital effects generators, microprocessor video production switcher. **Booth 302. Hospitality Suite: Loew's Anatole.**

**3M (A/V Products)**  
**New:** Endless-loop radio cartridge system. **Booth 439. Demonstration Suite: Fairmont, 1601.**

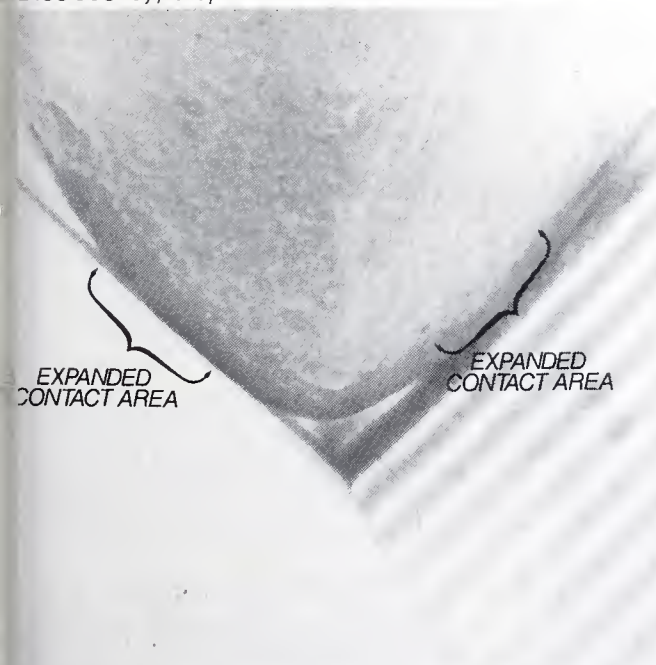
[see ad on page 111](#)

# PROFESSIONAL

**WUHY-FM, Philadelphia, rates Stanton's  
881S superior in every aspect!**



*Disc Jockey, Stephen Brooks at the mike.*



*Scanning Electron Beam Microscope photo of Stereo-  
hedron® stylus, 2000 times magnification; brackets  
point out wider contact area.*

The Stanton 881S cartridge, with its Stereohedron stylus, has been rated, worldwide, as the outstanding stereo cartridge of its time. So, it ought to be a rather delicate pick-up. Not so, says WUHY... outstanding National Public Radio FM Station in Philadelphia. Mr. Ajit George, Director of Development and Awareness, quotes his Engineering Staff in this way:

- 1) We back cue the 881S with no damage to the stylus.
- 2) It has excellent flat frequency response.
- 3) It handles high level complex music passages with complete freedom from mis-tracking.
- 4) The 881S has the highest output compared to average high quality magnetic cartridges, plus the fact that it gives superior signal-to-noise ratio from the phono preamp."

We are in total agreement with all of the above except, honestly, the 881S was not designed for back cueing.

Stanton guarantees each 881S to meet the specifications within exacting limits. The most meaningful warranty possible, individual calibration test results, come packed with each unit. Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the Stanton 881S.

*For further information write to: Stanton Magnetics,  
Terminal Drive, Plainview, N.Y. 11803*

**Visit Stanton at the NAB in Booth #363 for exciting news.**



# STANTON!

**The choice of the professionals™**

Circle (130) on Reply Card

March 1979 *Broadcast Engineering* 151

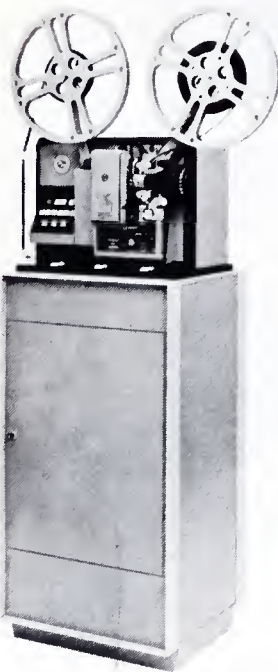
# FREEZE-FRAME & SLO-MO

"the easy way"

**ATHENA 4000**

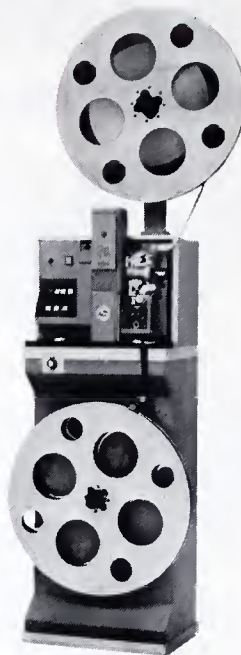


**ATHENA 5000**



The Athenas give you  
six more features  
than the RCA TP-66  
or the EK CT-500:  
**AT LOWER COST!**

1. Freeze-frame, instant start/stop, animation, slo-mo—all direct from film to tape by TV film chain.
2. Digital control CMOS circuitry for complete low-voltage remote control and/or computer control.
3. 115V 60 HZ or 220V 50 HZ
4. Modular digital design for easy service.
5. Extended 2-3 year warranty.
6. Insured against obsolescence—retrofitable to new design improvements and options.



SEE US IN BOOTH  
338 AT NAB



**L-W INTERNATIONAL**  
6416 Variel Avenue  
Woodland Hills, CA 91367 U.S.A.  
Telephone: 213/348-8614

Circle (131) on Reply Card

## ANTENNA IMPEDANCE MEASUREMENTS WITH INTERFERENCE IMMUNITY

**The Model SD-31 Synthesizer/Detector  
Is...**

... designed for antenna impedance measurements in presence of strong interference ■ High-level oscillator compatible with General Radio 916 Series, 1606 Series, and Delta OIB-1 Impedance Bridges ■ Special coherent detector circuit rejects interfering signals during measurements ■ Crystal controlled frequency, variable in 500 Hz steps from 100.0 kHz to 1999.5 kHz

- Receiver for detector can be external or optional built-in RX-31
- Powered by rechargeable batteries
- Self-contained portable package ■ Field proven
- Versatile — can use as an RF signal generator for troubleshooting antenna systems; as a variable frequency oscillator for antenna site survey; or other applications requiring a precise frequency source.



CONTACT US FOR DETAILS.

**POTOMAC INSTRUMENTS**

932 PHILADELPHIA AVE.  
SILVER SPRING, MD. 20910  
(301) 589-2662

Circle (132) on Reply Card

## Exhibit roundup: M-Mi

### MPB Technologies

New: Desk-top character generator and graphics system. **Booth 2815.**

### Mach One Digital Systems

**Booth 2505**

### Marconi Electronics

Studio camera, portable camera with triax, ENG cameras, telecine, standards converter, 1-inch type C VTRs, UHF/VHF transmitter, video switchers, audio equipment, VDAs, automatic VITs analyzing equipment. **New:** TV interval timer, low distortion oscillators, distortion and noise meter, wow and flutter meter. **Booth 322.**

see ad on page 45

### Marti Electronics

AM stereo STL package, remote control, mobile ENG repeater, battery-powered ENG transmitters, transmitter encoders, mobile ENG transmitters, FM stereo STL, sub-carrier equipment, compressor-limiters, monitor amplifier, program amplifier, automatic transmitter switcher, automatic receiver switcher. **New:** Remote control system, audio processor. **Booth 349.**

see ad on page 90

### Memorex

Spindle height alignment gauges: MRX 716-1-inch broadcast, MRX 716-2-inch (IVC-9000), MRX 8-C-½-inch, 1-inch and 2-inch, MRX QzHD ¾-inch, MRX VHS ½-inch cassettes, MRX audio training cassettes. **New:** MRX-spindle height alignment gauge for ¾-inch VCR. **Booth 485.**

### Merlin Engineering Works

**New:** Custom quad VTRs and accessories. **Booth 412.**

### Micmix Audio Products

Master audio meter (LED), reverbs, effects units. **Booth 421.**

see ad on page 140

### Micro Communications

Coaxial transfer switch, CP FM antenna. **New:** Channel combiner for TV, dual transmitter phase comparator. **Booth 513.**

see ad on page 46

# KING TUT LIVES AGAIN AND AGAIN AND...

The magnificent treasures of Egypt's legendary Boy King, Tutankhamun, are currently on view in a tour of major museums throughout the country. To add an extra dimension for museum-goers, a recorded commentary about the exhibit is available that singles out fine points of this most important exhibition of ancient Egyptian artifacts.

The pre-recorded cassettes used for these tours must be highly reliable. Typically, each cassette—both tape and mechanism—must hold up under 1500 plays, and as many as 50,000 stops and starts on a yearly basis.

That's the challenge Acoustiguide Corporation, the company that produces these recorded tours, posed to TDK. And we met that challenge, by providing cassettes that have proven themselves again and again to give outstanding reliability and faithful sound reproduction.

TDK's unlabeled "Y" series cassette for high-speed duplication, and our AVMC audio/visual cassettes are ideal for AV and industrial uses. They're loaded with the same high-quality tape as our regular top-rated "D" cassettes, for low-noise, high-output reproduction, with broad dynamic range and unusually-low distortion. The cassette shells feature TDK's five-screw cassette mechanism (as opposed to molded-type construction) for superb performance on every type of duplicating machine at even highest speeds. (If you prefer, the same tape is also available in 1/8" pancake).

In addition, we also offer TDK Audua Series open reels and pancakes for the ultimate in 1/4" lab-quality formulations, as well as a complete selection of endless, dictation (leaderless), data and test cassettes.

Get the reliable performance needed to keep King Tut alive—check your AV or professional products supplier, and ask for our technical specification sheets and full-color brochure on TDK Professional Tape Products.



# TDK

World Leader in Recording Tape Technology

TDK Electronics Corp., 755 Eastgate Blvd.,  
Garden City, NY 11530 (516) 746-0880;  
106 W. Peterson Ave., Chicago, Ill.  
60645 (312) 973-1222;  
141 Rosecrans Ave., El Segundo, Ca.  
90245 (213) 644-8625.



Circle (133) on Reply Card

March 1979 *Broadcast Engineering* 153

## Exhibit roundup: Mi-N

### Micro Consultants

Digital standards converter, digital frame store synchronizer, automatic noise reduction device. **New:** Digital effects, low-cost synchronizer. **Booth 404.**

### Micro Control Associates

Studio-transmitter links, remote control systems, automatic transmitter systems, accessories. **New:** Aural studio-transmitter links. **Booth 311A.**

### Microprobe Electronics

**Booth 445**

### Microtime

VSP, CCD time base corrector, image processing, digital automatic programming, PS PAL/SECAM TBC. **New:** Video signal digital processing system, video signal synchronizer frame base corrector. **Booth 2305.**

*see ad on page 109*

### Micro-Trak Corporation

Remote audio control center, sportscaster audio consoles, furniture, antenna heater control, phono preamps, audio consoles, tape cart racks. **New:** Audio center, audio console, furniture, turntable. **Booth 391.**

### Microwave Associates

**Booth 340.**

### Mole Richardson Company

**Booth 384**

### The Money Machine

**Booth 335**

### Moseley Associates

Digital control system with computer option, digital remote system, remote control, aural studio-transmitter links, audio limiter, stereo generator, remote pickup links, tele-control system, subcarrier system. **New:** Microprocessor remote control, telemetry return link, subcarrier main frame. **Booth 329.**

*see ad on page 75*

### Motorola Communications & Electronics

**Booth 433**

### Musicworks

**Booth 2512**

### Mutual Broadcasting

Live satellite distribution. **Booth 2200. Hospitality Suite:** Hyatt Regency.

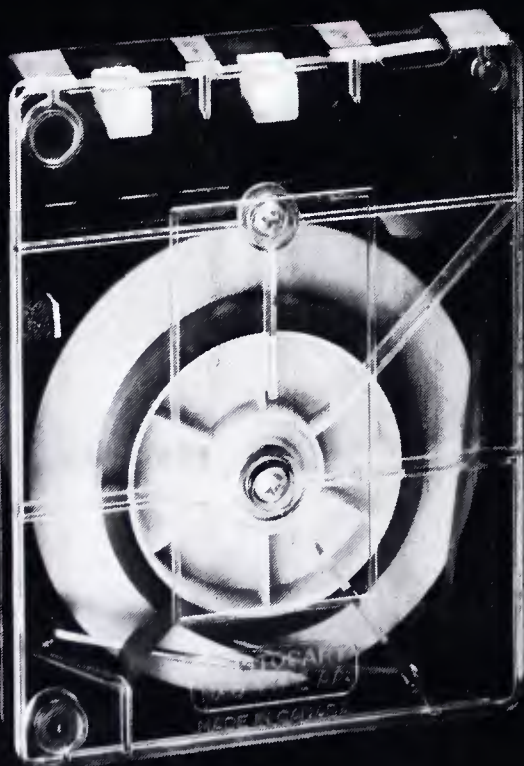
*see ad on page 79*

### McCurdy Radio Industries

Radio on-air consoles, radio production consoles, intercoms, switchers, turntable assemblies, audio distribution assemblies, power supplies. **New:** TV production console, compressor/limiters, telephone talk show interface, audio DAs. **Booth 321. Hospitality Suite:** Hyatt Regency.

### McMartin Industries

FM transmitters and exciter; AM transmitters; remote pickup equipment; FM, stereo and SCA monitors;



NAB TYPE AA Cartridge  
manufactured by  
ARISTOCART DIV. WESTERN BROADCASTING LTD.  
505 BURRARD ST. VANCOUVER, CANADA V7X 1M6  
TEL: (604) 687-2844 TELEX: 04-54639

**We've set  
the industry's highest standard  
of cartridge sound reproduction  
— and we maintain it  
in every cartridge**

With ARISTOCART, quality variation problems and time-consuming selection routines are eliminated. What you tape is what you hear — consistently. Each ARISTOCART is individually tested for phase, frequency response and overall performance. On a properly aligned machine, it will deliver stereo fidelity at least equal to the most sophisticated reel-to-reel equipment. Or we replace it at our expense. Another plus: ARISTOCART's exclusive pressure pad configuration prolongs the life of your expensive head by as much as 100%.

So you save significantly on maintenance.

Note to AM operators: ARISTOCART delivers superb mono quality now and incomparable stereo when you convert, without further alteration.

# ARISTOCART

The cartridge for people who care how they sound

Circle (134) on Reply Card

## HEAR FROM US BEFORE YOU HEAR FROM THEM.

Today's broadcasting equipment and standards let you transmit things you never could before.

Like tape hiss, cue tone leakage and turntable rumble, to name a few.

And that's precisely why you need the 4301 Broadcast Monitor. It's made by JBL, the recognized leader in professional sound equipment.

The JBL 4301 lets you hear everything you're

transmitting. All the good stuff. And, all the bad. So you can detect the flaws before your listeners do.

It's super-compact, so it fits all EIA Standard racks. 19" h x 12 $\frac{1}{16}$ " d x 11 $\frac{1}{2}$ " w.

Just give us your name and address and we'll send you all the 4301's very impressive specs.

Along with the name of your nearest JBL Professional Products Dealer.

He'll tell you everything you need to hear.



GET IT ALL.



James B. Lansing Sound, Inc. / Professional Division, 8500 Balboa Boulevard, Northridge, California 91329

Circle (136) on Reply Card

## Exhibit roundup: N-Or

EBS equipment; studio and remote consoles; audio amplifiers. **New:** AM transmitter, FM amplifier/transmitter, simultaneous transmission of audio and digital data over same SCA channel. **Booth 317.**

see ad on page S2

### NEC America

Time base corrector; transmitters; color camera; digital video effects; DFE; 7-, 13- and 40-GHz Domsat; switcher. **New:** Digital strobe action, multi-freeze. **Booth 2404.**

see ad on page 67

### NOAA (Weather) Booth 2840

### NTI America Booth 2209

### Nagra Magnetic Recorders

Nagra stereo 2-track portable recorder, Nagra E monaural recorder, Nagra IS intermediate monaural recorder, QGB extension 10½-inch

NAB reel adapter. **Booth 525.**  
see ad on page 16S

### Network Recording Productions Booth 2807

### Rupert Neve

Multitrack tape machine, radio broadcast console for medium markets. **New:** NECAM computer-assisted mixing console for TV post-production. **Booth 507.**

### Nortronics Company

Magnetic replacement tape heads, magnetic tape heads, relapping kit, alignment tapes, splicing blocks, head cleaners, maintenance products for magnetic recorders. **New:** Broadcast cart machine head degausser, broadcast conversion kit. **Booth 345.**

### Fred A. Nudd Corporation

Towers. **New:** Monopoles. **Booth 2310.**

### Nurad

Quad horn system, antennas. **New:** Digital remote control system, dual band quad system, directional antenna, 7 GHz transmit antenna. **Booth 533.**

### Oak Communications Booth 2223

**O'Connor Engineering Laboratories**  
Fluid pan & tilt camera heads, Hydro-P&D model 102 B. **Booth 2500.**

see ad on page 63

### Oktel Corporation

Slow motion disc recorder, RGB machine, slo-mobile, slide file disc recorder. **Booth 2125.**

see ad on page 81

### The Olesen Company Booth 2607

### Orange Coast (Van) Booth 2717

### Orange County Electronics

## The Orban 672A: A Dream Equalizer at a Practical Price



The 672A is a single-channel equalizer offering astonishing control and versatility. There are eight non-interacting parametric bands with reciprocal curves and the convenience of graphic-style controls. Highpass and lowpass filters with 12dB/octave slopes that tune continuously over a 100:1 frequency range. And, separate outputs that let you use the 672A as an eight-band parametric cascaded with an electronic crossover in reinforcement and monitor tuning applications.

\*suggested list

The dream equalizer is usable practically *everywhere* in professional and semi-professional sound: recording studios, cinema, theater, reinforcement, broadcasting, disco — you name it! Yet its price is down-to-earth: \$499\*. And, it's built to full professional standards.

Check it out at your ORBAN DEALER.

**orban**

**Orban Associates Inc.**  
645 Bryant St.  
San Francisco, CA 94107  
(415) 957-1067

See it at the NAB booth 429.

# New Trends Begin At QSi Systems At NAB Dallas

We'll be showing our unique line of broadcast equipment.

Come to Booth 2800 and see how QSi Systems can fill your equipment needs.



## QSi/CB-8000

The QSi/CB-8000, is a high quality, test signal generator, combining a color bar generator, a character generator and an audio signal source in a single, rack-mounted unit for studio, remote and common carrier signal origination.

- **Standard 525/60 NTS color sync generator**
- **Standard EIA-RS-189 split field color bar generator**
- **Standard ASCII code character generator** with on-board programming
- **Standard 600 ohm balanced +18 dbm 400 HZ audio tone generator**, with mike input, adjustable level and front panel VU meter
- **All solid state integrated electronics**
- **Standard 19" X 1¾" rack mountable**



## QSi/TVL 2400

You get a full day of off-air logging without a tape change with QSi Systems' 24-hour logging package.

- **24 full hours of off-air television logging**
- **24 full hours of off-air radio/computer CRT video logging**
- **Video and audio recorded on same tape** with automatic synchronization
- **Easily understood audio, precise video** for highly accurate logging
- **Standard thickness video tape** eliminates "thin tape" problems

**QSi** systems, inc.

**See us at Booth 2800  
NAB Dallas, Level II**

For more information on QSi Systems' full line of broadcast equipment, call or write: QSi Systems, Inc., 993 Watertown St., West Newton, MA 02165 (617) 969-7118

Circle (138) on Reply Card

## Exhibit roundup: Or-Po

series of clocks. **Booth 416.**

Rigid coaxial line. **New:** FM broadcast antennas. **Booth 353.**

Stressors, FM stereo processor, stereo processor. **New:** Parametric equalizer module. **Booth 2107.**

### Orhan Associates

Audio processing systems for AM and FM, dual-spring reverb, stereo synthesizer, stereo compressor/limiter, dynamic sibilance controller, parametric equalizer. **New:** Equalizer, dynamic sibilance controller. **Booth 429. Hospitality Suite:** Adolphus 1008.

see ad on pages 32, 138

### Orrox Corporation Booth 350

### Otari Corporation

2-track recorder, 2-speed 2-track reproducer, broadcast recorder, 8-track recorder. **Booth 405.**

see ad on pages 85, 87, 89, 91

### Pacific Recorders & Engineering

Multilimiter/multimax. **New:** BMX 12 and 22 input console, Digitimer

### Packaged Lighting Systems Booth 2611

### Panasonic Company Video Systems (see also Technics-Panasonic)

ENG/EFP color cameras, studio color cameras, 3/4-inch videocassette editing recorders, 3/4-inch VCRs, monitors and accessories, special effects generator, VHS recorders and players, time lapse video recorder, 4-hour VHS recorder, portable VHS recorder, high resolution monitors, TV projection system. **New:** VHS player/recorders, camera, 3/4-inch recorders, professional microphones. **Booth 483.**

see ad on page 57

### Perrott Engineering Labs

Silver zinc battery packs for cameras, VTRs and portable lighting; battery chargers, nickel cadmium battery packs. **Booth 2704. Hospitality Suite:** Fairmont.

### Phelps Dodge Communications

### Philips

ENG/EFP camera, multicore studio/field camera, triax studio/field camera, portable production camera, camera system, UHF and VHF transmitters, transmitter exciters, VTRs, videotape synchronizer, demodulators, modulators, RF converter, pattern generators, video signal generator, VITs analyzer, VITs inserter/generator, color analyzer, signal generator. **New:** Automatic noise reducer. **Booth 314. Hospitality Suite:** Hyatt Regency.

see ad on page 137

### Potomac Instruments

Antenna monitors, audio test equipment, audio signal generator, intermodulation analyzer, harmonic distortion analyzer, wow and flutter meter, stereo phase meter, AM field strength meters, FM/TV field strength meter, frequency synthesizer, jack panels, plugs, patch cords. **New:** Automatic transmission system for standard broadcast directional antenna arrays. **Booth 377.**

see ad on pages 16, 152

## CHECK THE BOTTOM LINE . . .

We're Audio Consultants, Inc. That's not just our name, it's our business. And our clients think we do it pretty good. It is no accident that we are the largest professional audio dealer in the southeast.

### CONSIDER THE FACTS:

- We are specialists in the craft of acoustic design and electronic systems design. We have designed and built some of the finest recording studios in the world.
- Our list of product lines reads like a *Who's Who* in the audio equipment business. We are the exclusive dealer in the southeastern U. S. for MCI consoles and tape recorders. We also sell AKG, BGW, Beyer, DBX, Dolby, Electrovoice, Eventide, JBL, Keith Monks, Lexicon, Marshall Electronics, Neumann, Orban, Sennheisers and Urei, just to name a few.
- And the equipment we sell you will be that which matches your needs. And furthermore, it won't come in a factory sealed box, because our staff will already have made a careful pre-delivery check on the equipment before you receive it.
- We also offer a quality of installation worthy of the equipment we sell. Our experience with multi-track recording studios puts us way out in front of the strictly broadcast supplier. And of course, we are in Nashville, which is a convenient location for two-thirds of the country.

So, if you think you need some sound advice on an audio problem . . . check the bottom line.

### Audio Consultants, Inc.

1200 Beechwood Avenue • Nashville, TN 37212

615-256-6900

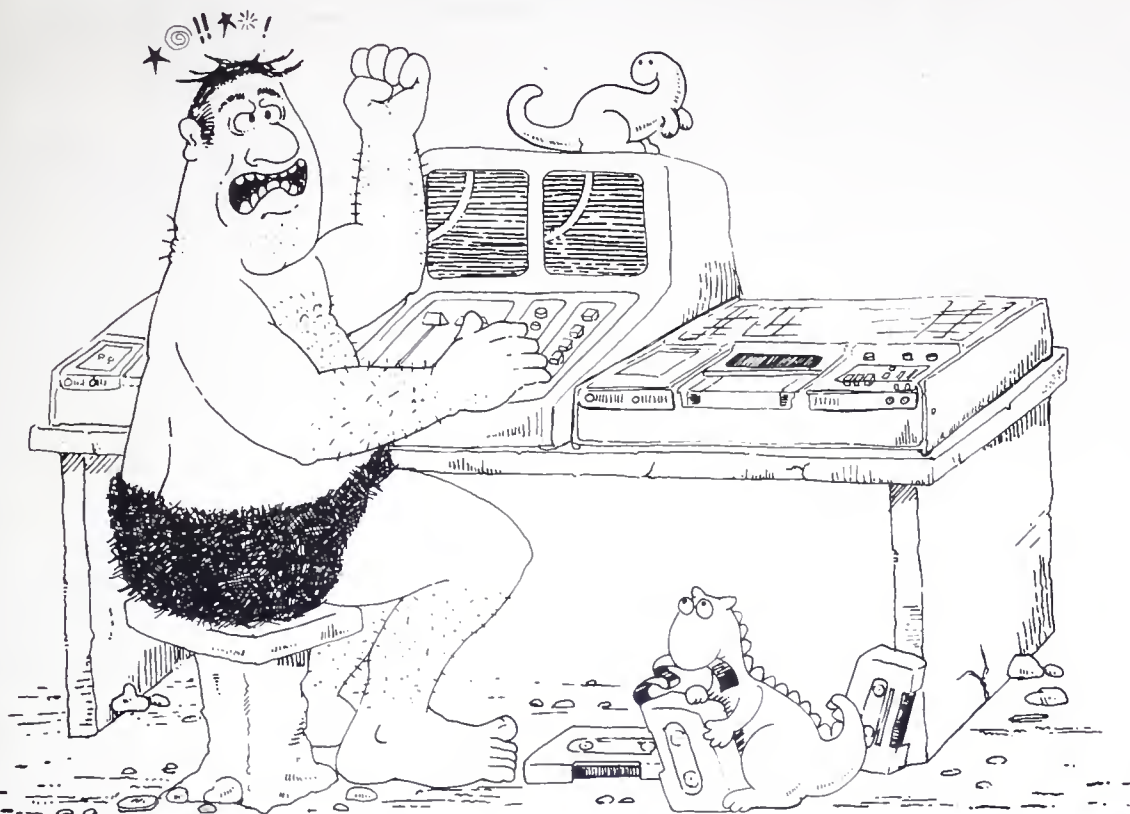


**EQUIPMENT  
+ EXPERIENCE  
+ INSTALLATION**

**= HIGHEST QUALITY AUDIO**

Circle (139) on Reply Card

# HAS STONEAGE 3/4" EQUIPMENT GOT YOU WHIPPED?



## THE PRO-PAK 1 IS THE SOLUTION.

**PRO-PAK 1** — A servo system that allows the 3/4" format to take its rightful place as a viable production tool for the broadcast medium.

PRO-PAK 1 updates the current 3/4" tach lock to a full broadcast, quality control and synchronizing system. This system allows full frame synchronizing of the television signal and eliminates vertical blanking problems caused by the TR. With PRO-PAK 1, the 3/4" user will gain many of the benefits associated with the best servo and monitoring systems used in today's QUAD and 1" recorders, while retaining all the benefits of the 3/4" format. PRO-PAK 1 minimizes the need for the time base correction in editing systems. In situations where correction is required, the PRO-PAK 1 makes it possible to use even a narrow-window

Currently, 3/4" VTR's are tach lock machines. At the 1978 NAB, VAL introduced the Direct Drive D. C. Drum Servo — the tightest tach lock system available for 3/4" VTR's. This was a good beginning; however, no matter how tight a tach lock servo may be, it still can't cure problems such as speed timing variations, a major cause of vertical blanking problems. To correct these variations, VAL expanded on the D. C. Drum Servo and the PRO-PAK 1 evolved. Here are some of its features. **V-lock** fully frame-synchronizes the output of the VTR regardless of the source of the tape. **Key-Lock** gives you the ability to monochrome key over tape black without a TBC. **H-lock** brings about a major reduction in multiple generation chroma velocity errors. H-lock

permits the use of a very narrow-window TBC, and eliminates the need for a TBC in many non-broadcast situations. **Stability marks** permit the quality control monitoring of a tape as it is being edited.

PRO-PAK 1 is a powerful tool! To insure that both the user and the engineer can realize all of the benefits available, VAL provides a **complete complement of servo status indicators** designed to be functional for both parties. Its design will allow the user to check the mode of operation and the status of all systems with a single glance. If there are any problems, the indicators will pinpoint them to the engineer, and allow him to make all operational adjustments without an oscilloscope.

PRO-PAK 1 is a comprehensive package that offers: • **Direct Drive D. C. Drum Servo** • **Framer** • **Full Monitoring Package** • **Comprehensive Status and Set Up Panel** • **Horizontally Stabilized Cueing** • **A Fully Synchronized Tach, V and H Locked Capstan-Framed System, That Will Edit In Any Of Those Three Modes.**



**Video Associates Labs**

2304 Hancock Drive Austin, Texas 78756  
512/459-5684

**Come Thumb Our Drum At Booth 2809**

Circle (135) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)

## Exhibit roundup: Po-Ra

### Power-Optics Booth 2407

### QEI Corporation

FM automatic transmission system, FM exciter, stereo generator, audio processing. **New:** 2nd generation FM stereo monitor. **Booth 435.**

### QRK Electronic Products

Audio consoles, turntables, tone arm, pre-amps, furniture. **New:** dc motor turntable, electronic clock, 16-inch turntable, ac speed control, disco mixer. **Booth 389.**

[see ad on page 126](#)

### QSI Systems

TV off-air logger, video source identifier, video frame/field counter, TV clock system, master clock calendar, test monitoring switcher, time date generator, video distribution amplifier. **New:** Color bar identifier, video back timer, radio broadcast logger. **Booth 2800.**

[see ad on page 157](#)

### Q-TV/Telesync

Video prompter systems. **Booth 332.**

### Quick-Set, Inc.

Pedestals, tripods, cam heads, fluid heads, dollies. **Booth 495.**

### RCA (American Communications)

Satellite transmission or multipoint distribution of TV or program audio. **Booth 300B.**

### RCA Broadcast Systems

TV cameras, VTRs, editing systems, radio transmitters, radio antennas, audio consoles, cartridge tape handling systems, turntables. **New:** UHF TV transmitters, CP TV antenna. **Booth 300.**

### RCA Electro-Optics & Devices

Camera tubes, Power tubes. **Booth 300-A.**

[see ad on page 129](#)

### RE: DB Company

**Booth 2811**

### R. F. Technology

**Booth 2410**

### RTS Systems

Intercom system, master station intercom, in-line microphone pre-amp. **Booth 2115.**

### Radio Original Network

**Booth 2612**

### Ramko Research

Audio consoles, audio distribution amps, line amplifiers, monitor amplifiers, mic/line amps, equalized line amps, automatic tape winder, turntable pre-amps, turntable, reel-to-reel, clock/timer. **New:** Turntable pre-amp, portable mixing console, audio router/amplifier, solid-state VU meters. **Booth 409.**

[see ad on page 205](#)

### Rank Precision Industries

Camera lenses, zoom lenses, automatic color correction for film chains, pre-programmed color correction with pan scan and machine



**LAIRD TELEMEDIA INC.®**

2125 SOUTH WEST TEMPLE • 801 487-6251  
SALT LAKE CITY, UTAH 84115

## TELEVISION CHARACTER GENERATOR

MODEL  
**3600A**



- ★ SYSTEM EXPANDABILITY
- ★ 10 LINE 25 CHARACTER FORMAT
- ★ SIMPLIFIED KEYBOARD CONTROL
- ★ ADJUSTABLE WIDTH FONT
- ★ ADJUSTABLE HORIZONTAL EDGING
- ★ MULTIPLE FLAG FUNCTIONS
- ★ FORMAT POSITIONING
- ★ DATA ROLL AND CRAWL
- ★ NON-ADDITIVE MIX
- ★ UNLIMITED DATA STORAGE
- ★ COMPUTER INTERFACE
- ★ OPTIONAL COLOR BILLBOARD
- ★ OPTIONAL LOWER CASE FONT
- ★ TWO GENERATORS IN ONE

**3600A**

**THE GENERATOR WITH CHARACTER**

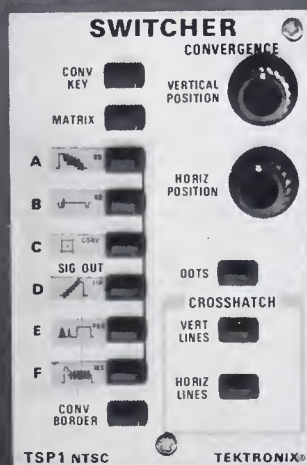
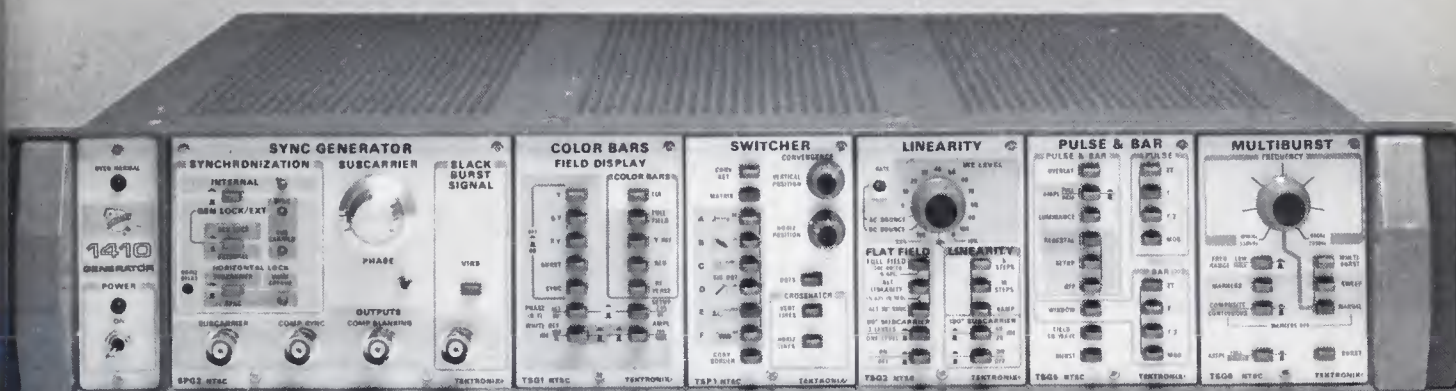
VISIT BOOTH 537 AT NAB

Circle (140) on Reply Card

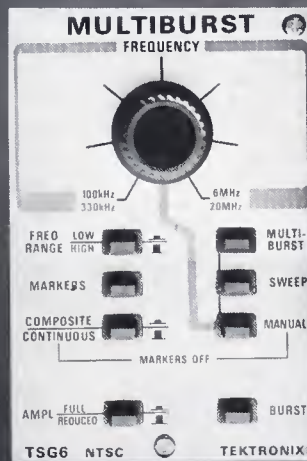
# THE TOTAL TEST SIGNAL GENERATOR

We've added important capabilities to our 1410 Series Generators. With the new TSP1 Switcher/Convergence Generator and TSG6 Multiburst/Video Sweep Generator, the 1410 is a complete, all-purpose sync and test signal generator. The 1410 mainframe accommodates any combination of five or six test signal generators driven by one sync pulse generator. Select the exact generator package you want without paying for more than you need. You can choose from genlock or non-genlock sync pulse and black-burst generators, and test signal generators for color bars, convergence, linearity, pulse and bar, or multiburst/video sweep.

For more information on the 1410 Series or on the new TSP1 Switcher/Convergence and TSG6 Multiburst/Video Sweep Generators, write Tektronix, Inc., P.O. Box 500, Beaverton, OR 97077. Or call our toll-free automated answering service at 1-800-547-1512. In Oregon, 1-644-9051.



The TSP1's single switchable output gives access to all the test signals generated by your 1410. Select a single signal for full-field display, or use the signal matrixing capability to evaluate several performance parameters at once.



The TSG6 provides 20 MHz sweep signals and high/low frequency range multiburst signals for frequency response testing in TV studios and on manufacturers' production lines. Markers are available for amplitude and frequency reference.

For Technical Data Circle (141) on Reply Card  
For Demonstration Circle (164) on Reply Card

**Tektronix®**  
COMMITTED TO EXCELLENCE

## Exhibit roundup: Ra-St

control, telecine. **New:** Lenses for ⅓-inch cameras, EFP lenses, film chain with Digiscan. **Booth 348.**

see ad on pages 37, 143

### Recortec

Reel servo modification, videotape addressor for 2-inch, editing for quads, 1-inch tape cleaner/evaluator, ¾-inch tape cleaner/evaluator, videotape timers. **New:** High band ¾-inch VTR. **Booth 336.**

### Research Technology (RTI)

Film cleaning systems, film and video storage racks, splicing and editing equipment. **New:** Micro-computer film timing system, speech processor, editing consoles. **Booth 539.**

see ad on page 64

### Rockwell International (Collins Broadcast & Transmission)

FM exciter, FM transmitter, AM transmitter, FM antennas, satellite communications, microwave communications, audio console 8-channel stereo. **New:** Audio console 10-channel stereo. **Booth 315 & 2102. Hospitality Suite:** Adolphus, 2600.

### Rohde & Schwarz Sales Company

TV precision color monitors, TV demodulators, multi-standard color receiver/monitors, multi-standard chroma, decoders. **New:** ENG color monitor, precision bridge monitor. **Booth 386.**

### Rosco Laboratories

HMI lighting equipment. **New:** Colors in a range of TV lighting filters. **Booth 2211.**

### Ross Video

Switchers. **Booth 2508.**

### Russco Electronics Manufacturing

Consoles, turntables, phono pre-amps, disco mixers. **New:** Turntable tone arm, variable speed turntable. **Booth 427.**

see ad on page 74

### SWR

Coax switches, various coax products. **New:** Coax transmission line with heat flow connector. **Booth 2702.**

see ad on page 15

### Scientific-Atlanta

Earth stations, receiver, automatic earth station control unit, TV demodulator, protection switching. **New:** Meteorological satellite terminal. **Booth 477. Hospitality Suite:** Hyatt Regency.

### Scully Recording Instruments

Audio recorders, tape reproducers, servo drive recorders, master recorders, broadcast logger recorders. **Booth 355.**

see ad on pages 34, 35

### Servo Corporation of America

**Booth 2716**

### Sescom

**Booth 443**

### Setcom Corporation

**New:** Television cameraman headset, television director/producer headset, television headset for portable camera. **Exhibiting with various distributors.**

### Sharp Electronics Corporation

Saticon ENG and EFP cameras, Vidicon ENG and EFP cameras, sync generator system, special effects generator, 19-inch color TV receiver, 19-inch color TV monitor-receiver, 13-inch color TV monitor-receiver. **New:** 13-inch rack-mounted monitor, half-rack waveform monitor. **Booth 2400.**

### Shintron Company

Switchers, character generator, encoded chroma keyer, edit code generator. **New:** Color switcher, edit code reader/raster display/prINTER. **Booth 410.**

see ad on page 146

### Shure Brothers

Professional microphones, mixers and other circuitry, audio consoles, amplifiers, hi-fi cartridges and tone arms. **New:** Studio condenser microphone. **Booth 371.**

### Sintronics Corporation

AM transmitters. **New:** FM broadcast transmitters. **Booth 387.**

see ad on page 177

### Skirpan Lighting

**Booth 2625**

### Skotel Corporation

SMPTE time code generator, SMPTE time code reader. **Booth 2827.**

### Elmer Smalling

**Booth 2800B**

### Soll

Videotape presentation of installations. **New:** Color graphics/computer control for RF switching systems. **Booth 505.**

### Sono-Mag Corporation

Programmer systems. **New:** Improved facilities for program data entry, editing and display. **Booth 397.**

### Sony Corp. of Am.

**New:** VTR with Dynamic tracking, TBC, camera with low-light capabilities, heterodyne monitor, professional broadcast monitor, VHF wireless mic transceiver. **Booth 380.**

see ad on pages 26, 27

### Sound Technology

Distortion measurement systems, signal generator. **Booth 2405.**

see ad on page 120

### Spin Physics

Videohead refurbishing using hot-pressed ferrite video heads. **Booth 473. Hospitality Suite:** Loew's Anatole.

see ad on page 125

### Stainless

Tower line. **New:** Device to prevent galloping guys. **Booth 2109.**

### Stanton Magnetics

Cartridges, styli, headphones, gyropoise turntable. **New:** Phono cartridge, pre-amp. **Booth 363.**

see ad on page 151



**"The TDF-1  
makes  
all our signals  
studio quality."**

**"The TDF-1 Digital Noise  
Filter has made a major  
difference in how our news  
feed looks..."**

"As a member of ITNA, we receive co-op news feeds from all over the world, and sometimes they are 6th or 7th generation converted from PAL by the time we receive them. The TDF-1 absolutely dramatically cleans up even the worst feeds. It makes us look live . . .

"Commercials shot with ENG/EFP equipment look better. It cleans up shots under existing light to the point where the client is happy with them . . .

"Overall, our day-to-day operations look significantly better."

— Hal Protter  
Vice President and General Manager  
KPLR-TV, St. Louis, Missouri

**"The TDF-1 has given us a  
consistent air look and  
higher overall quality -  
better than network ...**

"It really makes life easier — it improves the signals that need improving and leaves the rest alone . . .

"We did a side-by-side test with a competitive unit, which we thought was pretty good, but when we brought the TDF-1 in — well, somebody had sure done their homework on it! It especially handles film grain better . . .

"It's fabulous on cartoons! By the time you run the TDF-1 up to its top correction, you end up with a signal that has no grain . . .

"I haven't seen anything it doesn't handle well."

— Jim Gonsey  
Chief Engineer  
KPLR-TV, St. Louis, Missouri



**TeleMation**  
A Division of Bell & Howell  
P.O. Box 15068, Salt Lake City, Utah 84115  
(801) 972-8000, Telex 388-352

© 1978 Bell & Howell Company. All rights reserved. TeleMation and Bell & Howell are trademarks of Bell & Howell Company.

Circle (142) on Reply Card

March 1979 **Broadcast Engineering** 163

## Exhibit roundup: St-Te

### Station Business Systems

Business automation systems. **New:** TV computer system. **Booth 327.**

### Storeel Corporation

Room stretch for RCA carts, Ampex cassettes, storage for audio carts. **Booth 469.**

see ad on page 175

### Strand Century

Memory systems for lighting. **New:** Bambino lighting, Lekolite spotlights. **Booth 475.**

### Studer ReVox

Recorder reproducers, mixing console series. **New:** Audio multi magnetic tape recorder, mixing console series, telephone hybrid with electronic impedance matching, mono/stereo compatible recorder reproducer, code T control/digital FM tuner. **Booth 453.**

see ad on pages 60, 61

### System Concepts

Character generators. **New:** Character generators. **Booth 517.**

### TA & Track Audio

**New:** Discriminate audio processor, cart machine, peak program meter, compressor limiter. **Booth 2712.**

### TM Productions

**Booth 2307**

### Taber Manufacturing & Engineering

Ampex VTR audio heads, RCA VTR audio heads, Ampex audio recorder heads, Scully audio recorder heads, Taberamp-recorder electronics, Taberaser (bulk tape eraser), professional audio head reconditioning service. **Booth 459.**

### Tangent

**Booth 2106**

### William B. Tanner Company

**Booth 2206**

### Tayburn Electronics

**Booth 2502**

**Technics-Panasonic** (see also Panasonic Company Video Systems) Tape decks, cassette decks, turntables, dc preamp, peak average meter unit, headphones. **New:** Turntable, studio-monitor speakers. **Booth 481.**

see ad on page 57

### Technology Service Corporation

Weather radar to TV color converter, electronic map overlay, automatic time lapse recorder. **Booth 467.**

### Tektronix

Automatic TV signal measuring system SECAM-PAL equipment. **New:** Down converter for demodulator. **Booth 306.**

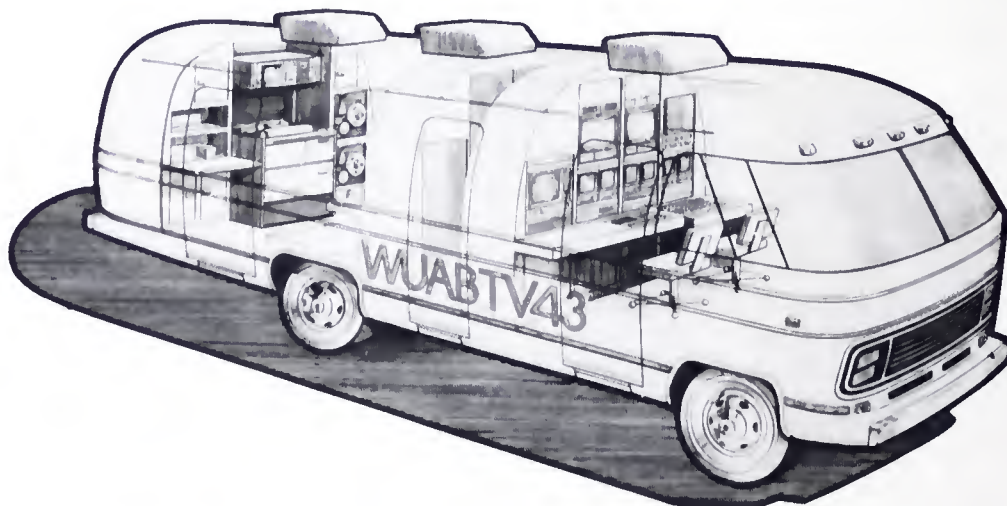
see ad on page 161

### Tele-Cine

Schneider lenses for 1¼-inch, 1-inch, ⅜-inch cameras, lens accessories, remote pan & tilt equipment. **New:** Schneider lenses and adaptors. **Booth 392.**

## FOR MOBILE PRODUCTION SEE US AT THE NAB

**BOOTH 503**



**Wolf Coach Inc.**

200 Bartlett Street • Northboro, Mass. 01532  
(617) 393-2551



**TELEVISION ENGINEERING CORPORATION**

519 Rudder Road • Fenton, Missouri 63026 314 343 5605

Circle (144) on Reply Card

# NAGRA

Portable Perfection

*Stereo Or Monaural With A "Flick Of A Switch"*

## Booth 525-NAB Show

March 25-28, Dallas



UNITED STATES DISTRIBUTION, SALES AND SERVICE

**NAGRA MAGNETIC RECORDERS, INC.**

19 West 44th Street, Room 715 • New York, NY 10036 • (212) 840-0999

West Coast Sales, Service & Technical Center — **RYDER MAGNETIC SALES CORP.**, 1147 N. Vine St. • Hollywood, CA 90038 • (213) 469-6391

In Canada — **ARRI/NAGRA INC.**, 6467 Northam • Mississauga, Ont. L4V 1J2 • (416) 677-1033

Circle (145) on Reply Card

**\$9,800  
IS THE PRICE!**



**IMI-3000**

**LARGE SCREEN  
TV PROJECTION**

**6FT. — 20 FT. WIDE**

**WIDE ANGLE VIEWING  
ON STANDARD FRONT  
OR REAR SCREENS**



739 Airway Circle,  
New Smyrna Beach Fla. 32069

**(904) 427-5293 - 5294**

Circle (146) on Reply Card

## Exhibit roundup: Tel

### Telecommunications Industries Limited

Television test charts, test chart systems, telecine test slides, telecine alignment films, transparency illuminators, test pattern transparencies, optical test media. **Booth 449.**

### Telegen

Teletext data transmission system. **Booth 2221.**

### TeleMation (Bell & Howell)

Graphics system, video/audio distribution switcher, color film camera, optical multiplexer, sync generator, video distribution amplifiers, pulse distribution amplifiers, subcarrier distribution amplifiers, black burst generator, digital color encoder, video/audio switcher, audio distribution amplifiers, audio monitor amplifier, digital noise filter. **New:** Machine control system. **Booth 342.**  
*see ad on page 163*

### Telemet

Clamping amplifiers, repeaters, modulators, sideband analyzers, test signal generators, chroma keyer, fiber optics, video cable terminals, RF test equipment, demodulators, group delay measuring equipment, video & pulse distribution amplifiers, chroma keyer decoder. **Booth 333.**

### Telescript

Monitor prompting systems, telecue transport, telescriptor transport. **New:** Contrast enhancer, 800 line monitor/prompter. **Booth 356.**

### Television Equipment Associates

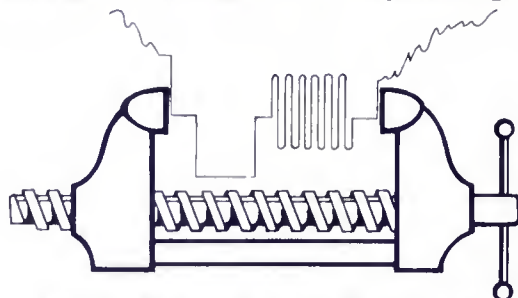
Video delays, video filters, automatic video equalizer, TV line selector, chroma corrector, headphones, test equipment, color monitor comparator. **New:** Intercom system, tape evaluator. **Booth 364.**

### Television Products

Line of camera products. **New:** Remote Location Dolly camera pedestal. **Booth 459** (with Listec).  
*see ad on page 144*

# FCC SQUEEZING YOU?

## Public Notice FCC78-423



**OVER 200  
NOW  
IN USE!**

### Our Blanking Squeezer

- Provides H and V Blanking below FCC Maximums-adjustable
- Works in any unit with a non-adjustable single-chip sync generator
- Is easily installed in any camera or TBC
- Processing before air restores correct blanking widths

**FOR \$200, WE WILL SEND YOU A SQUEEZER AND INSTALLATION INSTRUCTIONS  
FOR YOUR TK76, HL77, CVS504, CVS516, etc.**

**PEIRCE-PHELPS, INC.**  
**video systems**

2000 N. 59th STREET, PHILADELPHIA, PA. 19131  
(215) 879-7171

10215 FERNWOOD ROAD, BETHESDA, MD. 20034  
(301) 530-9580

# EMCEE

## A New Line of Low and Medium Power T. V. Transmitters!



TTU-10,000/10 kilowatt UHF transmitter  
TTU- 5,000/ 5 kilowatt UHF transmitter  
TTV-10,000/10 kilowatt VHF transmitter  
TTV- 5,000/ 5 kilowatt VHF transmitter

Total System Capability  
UHF, VHF, ITFS, MDS turnkeys

**See us at NAB Booth 328**



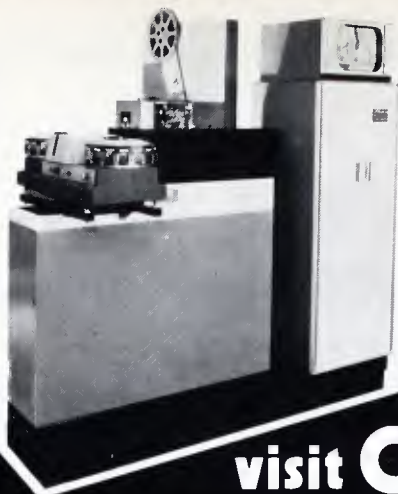
**BROADCAST PRODUCTS**

717-443-9575

P.O. Box 116, White Haven, Pennsylvania 18661

Circle (148) on Reply Card

March 1979 *Broadcast Engineering* 167



SEE  
the INDUSTRY  
"PERFORMER"  
1550 TELECINE  
in  
ACTION

visit **COHU** at **NAB**

COHU's 1550 Telecine has a new ENCODER/ENHANCER/AUTO BALANCE that makes its outstanding COLORIMETRY even better.

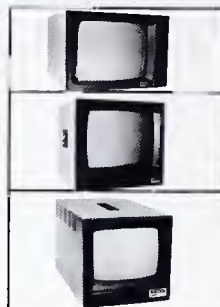
Also see COHU's new line of *BROADCAST QUALITY MONITORS*.

Available in 9, 14 and 17-inch models with Cohu's EXCLUSIVE AUTOMATIC VIDEO LEVEL. Other features include 800-line resolution; back porch gated dc restoration; interchangeable plug-in modules and more.



You expect more from Cohu  
...and you get it.

See us at booth 471



Post Office Box 623 □ San Diego, CA 92112 □ Phone: (714) 277-6700

Circle (149) on Reply Card

**There's a good  
chance that we  
know more about  
studio lighting  
than you do.**

Kliegl was in the lighting business for more than 40 years before and we've been furnishing TV lighting and control equipment for more than 40 years after the advent of television. The fact is we've been able to help more than a thousand studios and facilities, including the five major networks in North America.

Our seasoned staff will be happy to assist you in coming up with a carefully-engineered custom design to fit your specific and special needs.

Or, if you want a really economical buy, one of our typical packages will meet the usual needs for standard sized studios.

If you like the look of your studio before you've talked to us, you'll love it after it's lighted with Kliegl equipment.

For further information, see your local agent or dealer or write Kliegl.



**Kliegl Bros.**  
32-32 48th Ave.  
Long Island City  
New York 11101  
212/786-7474

Circle (150) on Reply Card

## Exhibit roundup: Tel-Ti

### Television Technology

VHF translator, VHF amplifier, FM translator. **New:** UHF translator, FM translator. **Booth 2306. Hospitality Suite:** Ramada Inn.

### Telex Communications

Headsets, reel-to-reel tape recorders, tape logger, cartridge tape recorders, tape transports, amplifiers. **Booth 357.**

see ad on pages 28, 134

### Tentel Corporation

Audio tension gauge, video tension gauge. **Booth 395.**

see ad on page 210

### TerraCom

TCM-6 series microwave radio, TCM-7 series microwave radio, TCM-3 series microwave radio. **New:** THP-2T20 digital program channel. **Booth 2401.**

see ad on page 149

### Thermodyne International Booth 2408

### Thomson-CSF Laboratories

Character generator system, color correction system, automatic level controller, automatic peak controller, for AM/FM VHF transmitter, UHF transposer. **New:** Digital video processor, portable camera. **Booth 324. Hospitality Suite:** Hyatt Regency.

see ad on page 50, 51

### Thomson-CSF-Electron Tubes Booth 2210

### Time & Frequency Technology

AM frequency & modulation monitors, FM frequency & modulation monitors, TV frequency & modulation monitors, digital remote control equipment. **New:** Microprocessor alarm and logging system, studio to transmitter link equipment, routing switches remote control. **Booth 341.**

see ad on page 66

### Times Wire & Cable Company Booth 2519

# "This Auditronics 501 was one of TM Productions' first

boards six years ago and it still runs a tightly packed schedule of original vocal session recording and mix-downs", says Ken Justiss, Operations Manager of TM Productions in Dallas. "Since we do more commercials and station ID's than anybody else in the world, we produce literally thousands each year, and at some point they've all gone through this Son-Of-36-Grand (serial number 011)."

"There's not a faster board to work with than the Auditronics 501 whether we use it for building demos or complex production tasks. It's compact; all its controls are so very accessible even trainees become proficient on it quickly."

"Its reliability is outstanding. We've literally worn out the faders once, and we've changed a switch or two, but the things I've seen go wrong with this board in six years are so minor, it's a waste of time to even talk about. It's an excellent creative tool and I'd find it hard to fault our Auditronics 501 in any area. In fact, our success with this board was largely responsible for our buying three more Auditronics consoles."

If you'd like to know more about how TM Productions' four Auditronics consoles are producing for Ken Justiss and his colleagues, we invite you to call him at 634-8511 while you're at NAB, or visit Auditronics in exhibit 379.



**auditronics, inc.**

Circle (151) on Reply Card

3750 Old Gerwell Road, Memphis, Tennessee 38118 (901) 362-1350



## SOUND PERFORMERS

Our AUDITION three way system means sound as it was meant to be. The AUDITION provides rich bass response, without booming, and midrange and tweeter are each independently adjustable.

**ALC**

CONTACT YOUR DEALER OR

Auernheimer Laboratories & Company  
4561 E. Florence Avenue-Fresno, CA 93725



Circle (152) on Reply Card

## NO SPRINGS ATTACHED!

VINTEN *The Smoothest in Lightweight Heads*

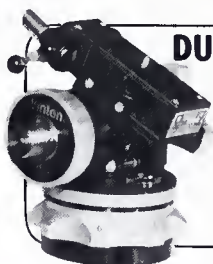
### DUNLIN 51 L.F.

50 lb. capacity

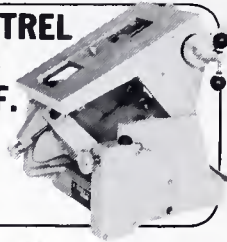
### PETREL 76 L.F.

100 lb. capacity

- perfectly adjustable balance without springs
- LF dampening-smoother than "fluid" heads



**DUNLIN 51 L.F.** **PETREL 76 L.F.**



**LISTEC  
TELEVISION  
EQUIPMENT CORP.**

**NAB Booth 465**  
LISTEC  
39 CAIN DRIVE, PLAINVIEW, NEW YORK 11803  
(516) 694-8963 TELEX 640470  
(WEST COAST)  
4527 SAN FERNANDO ROAD, UNIT 1, GLENDALE,  
CALIFORNIA 91204 (213) 244-0838

Circle (153) on Reply Card

*Through these terminals pass some of the best sounds around.*



Install Shallco attenuators for reliable performance. Replacements available for most all consoles.

Request catalog 102

**Shallco**

Shallco, Inc. P. O. Box 1089  
Smithfield, N. C. 27577 919/934-3135

Circle (154) on Reply Card

## Don't miss this at NAB!



A simple, economical, accurate method of measuring television V and H blanking widths (or any other pulse width) without a 'scope.

Booth 2823 Level II

**broadcast video systems ltd.**

1050 McNicoll Ave., Agincourt, Ont. (416) 497-1020

Circle (155) on Reply Card

## Exhibit roundup: To-Un

**Torbet Radio**  
Booth 2800A

**Toshiba International Corporation**  
Booth 2701

### Trompeter Electronics

Patching equipment, patch jacks, patch cords, plugs, paralleling networks, terminations, connectors, adaptors, attenuators, cable assemblies. **New:** Connector, electro optics, TPS, connector, electro optics, SMA. **Booth 511.**

**Tuesday Productions**  
Booth 2205

**Tweed Audio (USA)**  
Booth 2207

### UMC Electronics

Cartridge machines, splice finders, audio consoles, news recording systems, audio heads, motors, multi-cart machines, motorized azimuth cartridge machine. **New:** Multi-cartridge machines, semi-automated cartridge systems, audio consoles. **Booth 407.**

see ad on pages 22, 56

**US Tape & Label Corporation**  
Booth 2201

**Unarco-Rohn**  
Towers, communication. **Booth 373-A.**

**Uni-Set, Div. of Kniff Woodcraft**  
Booth 396

**United Media**  
Booth 2711

**United Press International**  
Booth 2300

**United Research Lab Corporation**  
Tape recorders, replacement amplifiers, motors, pinch rollers. **New:** Capstan idler assembly with ball bearing. **Booth 375.**

see ad on pages 116, 211

# "We evaluated all carts and have standardized on the Audiopak® AA-3"

—Bob Kanner  
Chief Engineer  
KRTM, FM 101  
KHJ, AM 93  
Los Angeles

"Our test results show that the Audiopak® AA-3 holds stereo phasing better than any other cart on the market."

"The excellent phase stability of the AA-3 will be of major importance as AM stations convert to stereo."

"The High Output, Low Noise (HOLN) tape in the AA-3 gives us excellent frequency response combined with 6db more headroom."

"The AA-3 maintains excellent tape motion with low wow and flutter."

"We had had previous cart pressure pad problems with our multiple playback machines — these have been resolved by the durability of the AA-3 pressure pads."

"The AA-3 is the 'state of the art' in cartridges — it meets or exceeds the specifications of the current NAB standards."



Capitol Magnetic Products  
A Division Of Capitol Records, Inc.  
1750 North Vine Street  
Los Angeles, California 90028



## New Audiopak® AA-3 Broadcast Cartridge

See the AA-3 Demonstration Booth 361 — NAB

Circle (156) on Reply Card

## Exhibit roundup: Us-Vi

### Utah Scientific

Audio-video routing switchers. **New:** Compact series switchers, control panels. **Booth 2707.**

see ad on page 113

### Utility Tower

Actual tower material, Rigid I-beam anchor, galvanized hardware, lighting equipment. **Booth 323.**

### V & B Tower

**Booth 2610**

### Thomas J. Valentino

**Booth 441**

### Van Ladder

Van mounted aerial ladder. **New:** Von mounted aerial ladder. **Booth 2804.**

### Varian Associates

Power grid tubes, UHF-TV kly-

strons. **New:** Power tetrode. **Booth 487.**

### Versa-Count

FM exciters/transmitters, FM translators, stereo generators, video processing amplifier, audio distribution amps. **New:** TV translator for VHF-UHF, RF power amplifier, stereo modulation monitor, modulation monitor FM. **Booth 2120.**

**Vega-Cetec** (see Cetec Broadcast Group)

### Video Aids Corporation of Colorado

Color sync generators, cross-pulse generators, electro isolators, editor programmers, video distribution amplifiers, burst-phase meter, H-phase meter, VIRS meter, black burst generator, party lines, video switches. **New:** Edit-oid, VIRS inserter, isolators for Sony recorders. **Booth 553.**

### Video Associates Labs

Direct-drive DC drum servo, refer-

ence field framer, **New:** Pro-Pok-I **Booth 2809.**

see ad on page 159

### Video Data Systems

Titler, character generator, digital weather system, titler/message unit. **New:** Microprocessor system. **Booth 2419.**

### Videomagnetics

**Booth 2705**

### Videomax, an Orrox Corporation

Quad video heads. **Booth 459.**

### Videomedia

VMU 44 add-on audio and video kit, VMC 100 3/4-inch videotape machine sequencer. **New:** Z-6, VM95U. **Booth 2825.**

see ad inside back cover

### The Video Tape Company

Videotape stock (all formats). **New:** Master broadcast videotape, 3/4-inch videocassettes plus an expanded

# Superior SMPTE from BTX

**4300 Reader and Video Display**

**4200 Reader and Digital Display**

**4100 Edit Code Generator**

**4400 Decoder**

BTX guarantees superior performance from 1.5 to 1200 IPS even at -18dBm or with any degree of time jitter.

BTX guarantees superior reliability and assures it with a 100-hour operational burn-in prior to shipment.

BTX guarantees time-code system compatibility with its complete line of cost-effective modular building blocks. For complete information, call:

The BTX Corporation • 438 Boston Post Road  
Weston, Massachusetts 02193 • 617-891-1239

**btx**

Circle (190) on Reply Card

# WILKINSON

## ELECTRONICS, INC.

**FM 2000 SS 2KW**

**SOLID STATE FM TRANSMITTERS**

**FM 500 SS/FM 1000 SS .5/1KW**

**SOLID STATE FM TRANSMITTER**



See us at NAB Booth 347

### FEATURES

Absolute Reliability With Multiple Amplifiers  
and Power Supplies

Low Operating Cost - No Tubes - No Filament  
Power - High Efficiency

Incomparable Exciter  
So Drift Free it Requires No Oven  
Noiseless -70db below 100% Modulation  
Distortionless .2% 20 to 15000 Hz  
Response 1/4db 30 Hz 350 KHz

Over 100 in Service

Solid — Solid State 500 Watt Power Amplifier  
Modules

Broad-banded Power Amplifiers So Stable Requires  
No External Tuning Controls

VSWR Protected With Automatic Power Reduction

Individual Power Supplies For Each Section

Unique Heat Exchanger Cooling Operates in Nearly  
Any Ambient Temperature or Altitude

Circulator Combining For Low Loss and Reliability

## Exhibit roundup Vi-Z

range of videotape duplication and distribution services. **Booth 527.**

### Videotek

Color monitors, demodulator. **New:** Demodulator. **Booth 2602.**

### Vital Industries

Total automation system, total TV production package, digital video switcher, terminal equipment. **New:** Frame synchronizer, switcher, automation. **Booth 316.**

see ad on back cover

### Vitex Division/Vital Industries Booth 2219

see ad on back cover

### Wang Voice Communications Booth 2112.

### Ward-Beck Systems

Radio consoles, transportable console, production console, television console. **New:** Intercom amplifier, intercom matrix amplifier, distribution amplifier. **Booth 489.**

### Weatheration Booth 2615

### The Webster Group Booth 2621

### Western Union Telegraph Company Booth 549

### Wilkinson Electronics

FM transmitters, amplifiers, silicon rectifiers, line surge protectors. **New:** 80 kW calorimeter dummy load, 250 W AM transmitter. **Booth 347.**

see ad on pages 36, 173

### The Winsted Corporation

Editing consoles, mobile cabinets, videotape and film storage systems, tape and film trucks. **New:** Digital editing console, portable production console, 1/2-inch videocassette storage system, dubbing packs for 1/2-inch and 3/4-inch. **Booth 2601.**

see ad on page 114

### Wolf Coach/Television Engineering Corporation

**New:** Mobile Production Unit. **Booth 503.**

see ad on page 164

### World Video

Rack mount color monitors, portable color monitors. **New:** ac/dc color video monitor, multi station intercom. **Booth 501.**

### Zei-Mark Corporation Booth 2521

# For Precision Indexing EECO MTG 550 Series Master Time Code Generators



2-79 1119

EECO's MTG 550 Series SMPTE/EBU Generators incorporate the latest state-of-the-art CMOS/LS TTL logic resulting in reduced size, weight and power requirements.

Slope and user bit input options are now standard together with new alarm features at reduced costs.

Instant reliability is assured by exclusive use of aged burned-in integrated circuits.

Four low price Models are now available.

MTG 551-NTSC

MTG 552-PAL B

MTG 553-SECAM

MTG 554-PAL M

Available from your nearest AMPEX Sales office world wide distributor for EECO Broadcast Products.

## EECO

1601 East Chestnut Avenue • Santa Ana, California 92701

Phone (714) 835-6000 • TWX 910-595-1550

Telex 67 8420

**AMPEX** Ampex is world-wide distributor for EECO broadcast products

Circle (165) on Reply Card

# Storeel is dedicated to conserving energy. Yours.

Energy conservation is much in the news these days. Like the weather, many talk about it but few do anything about it. We haven't figured how to change the weather, but we do have several systems specifically

engineered for broadcasters that both conserve energy and add efficiency. The very latest (shown installed) is called STOR-MAX.™

Save energy (yours) by converting your overcrowded film and VTR libraries to the new "Instant Access" high-density systems engineered and distributed only by Storeel. Modular Rapid Transit Storage™ maximizes units stored per square foot of floor space, minimizes retrieval time, optimizes energy efficiency.

Our many years of design and engineering pay off in solutions to your storage problems.

Call or write "The Railriders" at Storeel today for free estimate. No obligation, of course.



*Illustrated catalog of Storeel's "confusion eliminators" available upon request. Write on your letterhead or telephone for your free copy.*

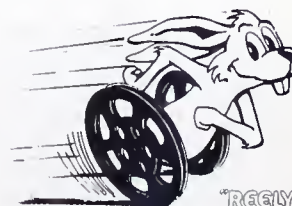
# STOREEL

CORP.

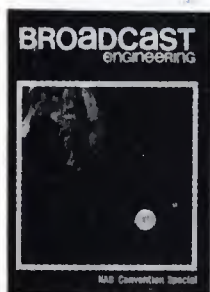
**The  
Space-Saving  
Engineers**

1993 New Peachtree Road • Atlanta, Georgia 30341 • Telephone (404) 458-3280

Circle (160) on Reply Card



March 1979 *Broadcast Engineering* 175



## Innovative products

This section includes products being exhibited for the first time at NAB-Dallas'79. The information was supplied by exhibiting companies willing (and ready) to release news of their latest offerings. Other companies, for a variety of reasons, have preferred to make the announcement at the convention. But this section of **BE** should get you started on knowing what will be available at the show this year.

Following each of the products described, a number will be included for use with the Reader Service Card at the back of the issue. When you find a product that interests you, turn to the card and circle the appropriate number.

### Retrieval system

The electronic still processor (ESP-100B) by Addo is a digital still frame storage and retrieval system designed for use by stations serving small-to-medium-sized broadcast markets.

The system is microprocessor based and can store up to 200 digital stills on-line on a fixed disc. The freeze-frame capability enables graphic artists to create stills from moving feeds such as 2-inch, 1-inch or 3/4-inch videotape recorders, 16mm film chain, live camera, network or satellite feeds. Two outputs allow fades, dissolves or super outputs.

Circle (210) on Reply Card

### Video delay lines

The model VP2075 video delay line by Allen Avionics features longer delay with flat loss of 3 dB for any delay setting. It is made up of 7 delay lines which can be switched in and out so any delay is achievable from 0 to 2.075  $\mu$ s in increments of 25 ns.

Circle (211) on Reply Card

### Diode gun Plumbicons

Amperex Electronics offers two models of diode gun Plumbicons which provide higher resolution than previously used triode guns. Dynamic beam control circuits allow greater camera mobility. The 1-inch

Plumbicon model 73XQ, is designed for EFP, studio and electronic cinematography applications and features internal bias lighting for improved lag characteristics. Model 74XQ, the 3/4-inch unit, is designed for ENG and EFP applications.

Circle (212) on Reply Card

### Metal particle tape

Ampex has developed a metal particle recording tape that is said to offer dramatic improvements in sound reproduction. The tape incorporates a binder formulation and a highly stable metal particle.

For the audiocassette, the tape is said to improve high frequency saturation capability by more than 10 dB over standard gamma-ferric oxides measured at 10 kHz and more than 5 dB over high-bias formulations.

Circle (213) on Reply Card

### Microtouch consoles

Microtouch, a line of moderately priced audio consoles, is being offered by Ampro Broadcasting. Compact packaging and electromechanical switching to replace lever key switches are featured.

The consoles are available with up to 21 inputs in 5- and 8-channel rotary and linear fader configurations with dual mono and dual stereo outputs. The unit is styled in a black matte finish panel with

anodized markings, stainless steel top, walnut end panels and a padded armrest.

Circle (214) on Reply Card

### Camera lens

The Angenieux 25x lens system is specially designed for 3/4-inch cameras such as the BCC-14, LDK-14, TK-760 and the TK-76B. The basic lens features a continuous zoom range up to 25:1, 10 to 250mm. Servo zoom and iris, manual focus and back focus adjustment are standard features. The relative aperture at short focal lengths is f/1.4 and f/2.8 at long focal lengths. An under-the-lens support bracket, sunshade and lens cover are standard.

Circle (215) on Reply Card

### ENG/EFP cases

A complete line of cases for field portable television products used in ENG/EFP applications are available from Anvil Cases. Cases for individual videotape recorders and television cameras or as combination units housing a complete ENG/EFP package are available.

The exterior is constructed of high impact ABS material, epoxy bonded to 1/4-inch plywood and finished with steel riveted aluminum edging and heavy duty steel hardware. Interiors are custom sculptured to the shape of the equipment out of high density polyfoam.

A full line of over 350 standard

# What makes these new Sintronic FM transmitters so exciting?



SI-10-T (10 Watt)

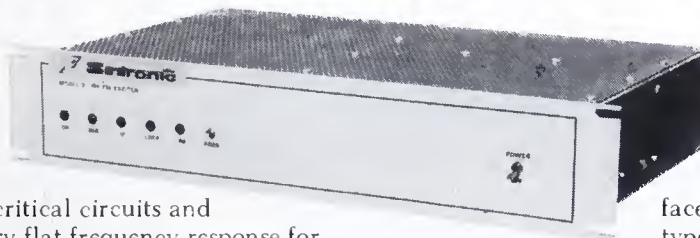
SI-F-25 (27.5 kW)

SI-F-5 (5 kW)

## Well for one thing...

The new Sintronic SI-10-E solid-state, direct-carrier FM exciter! Why? Because it does not have crystal ovens, or thermostats to burn out. It provides continuous LED monitoring of critical circuits and has low distortion and a very flat frequency response for excellent stereo and SCA operation. It utilizes a protected, regulated power supply and has a truly conservative specification throughout... We find this exciting... and the SI-10E "excites" all of our new FM transmitters too.

Our new transmitters' conservative design can also be exciting! They use stable zero-bias, grounded-grid power amplifiers, eliminating neutralization and the screen and bias power supplies. Their tuning and loading lines are really heavy duty, made for long-term reliable service. The entire transmitter's design is clean, straightforward and mechanically conservative. Standard features on all our FM transmitters include automatic step/start switching, full protection



against overload, recycling with a memory-type visual indicator that tells you the status of all critical circuits. Further, they will interface with any standard STL or wire-type remote control and have a built-in, automatic power output control.

The 1.5, 3.5, and 5 kW models each occupy a single modern style cabinet. The 15 and 27.5 kW models are housed in a single dual-section cabinet. All models are self-contained other than the RF harmonic filter and use our new "12 pulse" power supply. We find this pretty exciting stuff. If you ask us about price we think you will find our transmitters pretty exciting too!

Call or write to learn all the other exciting details of our FM transmitters—and our AM transmitters are exciting, too! Sintronic Corp., 212 Welsh Pool Road, Lionville, PA 19353. (215) 363-0444. Ask for Tom Humphrey.

**Sintronic** CORPORATION  
Sintronic is a subsidiary of Singer Products Co., Inc.

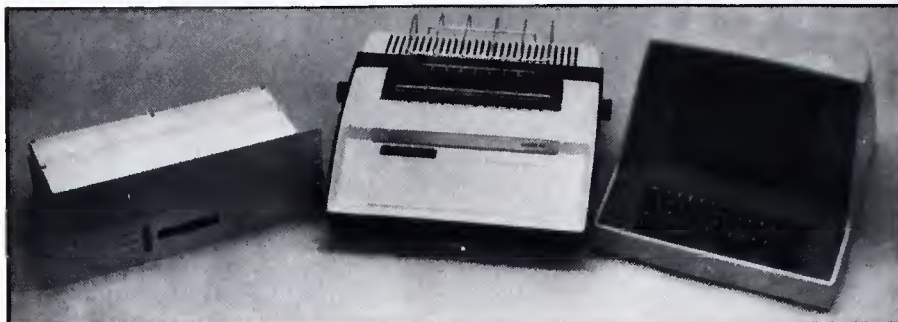
Circle (105) on Reply Card

March 1979 *Broadcast Engineering* 177

# PROGRAM LOGS PRINTED

With Your Present Automation

- FCC acceptable logs • Design your own format



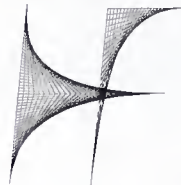
The H&F Program Logging System can automate the task of keeping accurate and easily readable program logs. The logs are printed as the programs are run so you know just what was aired and when. The system works with most existing automation systems including those by IGM, Schafer and Sparta. Call us about yours.

**Halikainen & Friends, Inc.**

101 D4 Suburban Road, San Luis Obispo, CA 93401

(805) 541-0200

NAB Booth No. 2312

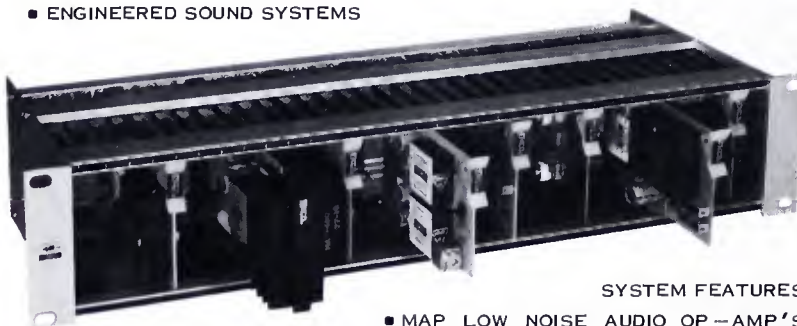


Circle (161) on Reply Card

## MAP IMPAC™ Series... Modular PC Card System

A COMPLETE LINE OF PLUG-IN PC CARD AUDIO MODULES & ACCESSORIES FOR PROFESSIONAL APPLICATIONS IN —

- AM — FM — TV BROADCASTING
- RECORDING STUDIOS
- ENGINEERED SOUND SYSTEMS



### SYSTEM FEATURES

- MAP LOW NOISE AUDIO OP-AMP'S
- SELF-CONTAINED OR REMOTE CONTROLLED OPERATION
- SOLID-STATE (FET) SWITCHING & VCA LEVEL CONTROLS
- AMPLIFIERS WITH BUILT-IN INPUT & OUTPUT TRANSFORMERS
- INTEGRAL CARD EJECTION HANDLES & KEYED CONNECTORS



**MODULAR  
AUDIO PRODUCTS**  
■ A UNIT OF MODULAR DEVICES, INC.

50 Orville Drive ■ Airport International Plaza ■ Bohemia, New York 11716 ■ 516-667-9820

Circle (162) on Reply Card

## NAB new products

cases are available for other reproduction equipment such as monitors and mixers.

Circle (216) on Reply Card

### Switcher

The ASW-100 multifunction switcher by Asaca is capable of performing all required operations for a portable field production system. The unit will operate with up to three cameras and can be powered by its own battery-pack, a 12-V vehicle battery or from 120-V ac lines.

Remote controls can be incorporated into the unit as an option enabling camera operation through multi-conductor cables with connectors provided on the rear of the unit. Synchronization pulses can be provided to any equipment requiring them through the internal sync generator.

Circle (217) on Reply Card

### Equalizer

The E950-RS Paragraphic equalizer by Audio & Design Recording is switchable between stereo six band per channel or mono 12 band. Pot. variable frequency and 'Q' with fader variable amplitude controls are offered. The entire audio spectrum is covered with each band spanning four octaves.

Circle (218) on Reply Card

### Broadcast consoles

The 2400/3200 series broadcast audio production consoles by Audio Designs and Manufacturing are modular, multi-input studio and production center units designed to be electrically and aesthetically compatible with video state-of-the-art.

Microphone and line level presentation with up to 92 microphone and 116 line level sources and two master output busses are featured. Interchangeability between equalizers, filters, limiters and noise suppressors is possible with both units.

Full four band, 14 frequency reciprocal equalizers and four independent monitor busses selectable from any of 12 sources with level controls are standard.

Circle (219) on Reply Card

### Sequential controller

Automated Broadcast Controls introduces the 1600S sequential controller for backup programming automation. The controller will

# Cassette and Reel. One Format. BCN

**50** BOSCH  
FERNSEH  
1929-1979

The economical VTR system for all applications in broadcast production and news.

1 inch type B format according to SMPTE/EBU. Excellent operational experience since 1975 in all TV standards worldwide. Brief-case sized cassette VTRs, economical production recorders, sophisticated post production systems and an automatic multicassette system - with one format. Digital techniques - slow motion, stills and video effects. The safe 1 inch format with a future.  
From Bosch.



BCN worldwide: Abu-Dhabi · Australia · Austria · Belgium · Brazil · Canada · Congo · CSSR · Cyprus · Dem. Rep. of Germany · Denmark · Fed. Rep. of Germany · Finland · France · French Guiana · Great Britain · Greece · Guadeloupe · Hong Kong · India · Indonesia · Iran · Ireland · Italy · Japan · Jugoslavia · Kuwait · Liberia · Libya · Luxemburg · Malta · Martinique · Mexico · Netherlands · New Caledonia · Nigeria · Norway · People's Rep. of China · Peru · Poland · Portugal · Réunion · Saudi-Arabia · South Korea · Spain · St. Pierre et Miquelon · Sudan · Sweden · Switzerland · Tahiti · Thailand · Turkey · USSR · USA · Venezuela

Your Video System Partner

## BOSCH

Television Systems Division

Further information available from our regional representatives, subsidiaries or head-office in Darmstadt: Robert Bosch GmbH, POB 429, D-6100 Darmstadt, Fed. Rep. of Germany · Robert Bosch Ltd., POB 166, Watford, Great Britain · Robert Bosch Corp., 279 Midland Ave., Saddle Brook N.J. 07662, USA · Robert Bosch Pty. Ltd., 69 Edward Street, Pyrmont NSW 2009, Australia · Robert Bosch Pte. Ltd., POB 4, Thomson Road, Singapore 20.

# IF YOU NEED ATTENUATORS YOU NEED THIS CATALOG!



## AUDIO AND RF ATTENUATORS TO MEET ANY REQUIREMENT

Here in one compact and informative 24 page booklet is all the data you need to select a Precision Audio and RF Attenuator for your application.

Reference Charts, Circuit Diagrams, Types and Uses, Current and Voltage Ratio Tables, Ratings, Etc., make this a handy and invaluable reference.

SEND FOR YOUR FREE COPY TODAY.

## TECH LABS, INC.

Bergen & Edsall Blvds.  
Palisades Park, N.J. 07650  
Tel.: (201) 944-2221

Circle (157) on Reply Card

# EXPAND VIDEO PRODUCTION CAPABILITY



Zoom Blow-Up/Reduction Positioner  
Shown on RCA FR - 35 Projector

## ADD A NEW DIMENSION DURING TAPE TO FILM TRANSFERS

Zoom from 1/4 film frame to 1/4 video raster — Pan & tilt to change composition. Locate film image anywhere in video picture. Create new scenes, multiple images or add titles.

Manual or Servo Models  
For 16/35mm Film & 35mm Slide

## ALSO

- CINE LENS ADAPTORS FOR 3 TUBE PRISM TV CAMERAS
  - CONTINUOUS SHUTTER KIT for TP-66,
  - ASSURES "CONSTANT COLOR"
  - MICROSCOPE and ENDOSCOPE ADAPTORS
  - CUSTOM OPTICAL SYSTEMS
- the WARREN R. SMITH CO.  
8-09 Fern St., Fair Lawn, N.J. 07410  
(201) 797-2579  
Circle (158) on Reply Card

## NAB new products

pand to 32 events from 16. Up to nine stereo sources can be controlled with one special event. The unit is part of the ASSIST™ backup program automation system.

Circle (220) on Reply Card

### Minicomputer system

Automation Electronics' Autotron Star System is a totally in-house minicomputer system designed for sales, traffic, management controls, and receivables for radio broadcasters. The system can be expanded to include general ledger, accounts payable, payroll and fixed asset depreciation modules.

Optional modules are also available including a word-processing system, a cross-index system to prepare a music log and an intercomm module which provides interstation communications.

Circle (221) on Reply Card

### Control system

The BTX Corporation is introducing model 4600 SMPTE tape controller. The programmable audio production system controls all functions of video-audio recorders. It accounts for 30 sequential events at one time. Features include the ability for replaying material before the final recording is made and the ability to learn plus reassemble.

Circle (222) on Reply Card

### Audio step generator

The audio step generator by Bald Mountain Lab features nine precise crystal controlled frequencies which correspond to those used in proof of performance measurements. The frequencies are pushbutton selectable.

Frequencies can be sequentially stepped one time, or repeatedly, with rates ranging from one second to 1000 seconds. The unit is 1 3/4-inch rack mountable and features a front panel output jack.

Circle (223) on Reply Card

### FM stereo monitor

Model FMS-2 FM stereo monitor from Belar Electronics offers operational ease and a high order of magnitude and specifications. The unit features two independent modulation meters for simultaneous monitoring of left and right channels. Two autoranging volt meters

provide automatic measurement LED display of channel separation, crosstalk, subcarrier suppression and noise.

Circle (224) on Reply Card

### Generator prompter

Beston Electronics is offering a character generator system for prompting. The Data-Prompter features continuous variable roll speed with manual control and an automatic mode, auto-time.

The auto-time has an over-ride to speed up or slow down the roll. When the over-ride is released the system will recalculate the roll speed required to make the spot time out.

Circle (225) on Reply Card

### Load resistor

The Termaline RF load resistor by Bird Electronics is designed for use with low power transmitters and features a rugged thermal design. Models are available with 1 5/8-inch or 3 1/8-inch flanged or unflanged input or QC cable connectors. VSWR is 1.1 from dc to 1000 MHz.

Circle (226) on Reply Card

### Program automation

The Econo Control 16 by Broadcast Electronics provides broadcasters with many of the advantages of the full Control 16 but at a lower cost. The microprocessor system features 2000 program events and 10 repetitive compare times.

Full data entry error sensing, four remote alerting relays and completely interchangeable universal source cards are standard features.

Circle (227) on Reply Card

### Rotary wipe

With the Cox 360 rotary wipe from Broadcast Video Systems the start of any wipe can be positioned using the joystick positioner. The speed of rotation and the extent of wipe can be changed for a variety of shapes along with the four standard shapes. The optional effects amp module allows stand alone operation of the unit.

Circle (228) on Reply Card

### Editing keyboard

CMX Systems expanded/dedicated

keyboard incorporates a new approach to the logic of videotape editing sequences. The keyboard is re-structured into a more organized, human engineered layout, and the software has been improved so that simpler commands are necessary from the program editor.

Operational parameters are directly accessible through the keyboard without the need of lengthy initialization dialogue. The E/D keyboard is applicable to existing CMX Systems 340X editors.

Circle (229) on Reply Card

#### Dielectric cable

The Flexwell cable from Cable-wave Systems is a copper corrugated air dielectric cable for high power, low loss broadcast application.

A corrugated tubular copper center conductor, high density helix dielectric, corrugated copper outer conductor, polyment and black polyethylene jacket are included. Low insertion loss, high power and mechanical stability are features.

Circle (230) on Reply Card

#### BNC connector

Cambridge Products introduces a BNC coaxial connector for 8281. It is a fast-fit, easily assembled 1-piece connector. It requires no

special tools; just trim the cable and screw it on. The connector also is available for RG-58 and RG-59 cable.

Circle (231) on Reply Card

#### Compositing system

UltiMatte, a tool for compositing television scenes, is being marketed in the New England states and New York by Camera Mart. The system is used in production where a live video camera is on the foreground and the background comes from a previously recorded tape, or where live video is used on foreground and background. For post production, the system composites images recorded on film onto tape. The composites are made during film-to-tape transfer.

Production features include shadow control where it is possible to reproduce, darken, lighten or eliminate shadows. A surface gloss control allows for minimization of reflections of the blue screen from glossy surfaces.

Circle (232) on Reply Card

#### Zoom lens

Canon's model P12X18B W/PP zoom lens is designed for 30mm plumbicon TV cameras such as the HK-312 and the TK-47. The focal

length is 18mm to 216mm with a maximum f-stop of 2.1. The lens features a built-in pattern projector and extender.

Circle (233) on Reply Card

#### Lubricated tape

Q17 high output, low noise (HOLN) back lubricated tape by Capitol Magnetic Products has been designed for use with the AA-3 broadcast cartridge. The tape uses ferric oxide and is bias compatible with the industry standard lube tape and Capitol's Formula 17 as used in the A-2 broadcast cartridge.

A low friction binder on the oxide side results in smoother tape motion regardless of the tape pack length. The tape is slit on precision equipment to eliminate skew and weaving, assuring no tape-related phase instabilities.

Circle (234) on Reply Card

#### Wireless microphones

The Dynex option offered by Cetec Vega for their wireless microphone systems expands the dynamic input range of the microphone and eliminates the need for continuous mic gain adjustment. The option is especially suited for live musical recordings and applies to hand-held, lavalier and pin-on models.

Circle (235) on Reply Card

## OUR BEAM DELIVERS

COLOR or B & W  
Television Signals  
with Audio



INFRARED OPTICAL  
TRANSMITTER sends Audio & Video  
up to 1/2 mile. No cables to be laid.  
No license is required. Any 1V (p-p) Signal  
will do, no matter the source. Industrial  
& Broadcast Rated Systems available.

from **\$4,415**

Dealer Inquiries Invited 805-967-0423



AMERICAN LASER SYSTEMS, INC.

SANTA BARBARA, CALIFORNIA

106 JAMES FOWLER ROAD, GOLETA, CA 93017

Circle (163) on Reply Card

# AGFA

**When performance is more important than price**

There is no one "best" videocassette. No one "best" TV set. The "best" is the cassette that delivers to you recordings of far superior quality. Well-defined, crisp, brilliant colors with absence of drop-outs. Finding out which is that best cassette means trying them all. So maybe you ought to try ours also. Although we are just coming on the market now, it is the U-Matic that thousands of sophisticated and demanding European connoisseurs have picked as their unquestioned super-duper mastering tape for years. Not a look alike U-Matic. Or an export version of the tape. Just plain real AGFA.

This exacting tape is available to you on a limited basis exclusively from DIMENSION 3. It just might be that for you the best U-Matic is yet to come. AGFA from DIMENSION 3, at \$26.00 an hour (KCA-60).

## Another House Brand Special:

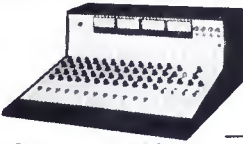
1/2 INCH VIDEO CASSETTE - 1 HOUR

**\$9.50** Unconditionally guaranteed brand new, sealed factory fresh • high-energy chromium dioxide polyester backed Sony type KCA-60 Stop-frame

DIMENSION 3 RECORDING CO.  
Box 326 NEW MILFORD, N.J. 07646  
(201) 265-5599

Circle (166) on Reply Card

**FREE CATALOG & AUDIO APPLICATIONS**



CONSOLES  
KITS & WIRED  
AMPLIFIERS  
MIC, EQ, ACN, LINE,  
TAPE, DISC, POWER  
OSCILLATORS  
AUDIO, TAPE BIAS  
POWER SUPPLIES

**OPAMP LABS INC.**  
1033 N. SYCAMORE AVE.  
LOS ANGELES, CA. 90038  
(213) 934-3566

Circle (188) on Reply Card

**BUILDS STUDIOS**

**DYMA** AUDIO CONSOLES  
STUDIO CABINETRY

**DYMA** BOX 1697  
TAOS, N.M. 87571  
(505) 758-8686

Circle (189) on Reply Card

**To get more information...**

on items advertised or described in this publication, use the Reader Service Card.

## NAB new products

### Battery charging system

A ReFlex 20 nicad battery charging system for ENG, EFP, video and film cameras is available from Christie Electric. The system provides a full charge of completely discharged nicad packs in 12 to 20 minutes at a 90 to 97% net charge efficiency. A "Trough Voltage" sensor as well as multiple protection circuits are provided to prevent overcharging.

Circle (236) on Reply Card

### Election reporting system

The TTC-400 television titler controller by Chyron Telesystems is an interfacing, communications, and controlling microprocessor which allows a computer to control and feed data to the Chyron graphics and titling system.

Automatic computer control switching allows normal operation except during time when data is being transmitted from the computer to the Chyron. The remote computer control allows the computer to be controlled from the data entry terminal connected to the TTC-400 or the optional light pen device.

Circle (237) on Reply Card

### Editing console

The U/F-16 upright/flatbed editing console by Cinemo Products employs coaxial sprocket wheel assemblies and six terraced horizontal feed and take-up plates accepting one 16mm picture track and two 16mm magnetic sound tracks.

A hollow polygon prism system for continuous flickerless projection on an 8"x10" screen and crystal-controlled sync sound speeds of 24 and 25 fps, with infinitely variable speed control from 0 to 240 fps, forward and reverse are featured.

### Portable mixer

The AD031 Micromixer by Coherent Communications is a portable mixer suited for location sound recording. The unit is equipped with eight inputs (extendable to 18) and features microphone or line switching. The system is battery powered and completely self-contained and features XLR connectors for input and output connections.

Circle (238) on Reply Card

### Monochrome monitors

The electronics division of Cohu offers the DM series of monochrome TV monitors for surveillance, industrial, computer, educational and broadcast applications. Three picture tube sizes are featured: 9-inch, 14-inch and 17-inch. Available options include CRT phosphors, remote contrast and brightness control, external drive capability, rack slides on the 17-inch model, a tally light on the 14- and 17-inch models, a yoke mount on the 17-inch model and an underscan switch.

Circle (239) on Reply Card

### Video frame store

A tool for research or industrial inspection, the model 274 video frame store by Colorado Video Incorporated, allows single frame freezing of television information in a digital memory for computer processing, decision making, and redisplay.

A/D and D/A converters and a solid-state memory provide versatility of either video in with video or digital out, or digital in and digital or video out. The unit is available with either 256 x 256, or 256 x 512 picture elements and can be interfaced with minicomputers or other digital processing equipment.

Circle (240) on Reply Card

### Camera system

Commercial Electronics introduces the CEI 310 modular broadcast color television camera system. The camera head contains a prism optical assembly with bias light and 4-position filter wheel. High-gain, low-noise pre-amplifiers deliver a S/N of -52 dB. The camera head can be operated up to 600 ft from its electronics unit. The camera can be a portable EFP camera, a studio systems camera or a studio self-contained camera.

Circle (241) on Reply Card

### Computer animation

Modifications of Computer Image's Caesar and Scanimate computers now allow all the animation capabilities of the systems applicable to full color inputs, such as original color artwork, slides or previously taped live action scenes.

The process preserves the origi

nal color without posterization or fading to monochrome. Rotation and perspective manipulations are possible.

Circle (242) on Reply Card

#### Sync generator

Consolidated Video Systems is marketing an automatic VTR advance sync generator that reduces the possibility of excess vertical blanking with broadcast-type time base correctors (TBCs).

Designated the AVA (automatic vertical advance), the unit will operate as a stand-alone accessory for most broadcast TBCs. The unit monitors offtape vertical sync, compares it with TBC vertical sync and generates a steering signal. The AVA fits in a standard, 19-inch rack.

Circle (243) on Reply Card

#### Editing control systems

The ECS-100 series Superstick by Convergence now includes 3/4-inch helical and 1-inch type "C" videotape recorder interfaces. The Superstick controls tape motion in both the record VTR and up to three source VTRs.

Pushbuttons control preview edit, perform edit and replay. The CUT/LAP option allows creation of fades to or from black and soft edit transitions between scenes using a single source VTR. Other features include edit decision listing, special effects switching, A/B rolls, time code and automatic animation.

Circle (244) on Reply Card

#### Production switcher

Four buses and two mix-effects systems with separate pattern generators and positioners are features of the model 6112 production switcher by Crosspoint Latch. The mix-effects function is possible because each system has its own re-entry.

A downstream keyer and two additional keyers are standard. Other features include pattern modulator, colorizer, border, soft wipe, intercom, toggle, auto and manual iders.

Circle (245) on Reply Card

#### Switching unit

The D-4300 series of video and

audio switching units by Datatek are designed for auxiliary switcher and small routing switcher applications.

Available as 6x1 video, 6x1 audio, 16x1 video-audio, 20x1 video and 20x1 audio, the units feature their own power supply. Applications include input preselecs to production switchers to expand their capacities, switching inputs to Vectorscopes and monitors, adding preview busses to existing switchers and VTR input selection.

Circle (246) on Reply Card

#### Time code reader

Datametrics is offering a compact time code/user bit reader. The 9"x2 1/2"x10" reader has an all speed operation plus forward and reverse. It displays the time information or user bits. Other features include front panel switches and logic compact outputs.

Circle (247) on Reply Card

#### Time base corrector

Digital Video Systems is offering model DPS-1, a frame store/oblique timebase corrector/oblique synchronizer. All systems operate at 4X subcarrier with digital controls. Printed circuit board modules, housed in a wire wrapped mainframe, are interchangeable between systems for longer product life.

Circle (248) on Reply Card

#### Disc recorders

Eigen Video is marketing three 6 MHz high-resolution videodisc recorders which are said to provide 50% more detail in recording than the standard 4 MHz disc recorder.

The slow motion recorders have 20 (1200 fields) or 10 (600 fields) capacity. Model 16-05 has 500-track capacity with each track holding one TV field. All units feature a continuous loop format, with odd numbered tracks recorded when the head is stepping to the center of the disc and the even tracks recorded in the outward direction.

Circle (249) on Reply Card

#### Memory control system

The Plexus 1000 memory control system by Electro Controls is capable of many configurations including a memory only record and play

back system and a memory only system with space for future manual single or two scene preset.

All control panels are modular plug-in units and an optional CRT display provides complete cue and sequence display with preview capability to simplify play back, sequence or intensity modification. The manual or memory control modules or both may be used to record cues.

Circle (250) on Reply Card

#### Dynamic microphone

Electro-Voice's model D056 is a shock-mounted omnidirectional microphone for handheld broadcast and sound reinforcement applications. The main acoustic cavity and the diaphragm/voice-coil assembly are isolated as an integral unit from the case which enhances shock isolation. Frequency response extends to 18,000 Hz with slight emphasis in the 2,000 to 12,000 Hz range which allows vocal qualities without low frequency noise interference.

Circle (251) on Reply Card

#### Surveillance monitor

Model ESM-914, offered by Electrohome, is a 9-inch surveillance monitor designed for a variety of applications. The monitor features 10 MHz frequency response, simplified operator control, rear control, externally adjustable to permit scan adjustment from 80% to 105% of CRT size and a 750 line resolution.

The model can be used for security surveillance, industrial process surveillance, data display systems and tape editing systems.

Circle (252) on Reply Card

#### VHF transmitter

Electronics, Missiles and Communications offers a VHF transmitter which is internally diplexed and therefore more compact than previous models. Designated model TTV-5000B, the unit is a 5000 W highband transmitter and features two amps and medium power output. All components are solid-state except for the IPA and the PA which are tetrode tubes.

Circle (253) on Reply Card

## NAB new products

### Central receiver

A central receiver designed to minimize the problems of weak signals and distortion related to ENG has been introduced by Farinon Video. The receiver has a dynamic range of 82 dB and can operate with a minimum system fade margin of 20 dB for transmission distances up to 300 miles.

Designated the FV2CR, the unit operates from 1.99 to 2.11 GHz and has 21 synthesized, phase-lock channels for remote or manual selection.

Circle (254) on Reply Card

### Tape eraser

Fidelipac's new tape eraser, Blank-It, is an all-format magnetic tape eraser. It is said to have a longer duty cycle than any other hand-held unit, making it a good choice for long-term field taping sessions. The eraser features thermal overload coil protection to prevent burnout and a no-mar work surface.

Circle (255) on Reply Card

### Videotape

The H-621 high energy 1-inch Beridox broadcast videotape by Fuji Photo is specially designed for rugged performance in editing. The estimated tape life is 2000 passes. Its audio-video S/N is 0 dB (relative to 621 reference roll). The tape is capable of stop motion exceeding one hour.

Circle (256) on Reply Card

### Camera lens

The 17x9 ERM lens offered by Fujinon Optical comes with a built-in 2X extender. The focal length of 1X is 90-150mm. The lens can be used for EFP or ENG.

The lens is treated with EBC (electron beam coating). The process reduces lens reflection and veiling glare and allows higher light transmission.

Circle (257) on Reply Card

### Antenna diversity systems

The Swintek antenna diversity systems by Alan Gordon Enterprises are designed to incorporate the most advantageous features of space diversity application to radio microphone operation.

Two ANT-2 receiving antennas virtually eliminate dropouts and buzz zones and other forms of interference are significantly reduced by using dB-S equipped systems. Gain dB per channel of the Mark 9 is 3 dB while the Mark 9B is 12 dB. Frequency range is 10-250 MHz for the Mark 9 and 10-470 MHz for the Mark 9B.

Circle (258) on Reply Card

### Digital antenna monitor

Model CMR digital antenna monitor by Gorman-Redlich is remote controllable and FCC type approved. The true ratio readout is a factor of 10 more stable than instruments that measure normalized amplitude. An optional repeater-controller is available for hardwire remote control and readout via multiconductor cable at distances of up to 1500 feet.

Circle (259) on Reply Card

### Shot-gun microphone

An ultra-directional shot-gun microphone, model KMR 82i, is being marketed by Gotham Audio. Smooth frequency response and a directional pattern which is said to differentiate pattern vs. frequency less severely than in the past.

The microphone has a charcoal matte finish and accessories include a foam wind screen, elastic suspension, wind-proof blimp and active handle for hand-held use. A 9-V battery is used for the 48-V phantom powering converter.

Circle (260) on Reply Card

### Flash strobe

The Great American Market is offering a self-contained special effects random flash strobe unit for concert, television special, club and disco application.

The unit may be hung behind scrims for star effects, interspersed with band gear, hung in the air for fireworks effects or provide a glitter effect for bandstands. Designated the Star Strobe, the unit is mounted in a Plexiglas tube and plugs into any 110-V line.

Circle (261) on Reply Card

### Tri-band amplifier

Gregg Laboratories offers Series 2530, a tri-band audio processing

amplifier designed for AM, FM and TV broadcast transmission and recording applications. Filters and gain control amplifiers to process the audio three bands are featured to eliminate gain control effects. Parameters which determine the sound are controlled through front panel controls.

Circle (262) on Reply Card

### Portable receiver

HM Electronics' WM 152 flat pack portable receiver can be operated on four 9 V Alkaline or four Nicad rechargeable batteries. The auto-lock detection feature prevents drift and distortion. Other features include a 95dB dynamic range; receiver and transmitter power on LEDs and a meter indicator for VU, RF and internal battery status condition.

Circle (263) on Reply Card

### Digital telemetry

Hallikainen & Friends announces the TEL 172. The digital telemetry converts the Moseley PBR-30AW or PBR-30AR to digital metering transmission.

The system consists of five printed circuit boards that substitute directly for the metering oscillator, audible metering processor, SCU metering processor, metering demodulator and the analog meter. The local display is mounted in the transmitter control unit and it duplicates the readings displayed by the studio control unit.

Circle (264) on Reply Card

### FM transmitter

The 25 kW FM transmitter by Harris, designated the FM-25K, features just one high gain tetrode tube and a wide bandwidth solid-state IPA. Features include solid-state control logic, automatic power control, full status lights and simple remote control capability.

Circle (265) on Reply Card

### Color camera

The SK-96 convertible camera from Hitachi Denshi features a die-cast housing. Several lens options are available for hand-held or studio use. The camera is suited to equip a remote van by using a 22:1 zoom lens on the studio/field mode

and a 14:1 portable lens on the hand-held configuration. The color camera has internal triax.

Circle (266) on Reply Card

### **CART player**

IGM introduces the Information Retrieval Instacart, a new version of the broadcast Instacart. The information unit can play any or all of its cartridges simultaneously, each of a differing output. This enables a station to lease out separate information cartridges to advertisers for telephone access by listeners.

Circle (267) on Reply Card

### **Audio mixer**

The Industrial Sciences model 702 audio mixer is a 10 input, two output, audio mixer designed to compliment the model 902 video production switcher. Each input channel features equalization, fold-back/echo send, CUE and muting capabilities and may be selected on either one or both of the output channels. A built on calibration oscillator is provided for testing and level-setting purposes.

Circle (268) on Reply Card

### **ENG camera**

Model HL-78B is a self-contained portable ENG camera offered by Megami Electronics. State-of-the-art performance is provided in the areas of sensitivity, signal-to-noise ratio and low power requirements.

Standard features include rapid auto white balance, +9 dB/+18 dB added video gain, genlock, adjustable horizontal and vertical blanking pulse widths and a +12 V attachable battery power supply.

Circle (269) on Reply Card

### **Pointer-tracker**

Interand's Telestrator pointer-tracker unit permits the operator to insert a movable symbol instantly into any video image. Pushbuttons are used to select symbols which automatically appear in the video scene at the point where the stylus touches the image. Two units are available: the Mark I will accommodate six pre-programmed symbols while the Mark II accommodates 12 symbols.

Circle (270) on Reply Card

### **Audiocartridge machine**

International Tapetronics offers the Series 99 audiotape cartridge machine. The Series 99 utilizes computerized control and solid-state electronics and mechanical features to provide reel-to-reel sound from cartridge tapes.

Circle (271) on Reply Card

### **Studio cameras**

The IVC-7005 studio camera by International Video Corporation is an improved version of the IVC-7000. Improvements include a high brightness, flat-faced 7-inch viewfinder; preamplifiers; and a wire intercom.

The IVC-7005P is an updated EFP camera with diode gun tube capability coupled with an instantaneous beam correction system for elimination of specular highlights. Horizontal blanking width is 10.6  $\mu$ s maximum.

Circle (272) on Reply Card

### **Lighting control**

The Performer lighting control console by Kliegl will interface with any solid-state dimmer system presently available. The unit is available in 32, 64 and 96 channels of control with either 100 or 200 memories and features a manual split dipless crossfader, two timed faders, 10 group master controls with grand master, display mimic, integral back-up matrix and loop, delay and auto follow functions.

Circle (273) on Reply Card

### **Audio console**

The Monogram series audio consoles from LPB features 5-mixer mono and stereo models using the mother/daughter board plug-in. The all input channels utilize maximum input flexibility. The audio console includes necessary functions such as built-in monitor; cue; headphone amplifier; and using relays.

Circle (274) on Reply Card

### **Studio monitor**

Model 4313 monitor/loudspeaker system by James B. Lansing Sound is designed for control room, mix-down facilities and other profession-

al applications. The system features a low frequency driver and system design utilizing in-line mounting of transducers.

All components mount directly to the baffle panel and can be removed from the front of the walnut finished enclosure.

Circle (275) on Reply Card

### **Equipment carrier**

Lee-Ray Industries introduces a video equipment carrier that weighs 20 lbs. The body is welded tubular steel. It comes equipped with an adjustable handle and 16-inch spoke wheels with semi-pneumatic tires. A 1-year limited structural warranty accompanies the carrier.

Circle (276) on Reply Card

### **Color monitors**

A line of color monitors offered by Lenco features high resolution, shadow-mask precision and in-line CRTs. Available in a 14-inch, 19-inch or 23-inch screen, all monitor functions are completely remote controllable up to 1000 feet. Standard features include A, B and RGB inputs and a comb filter which provides a 6 MHz video bandpass.

Circle (277) on Reply Card

### **Filtering systems**

Kleanline electronic filtering systems by Lightning Elimination Associates are designed to protect computers and microprocessor controlled equipment against surges, spikes, lightning and RF disturbances.

Standard features include instant response, absolute protection, neon status indicator, bi-polar protection and bi-directional protection.

Circle (278) on Reply Card

### **Film cleaner**

Lipsner-Smith has developed the CF200 Micro-Perfect film cleaner with non-evaporative drying. With the CF200 process nothing touches the film but filtered cleaning/conditioning solution.

This new model is designed for use in film and microfilm libraries, media centers, TV stations and motion picture labs. The CF200 machines are available to clean 8mm-105mm film, as well as micro-

## NAB new products

film on either reels or flanges.

Circle (279) on Reply Card

### Camera pedestal

Vinten introduces the Fulmar pneumatic pedestal type 702. The Fulmar provides a low operating height of 21 in. to a full extended height of 58½ in. The pedestal incorporates center ring control for both steering and elevation. Tiller steering is dispensed with and the cameraman can crab, or steer, and adjust camera height by precise center ring control. The Fulmar uses the triangular base, a 2-stage pneumatic ram and a 3-stage tube assembly.

Listec Television Equipment distributes Vinten products for the US market.

Circle (280) on Reply Card

### Monitor and remote control

The Logitek DIMARC 30/15 is designed to operate over a single voice-grade phone pair. The DIMARC 30/15 provides 30 control functions along with 15 simultaneous metering functions, plus 40 on/off status indicators.

Each metering function is individually displayed at both ends of the system. Calibration is accomplished by thumbwheel controls.

Circle (281) on Reply Card

### Generator/reader/synchronizer

The MCI AutoLock is designed to provide a SMPTE/EBU code synchronizer for all MCI tape machines. The AutoLock locks combinations of audio/audio, video/audio and film/audiotape machines together and will generate the code required.

The unit is microprocessor-based, needs no wide band amplifiers for slave, the offset range is limited only by the length of tape and it has NTSC color code capability.

Circle (282) on Reply Card

### Radio cartridge system

3M's Magnetic Audio/Video Products Division is offering the Centra-Cart Radio Cartridge System. The system consists of a special cartridge, new magnetic tape and play/record equipment. The endless loop cartridge system allows the

recorder/player to optimize tape alignment and head-to-tape contact.

Circle (283) on Reply Card

### Character generator

3M Mincom Division introduces a dual microprocessor character generator. In addition to two high-resolution channels which can be mixed, the D-8800 offers internal storage of up to four type fonts, proportional horizontal spacing, pre-programmed roll/crawl and selectable mask position.

Other features include centering on line-by-line or page-by-page basis, eight color character-by-character control and an interactive control panel which instructs the new operator through system operation.

Circle (284) on Reply Card

### Graphics system

The VISTA 80 Graphics System desk top model from MPB Technologies is a 2-channel microcomputer controlled character generator and graphics system. It permits keyboard control of eight color, multiple-style character displays, graphics, logos and their storage and recall from discette. The two channels can be used independently or they can be mixed to produce special overlay effects. Both channels can be controlled by a remote computer.

Circle (285) on Reply Card

### TV interval timer

Marconi Instruments offers a television interval timer which provides critical measurement of H and V blanking. Designated the model 2920, the timer provides digital readout of up to 15 parameters at the touch of a button. Front panel selection monitors any parameter changes.

Circle (286) on Reply Card

### Effects unit

MICMIX Audio Products announces additional features of the Dynaflanger. The control voltage tracking reversal feature is utilized in all modes. CV tracking reversal allows an increase in control voltage to cause either a higher or a lower fundamental flanging frequency in the output.

Another addition is a front panel

switch that allows the unit to operate in either the normal flange mode, the direct (bypass) mode or the delay-only mode.

Circle (287) on Reply Card

### Time base corrector

Micro Consultants is offering a digital synchronizer/time base corrector which is capable of synchronizing any non-synchronous NTSC TV signal and time base correct direct record and non-phased video-tape recorders.

Standard features include look-ahead velocity compensator, sync pulse generator, drop-out compensator, diagnostic store analyzer and switch-selectable blanking of VITS and VIRS.

Circle (288) on Reply Card

### Signal synchronizer

The video signal synchronizer 2525 by Microtime will correct VTR signals from no lock or V-H lock, non-synchronous or synchronous, direct or heterodyne ½-inch helical through 2-inch quad. The unit includes line error detection; field one, field two or frame freeze; for digital video effects applications, a RS170A sync generator for improved lockup and interfacing with any switcher; Hetrocolor processing provides optimum performance for color under signals.

Standard features include H-phasing for output timing control; auto freeze or black selectable and a low error rate computer memory.

Circle (289) on Reply Card

### Remote terminal

The model MRC-1 microprocessor remote control from Moseley Associates features programmable command functions and status input for latching/following and NO/NC telemetry mapping and keyboard calibration. Full tolerance alarming is standard. Up to 64 command lines, 32 status and 32 telemetry channels, nine sites and automatic logging are available.

Circle (290) on Reply Card

### AM transmitter

McMartin's BA-5K2 is an addition to, not a replacement of, the 5 kV AM transmitter. The AM transmitter is a single ended, 3-tube mode

oused in a single cabinet.

The unit features modulation capability, a 12-phase power supply, two crystal controlled oscillators, LED status indicators and full metering.

Circle (291) on Reply Card

#### **Cartridge head degausser**

The Recorder Care Division of Fortronics announces a broadcast cartridge degausser designed to remove residual magnetism from the heads in broadcast cartridge machines.

The QM-380 develops a magnetic field of 400 gauss which degausses heads regardless of the type of material from which they are fabricated.

Circle (292) on Reply Card

#### **AM processor**

Orange County Electronics announces the VS-1 Stressor which contains a PEQ Parametric Equalizer module. The complete processing system includes the separate functions of peak limiter, compressor with adjustable ratio, threshold, release time and expander/noise-gate.

Circle (293) on Reply Card

#### **Equalizer**

The Orban 627A is a quasi-parametric equalizer that includes an active balanced input, optional transformer balanced output and extensive RF suppression.

Other features include equalization technique, the high- and low-pass filters, the graphic EQ controls, the broad tuning range and the overload indication.

Circle (294) on Reply Card

#### **Color camera**

Panasonic self-contained ENG color camera, model WV-3800, is equipped with a 1-inch stripe filter integrated vidicon tube that produces 250 lines horizontal color resolution.

The VSD color camera also is equipped with a full system operation and has available optional remote control unit and 5-inch viewfinder.

Circle (295) on Reply Card

#### **FM broadcast antennas**

Phelps Dodge Communications ex-

pands its series of circularly polarized FM broadcast antennas by adding three models, SPC-1, SPC-2 and SPC-4.

Each antenna features lower Q than previous designs. They have a VSWR of 1.1:1 for approximately 500 kHz, 2½ times the bandwidth of the standard circularly polarized low power and high power antennas.

Circle (296) on Reply Card

#### **Transmission system**

The ATS-11 automatic transmission system by Potomac Instruments is designed for automatic monitoring and control of standard broadcast transmitters utilizing directional antenna arrays. The system can accommodate antenna arrays of up to 12 towers with three separate directional patterns.

The system automatically adjusts modulation and power and continually compares antenna monitor and other specified parameters to preset limits. Transmitter parameters, common point current, antenna phases, and current ratios are continually monitored.

Circle (297) on Reply Card

#### **Audio mixer**

The QRK BroadKaster utilizes slide attenuators for audio mixing and master controls. The unit is contained in one cabinet; all the electronics of the 4-fader mono-stereo audio mixer are constructed on printed circuit boards. Each fader has two switchable audio inputs.

The normal operating output level of the console is 8 dBm across 600  $\Omega$  but distortion-free operation will occur to 18 dBm output level.

Circle (298) on Reply Card

#### **Color bar identifier**

The QSI Systems CB-8000 color bar identifier is a color bar generator combined with a character generator and audio signal source.

The video signal is standard NTSC color 525/60 sync with color bars generated in accordance with EIA-RS-189 specifications. The audio generator provides a 400 Hz tone from 600  $\Omega$  balanced, transformer isolated output at a full level of +18 dBm.

Circle (299) on Reply Card

#### **Television transmitters**

RCA Broadcast Systems has introduced a series of lowband and highband VHF television transmitters which feature the latest advances in solid-state design techniques. The transmitters are available for operation on all color broadcast standards including NTSC, SECAM, PAL-B and PAL-M.

Circle (300) on Reply Card

#### **Turntable preamps**

Features for the Ramko Research ESP-38 turntable preamps include pushbutton activated scratch, brilliance and rumble filters and a mono output push button. These push buttons are located on a front panel plate that may be removed and mounted remotely from the unit. A remote turntable start/stop is built in.

Circle (301) on Reply Card

#### **Color telecine**

Rank Precision Industries offers a flying spot Cintel color telecine with digital frame store. The 3B flying spot telecine offers the same transport options for 16 and 35mm film or slides in color or mono (positive or negative).

Circle (302) on Reply Card

#### **Videocassette recorder**

Recortec announces the model HBU-2860 ¾-inch VCR. The unit is a Sony VO-2860 recorder which has been modified by tripling its normal scanner speed and increasing the linear tape speed by the same factor. It uses standard ¾-inch videocassettes.

Features include quad quality without banding, two audio tracks, full editing capability and compactness.

Circle (303) on Reply Card

#### **Speech processor**

Research Technology Incorporated has developed a speech processor for use with film viewing systems. Quik-Trac delivers modulated voice tones at 48 frames per second. Quik-Trac is offered as a factory-installed option on the TV-120, Evaluator, Pulsar, Omega, Omni and the Edette self-drive previewer.

Circle (304) on Reply Card

### Audio console

Rockwell-Collins introduces a stereo audio console, the 212R-1. The console provides 30 inputs to 10 mixers, all medium to high level, balanced. Eight microphone pre-amps can be accommodated within the console, providing eight mono or four stereo mic channels.

Headphone and monitor amplifiers can be driven by either program line, the mono mix channel, the cue buss or one of two external sources. Front panel level controls are provided for headphone, cue and monitor amps.

Circle (305) on Reply Card

### Turntable

Russco Electronics announces a variable speed turntable. The turntable utilizes the belt driven capstan and has a servo control mechanism. The turntable is capable of varying 10% over or under the speed.

Circle (306) on Reply Card

### Transmission line

The C "K" model by SWR is a high performance rigid transmission line which dissipates heat from the transmitter to the antenna. A thermal probe which is built into the connector eliminates hot spots and increases the life of the line itself.

Circle (307) on Reply Card

### Fresnel lens spotlights

A smaller, lighter line of fresnel lens fixtures manufactured by Ianiro in Italy are being marketed by The Stanley Schwartz Company in the US.

Designated the Bambinos, the units are available in 2000 W, 5000 W and 10,000 W configurations. The 2000 W spot, model 3302, has a 6-inch lens and weighs 14 lbs. The 5000 W spot, model 3505, weighs 24 lbs and features a 10-inch fresnel lens. The third unit, model 3701, is the 10,000 W spot and features a 14-inch fresnel lens. It weighs 38 lbs.

Circle (308) on Reply Card

### Satellite terminal

The METeorological SATellite Terminal (METSAT) by Scientific-

Atlanta consists of an orbital programmer, a receiver, an elevation/azimuth pedestal and an 8-foot reflector with feed and downconverter.

The orbital programmer accepts inputs of satellite orbital elements and calculates the satellite trajectory. Orbital data for as many as 10 polar orbiting satellites can be stored and signals are optimized by front panel controls.

Circle (309) on Reply Card

### Communication headsets

A line of Phantom powered communication headsets designed for interface with existing Western Electric circuitry have been introduced by Setcom.

Model 5-TV1 is a single-speaker cameraman's unit with an all-plastic, adjustable headband. The fully adjustable stainless-steel boom can be rotated through 360° with no exposed microphone cable.

Model 5-TV2, the dual speaker director's headset, features a second speaker that allows monitoring a program and is terminated with a twin-pin connector.

Circle (310) on Reply Card

### Effects generator

Shintron offers a color special effects generator with 12 inputs, including built-in color black and two color background generators. Designated model 375, the system features an internal RGB chroma keyer, a downstream matte keyer with panic fade to black, a built-in luminance keyer with both internal and external keying and ten wipe patterns.

Circle (311) on Reply Card

### Edit code reader

Model 644 edit code reader/raster display/printer by Shintron is capable of reading SMPTE (NTSC) or EBU code with no equipment modification. The audio edit code is displayed on a TV raster and on an instant paper tape printout. The unit reads edit code at tape speeds ranging from 1/5X to 40X forward or reverse. Edit code or user code can be displayed in characters

selectable as black or white, large or small and can be positioned anywhere on the screen.

Circle (312) on Reply Card

### Condenser microphone

Shure Brothers' model SM81 microphone is a cardioid condenser unit designed for mechanical and environmental ruggedness.

A 3-position, low-frequency response switch located on the microphone's case is adjustable without tools or disassembly and can provide the option of flat response, a low-frequency rolloff of 6 dB per octave below 100 Hz, or a low frequency cutoff of 18 dB per octave below 80 Hz. A switchable 10 dB attenuator is built into the microphone head to prevent high sound pressure levels from overloading the microphone's internal components.

Circle (313) on Reply Card

### Broadcast transmitter

The model SI-F-25 FM broadcast transmitter by Sintronic is a 27.5 kW RF power output unit which features a direct solid-state exciter, grounded grid driver and power amplifier.

A dual rugged, welded steel frame structure with lift-off side panels houses the transmitter. A 12-pulse power supply eliminates power supply complexity by a single high-voltage source for PA and driver plate and IPA plate/screen operation. A stereo generator and multiplex generator are optional.

A 3.5 kW transmitter, the SI-F-3 is also available.

Circle (314) on Reply Card

### VTR and TBC

Sony's newest VTR features Dynamic Tracking for on-air noise-free playback video, from quarter speed in reverse through still to twice forward speed. The programmed jog function allows the tape to be shifted automatically between any chosen points; yet no Dynamic Tracking functions affect the video signal quality. The BVH-1100 also features a confidence head which the operator can use to monitor the video and sync signals. Signal-to-

noise is 48 dB.

A time base corrector, the BVT-2000 also is being introduced as a compatible unit. The TBC is said to have a recognizable picture up to 30 times real time when used with the BVH-1100.

Circle (315) on Reply Card

### Stereo cartridge

The model 680 SL cartridge by Stanton features a stereohedrom stylus tip which makes professional sound quality possible in the consumer market. A self-cleaning brush can be attached to the cartridge that cleans the grooves before the stylus. Frequency response is 20 Hz to 20 kHz and channel separation is 30 dB.

Circle (316) on Reply Card

### Peak meters

A line of peak program meters are being marketed by TA & Track Audio. Eight models are available which feature dual channel and a printed board carrying two low pass filters with roll off above 20 kHz.

Two full wave rectifiers for peak voltage, a logic generator and counter, an impulse former for extended scale and a voltage multiplier of 24-230-V are standard.

Circle (317) on Reply Card

### Manual turntable

Model SL-5100 manual turntable from Technics (Panasonic) incorporates digital pitch readout and double isolated suspension design. An anti-resonant material, TRNC, is used in both the turntable base and main base for greater resistance to howling.

All controls, including the cueing lever, are on the front panel for ease of operation. The stator is structurally unified with the motor casing, while the motor and turntable platter are designed in a single unit.

Circle (318) on Reply Card

### Zoom lenses

Tele-Cine is marketing three Schneider 30X zoom lenses for 2/3-inch format cameras. Lenses

included are a 30X standard Fl. 4/11-330mm, a 30X wide angle Fl. 4/8.7-260mm and a 30X field Fl. 4/18.5-550mm.

All lenses require a mounting adaptor and include a flat iris for at least 13X with iris compensation for remaining zoom and a modular drive system.

Circle (319) on Reply Card

### Machine control system

The TMAC-1 machine control system by TeleMation is used for station automation. The unit provides remote control of VTRs, film islands and other related equipment.

The system is capable of operating up to 99 separate machines and can be either manually or computer operated.

Circle (320) on Reply Card

### Camera pedestal

Television Products introduces a Remote Location Dolly (RLD) camera pedestal. The lightweight (140 lbs) unit is designed for remotes. It features a removable base that will go through any standard door opening. Height range is 30 to 50 inches; capacity is up to 200 lbs.

Circle (321) on Reply Card

### Multiplexer

The THP-2T20 program channel multiplexer by TerraCom features four 15 kHz program channels to produce a 1.544 Mb/s data stream. Transmission is possible on T-carrier lines or microwave radio. Standard features include interchangeable PC boards color coded for error-free positioning, front panel test and monitor points and modular construction.

Optional interface formats including the standard T1 interface, AMI, NRZ and bitternary for microwave transmission are also available.

Circle (322) on Reply Card

### Video processing system

Model 9100 digital video processing system by Thomson-CSF features a digital noise reducer, a frame synchronizer, a 4x1 input switcher and a freeze frame, all operating at

4x subcarrier sampling.

Multiple remote video sources can be phased to studio sources and selectable synchronization and precise automatic timing for multiple picture sources are possible without genlocking.

Circle (323) on Reply Card

### Logging system

Model 7840 microprocessor alarm and logging system is being offered by Time & Frequency Technology. The programmable software logging printer and scanner is microprocessor based. The model 7610 remote control unit is needed for complete operation.

A computation software package is optional. The package offers continuous automatic computation of power (direct, indirect, forward and reverse), efficiency 1 and efficiency 2 and VSWR.

Circle (324) on Reply Card

### Capstan idler assemblies

United Research Laboratory introduces the BB100068M capstan idler assembly with self-aligning ball bearing. The assembly, designed for most professional recorders, is coated with almost indestructible ML-6. It is available in a number of sizes: 1/4- to 1/2-inch, 1-inch, 1 1/4-inch and 1 1/2-inch.

Circle (325) on Reply Card

### Connectors

A line of electro-optical connectors for single and bundle fiber communications has been introduced by Trompeter Electronics. The single channel connectors are all metal and include two styles: the threaded SMA and the quick disconnect bayonet TPS.

Each unit will accommodate a single fiber as small as 125  $\mu$ m as well as large bundles of 1143  $\mu$ m in diameter. The TPS style requires no torquing while the SMA style does. A three lug bayonet features positive locking for stability.

Circle (326) on Reply Card

### Control panels

Utah Scientific introduces the line of control panels for the AVS-1

## NAB new products

series audio-video routing switchers. All feature loop-through party line matrix connection, continuous status readout and separate audio-video switching and statusing.

The CSP-300 is a full matrix control panel. The CSP-200 is a single buff control panel. And the CSP-10 is a 10 buff control panel.

Circle (327) on Reply Card

### Aerial ladder

A van mounted aerial ladder for maintenance of microwave dishes is available from Van Ladder. The positioning system features a rugged 24 V electrical motor drive worm gear reduction for positive control and braking.

The positioning controls are located in the bucket and on the platform. Electrical rack and pinion drive controls the antenna tilt system. Safety features include a warning system alert when the antenna is raised, thermal circuit breakers for overload protection, non-skid ladder rungs and platforms and weather protected electrical equipment.

Circle (328) on Reply Card

### Radial beam tetrode

The Varian EIMAC 4CX40, 000G is a ceramic/metal power tetrode designed for use in audio or radio-frequency applications. A high-stability pyrolytic graphite grid and internal mechanical structure which results in high RF operating efficiency are featured.

The anode is rated for 40 kW of dissipation with forced-air cooling. Applications include FM broadcast service, RF linear power amplifier service and VHF TV linear amplifier service.

Circle (329) on Reply Card

### TV translators

Versa-Count Engineering is offering two models of VHF to VHF TV translators. Model V-213 has an output of 1 W and model V-214 has a 10 W continuous output.

Features include highly selective proprietary phase corrected IF filtering, keyed AGC to insure that peak video will remain constant with varying input levels and minimizes rapid rate of changes in received signal level caused by airplane flutter.

Circle (330) on Reply Card

### Servo system

Video Associates Labs' Pro-Pak-I is designed as a servo system for the Sony VO-2860 and will allow full frame synchronization of the television signal leaving the VTR. Features associated with quad recorders including V-lock, H-lock, stability marks, head override and servo status indicators can be incorporated with the unit.

Circle (331) on Reply Card

### Editing system

The Z-6 editing system from Videomedia features frame-accurate editing and a 99-event memory without SMPTE time code. The system utilizes a Z-80 microprocessor control which functions on industry standard S-100 buss electronics.

Standard features include bidirectional shuttle controls, auto search, cruise control, event tag, rehearse, perform and review edit, prompting for proper entries and an error message with keyboard lockout to prevent mistakes.

Circle (332) on Reply Card

### Editing console

A ¾-inch editing console which requires no mechanical modifications to the VTR is available from Videomedia. Designated the NV950W/VM95U the unit will interface the Panasonic NV 9200, NV 9500 and the Sony VO 2860.

Standard features include bidirectional joystick control, random search, remote control of BTRs and a dual tape timer.

Circle (333) on Reply Card

### Broadcast videotape

The Video Tape Company introduces the master broadcast video-

tape, VTC 1000. Features include a S/N of more than 50 dB, the capability of 4000 passes, audio uniformity of  $\pm 1$  dB and a head-wear of less than 4 um per hour.

Circle (334) on Reply Card

### TV tuner/demodulator

Videotek's model DM-4R demodulator is designed for broadcast, CATV, microwave modulation and CCTV applications. The unit features automatic fine tuning with defeat switch for accurate tracking of all 83 channels.

The audio output is adjustable with 4.5 MHz output impedance and 75 $\Omega$  unbalanced level. The video output is 1.5 V adjustable into 75  $\Omega$ . Front panel controls and indicators are featured.

Circle (335) on Reply Card

### Production switcher

Vital Industries PSAS-1 production switcher automation system is capable of simultaneously controlling fader handlebars, positioners, preset limits, border width or softness and select sources and modes for three mix/effects units and the squeeze zoom.

Unlimited floppy disc storage of up to 2000 events per discette is featured. The unit can be initiated internally or externally with output pulses for starting machines, pan/tilt or zoom camera standard.

Circle (336) on Reply Card

### Mobile TV unit

Wolf Coach and Television Engineering have introduced a custom engineered mobile unit for out-of-studio TV recording and production. The unit is self-contained and completely equipped with cameras, audio control, video switching and video and audio tape systems.

Vehicles are provided with the required mounting racks, consoles, electrical distribution, ducting and interior/exterior decor. ☐

Circle (337) on Reply Card

# Automatic Transmission Systems (ATS): A survey

By Donald L. Markley, BE facilities editor and consulting engineer

The use of automatic equipment to monitor and control transmitting systems for non-directional AM stations and for FM stations was first authorized by the FCC effective February 14, 1977. This was the result of a rather lengthy rule-making which received heavy comment. Several manufacturers have since developed systems which operate within the simple framework of the Rules and Regulations and some of those manufacturers have additional systems in the design phases at the present time.

Before going into the actual hardware available, it is useful to briefly review the applicable Rules and Regulations. These can be found in Volume III as follows:

AM: Sections 73.140 to 73.146

FM: Commercial in Sec. 73.340 to 73.346

Non-Commercial in Sec. 73.540 to 73.546

It should also be noted that the commission has

## Thoughts on ATS: A new box needed?

Automatic transmission systems have now been legal for over two years. The equipment has been available on the market for such systems for almost that long and is currently available in a wide range of sophistication and ability. Yet, despite the hue and cry of the broadcaster for such systems, only a small percentage of the operating stations have elected to install ATS. Why???

A large school of thought, to which I subscribe, feels that the basic philosophy of ATS is to blame. The current crop of systems function as an "add-on" type of black box which simply eliminates the need for an operator to ride herd on the facility all of the time. However, if an oscillator circuit fails, as one example, the station will still go off the air until someone physically goes to the transmitter and eliminates the problem either by repairs or by switching circuits. Of course, this can be eliminated by use of a second transmitter which can be switched physically into service by the ATS. However, this is simply another patch rather than an attempt to solve the basic problem, and some downtime will still occur.

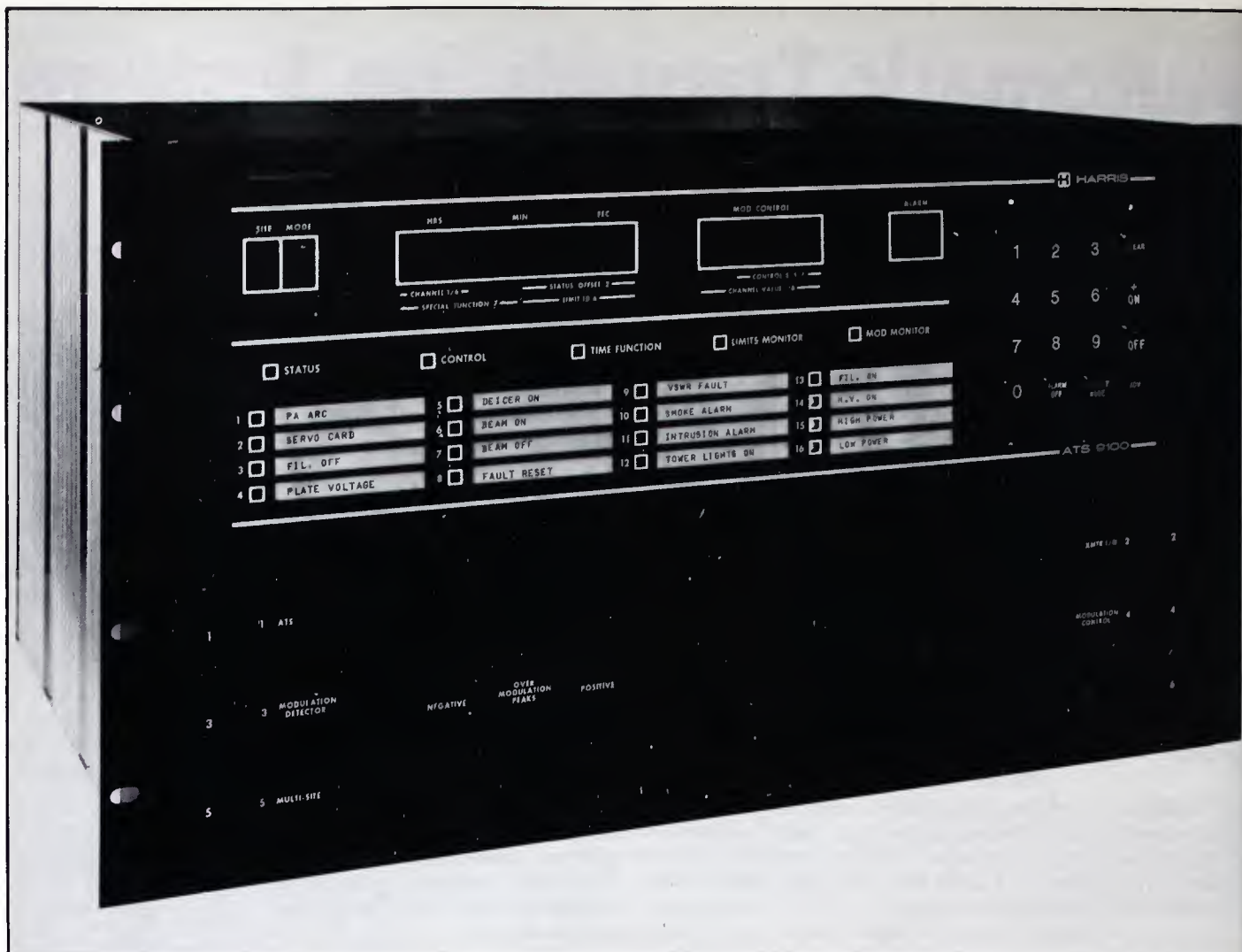
A more desirable approach to the whole concept of ATS would be to design the transmitter itself to contain the type of control and monitor circuitry necessary to operate not only within the requirements of the commission's ATS rules but within the capability of the state-of-the-art. There is no sound technical reason why transmitters cannot be built to incorporate redundant circuitry throughout with automatic fault sensing and change-over; trend spotting of variation in parameters; plug-in circuitry; automatic storing of parameter records for later print-out, if desired, and multiple location alarm-notification in case of major failures. Such a transmitter would provide the high reliability desired by the broadcaster, meet the spirit of the commission's regulations and significantly reduce the need of the broadcaster to have a technician available at a moment's notice.

Before you start bombarding the manufacturers with your orders, it should be pointed out that two highly

significant non-technical problems are associated with such a project. First, the development leading to such a product would be expensive. All such development costs are obviously going to end up as part of the purchase price of the transmitter. In this day of fierce price competition for the broadcast market, it is questionable whether enough broadcasters are willing to pay for the quality product proposed. This determination would require a market survey far beyond the scope of this article.

The second problem concerns the average broadcaster and the "If it doesn't look like a transmitter, it isn't one" syndrome. An old friend who is a highly experienced broadcast engineer long ago stated that all transmitters with output power of 1 kW or less should be kept in the chief engineer's desk. Yet most engineers who have been around for a few years remember when one of the major manufacturers offered a new transmitter, far ahead of the rest of the field, which was not in a standard 3'x3'x7' box. Its acceptance by the industry was, conservatively speaking, underwhelming. That same manufacturer now has a new transmitter which is probably the largest selling unit for 1 kW AM. However, it looks very much like all of the older transmitters with the exception of being slightly smaller. The CE's desk is still empty while low power transmitters have enough empty space to store the station's miscellaneous files.

For ATS to become widely used, a new series of hardware needs to be designed and marketed which does not simply try to replace the operator but which is *designed* to not need an operator in the first place. It probably wouldn't look conventional, which would bother some, but it would bring the broadcaster's transmitter into the same decade of sophistication as his program automation system. Downtime would be virtually eliminated, yet the equipment would be operated with constant supervision and would require only careful routine maintenance by the licensed operator. □



The new Harris 9100 Facilities Control provides microprocessor-based protection for broadcasters' large plant investments and provides monitoring and/or control of the entire transmitter plant. It boasts expanded remote control channelization and has an optional video terminal and/or logging printer at the studio to identify problems and keep the transmitter plant on the air.

## ATS survey

indicated that ATS for television stations and for AM stations which use directional arrays will be permitted in the future.

The Rules and Regulations permit the station to design, purchase and install the ATS equipment without the necessity of a previous application. Stations also are permitted to make such transmitter modifications as are necessary to permit the proper operation of the ATS equipment. After the installation, the equipment and its operation is to be checked by the chief engineer, technical director or the station's consulting engineer, who must then prepare a statement advising the commission with the applicable Rules and Regulations. The station will then receive and Regulations. The station will then receive permission from the commission to start operating with the ATS system.

### ATS requirements

As to the actual requirements for the system itself, the ATS system must, as a minimum, perform the following functions:

- The system must periodically monitor the output

power or, for AM stations, antenna current. In the case of FM stations, this power measurement may be by the indirect mode. If the power of the station becomes outside of the permitted limits, the system is to automatically adjust the transmitter power output back to be within limits. If the automatic adjustment capability is unable to bring the power back to below 105% of the authorized value, the system must shut down the transmitter within a maximum of three minutes.

- The system must continuously monitor the modulation levels on both main channels and sub-carriers. In accordance with a defined method, the system must both sense over-modulation and adjust the levels to eliminate such over-modulation. Again, this is a "fix-it or shut-it-off" type of rule.
- The system must check itself periodically without interfering with the broadcast operations.
- The system must prohibit operation outside of the authorized hours or with the power at the wrong level for those particular hours.
- The system must require the initial command of the day to start the system in operation to be originated



The DYMA model 702 ATS is microprocessor based and is extremely flexible. It was developed to achieve a system that provides automatic supervision of the transmitter plant with much the same attention to detail and system functions as would be exercised by a human operator.

by being "manually activated," which means that the morning man must push his first switch of the day. (The commission is obviously aware of the type of operator frequently found as the door opener in the morning since the regulation does not require the activating function to be performed by a live person.)  
 • Finally, the system must alert the operator of failure of the transmitter, ATS or associated systems to operate normally. This alert must be provided to at least one operator/control point which may be almost anywhere as long as the required alarms are available and off-the-air monitoring is available.

While not required by the Rules and Regulations, the ATS may switch to a second transmitter automatically upon the failure of the main unit to operate within the authorized limits.

Obviously, all of the units presented to BE for this survey by current manufacturers met all of the above listed requirements. The level of sophistication, as well as the price, did vary considerably along with the list of optional features. The following listing highlights the main individual features of those units for which information was furnished.

**Dyma Engineering**—The newest unit on the market, the Dyma model 702, is a microprocessor based system. In addition to the normal and required functions, this unit will operate the standby power plant, switch to alternate transmitters and antenna systems, monitor tower lights and the building systems. In addition, the microprocessor provides for correction of parameters back to normal rather than just to within limits. The same unit is used for both AM and FM. Follow-up products are planned for television and directional AM systems.

**Harris Corporation**—The model 9100 Facilities Control unit is also microprocessor-based and will operate either on AM or FM systems. It has a sophisticated rack-mounted 2-channel amplifier which has digitally controlled gain. The increments of gain are typically less than 0.2 dB per step which the manufacturer

## STOP GROUND-LOOP HUM!

### VIDEO HUM STOP COIL...HSC 1

Will ELIMINATE HUM and other INTERFERENCE in Video Lines caused by differences in Ground Potential.

- For Color and Black and White.
- FLAT-DC to 6.5 MHz.
- No Low-Freq. or Hi-Freq. Roll-off.
- No Differential Phase Distortion.
- No Differential Gain Distortion.
- No Envelope Delay.
- Passive Device - Failure Free-Low Price.
- Small Compact Package 4" x 4" x 2-1/4".

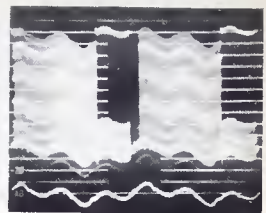
### ELIMINATES HUM AND INTERFERENCE:

#### IN STUDIO

- Between Buildings
- On long runs in Buildings
- Between Studio and Transmitter
- On Incoming Telco circuits
- On Outgoing Telco circuits

#### IN FIELD

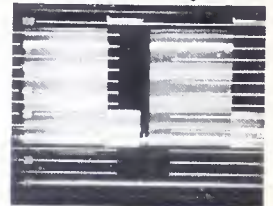
- Betw. Remote Truck and Telco
- Betw. Remote Truck and Microwave
- For Intertruck Hookup
- For VTR Units
- For Monitoring Lines



NEW!



\$140  
F.O.B.  
N.Y.



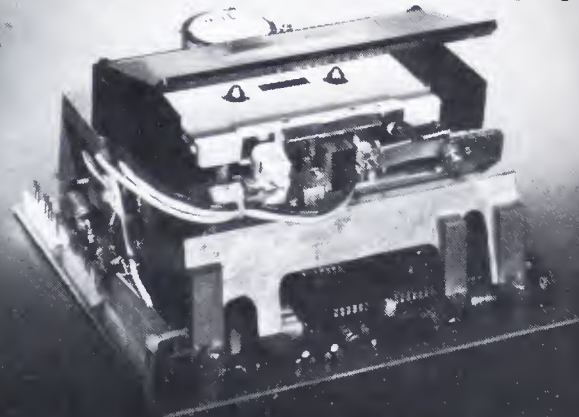
Available on  
10 day free trial

**AUDIO-VIDEO ENGINEERING COMPANY**  
65 Nancy Blvd., Merrick, N.Y. 11566  
Tel. (516) 546-4239

Circle (170) on Reply Card

Introducing

## SELECTO-SYNC™



A Unique Cassette Transport with Synchronous Capstan Speed Control from Triple I, manufacturers of PHI-DECK® cassette transports.

• Fully Remote Controllable • Four Motor Design • Cast Chassis

Digitally Selectable Speeds over a 15 to 1 range. Excellent speed regulation, low flutter and wow, extremely low jitter. For Analog or Digital use.

- Low Speed Recording, High Speed Playback
- Extreme Low Speed Operation — Data Acquisition
- High Speed Operation — System Loaders
- Critical Timing Operations

(405) 521-9000

TWX: 910-831-3286

Write or call for more information.

4605 N. Stiles P.O. Box 18209 Okla. City, Ok 73154



Circle (171) on Reply Card

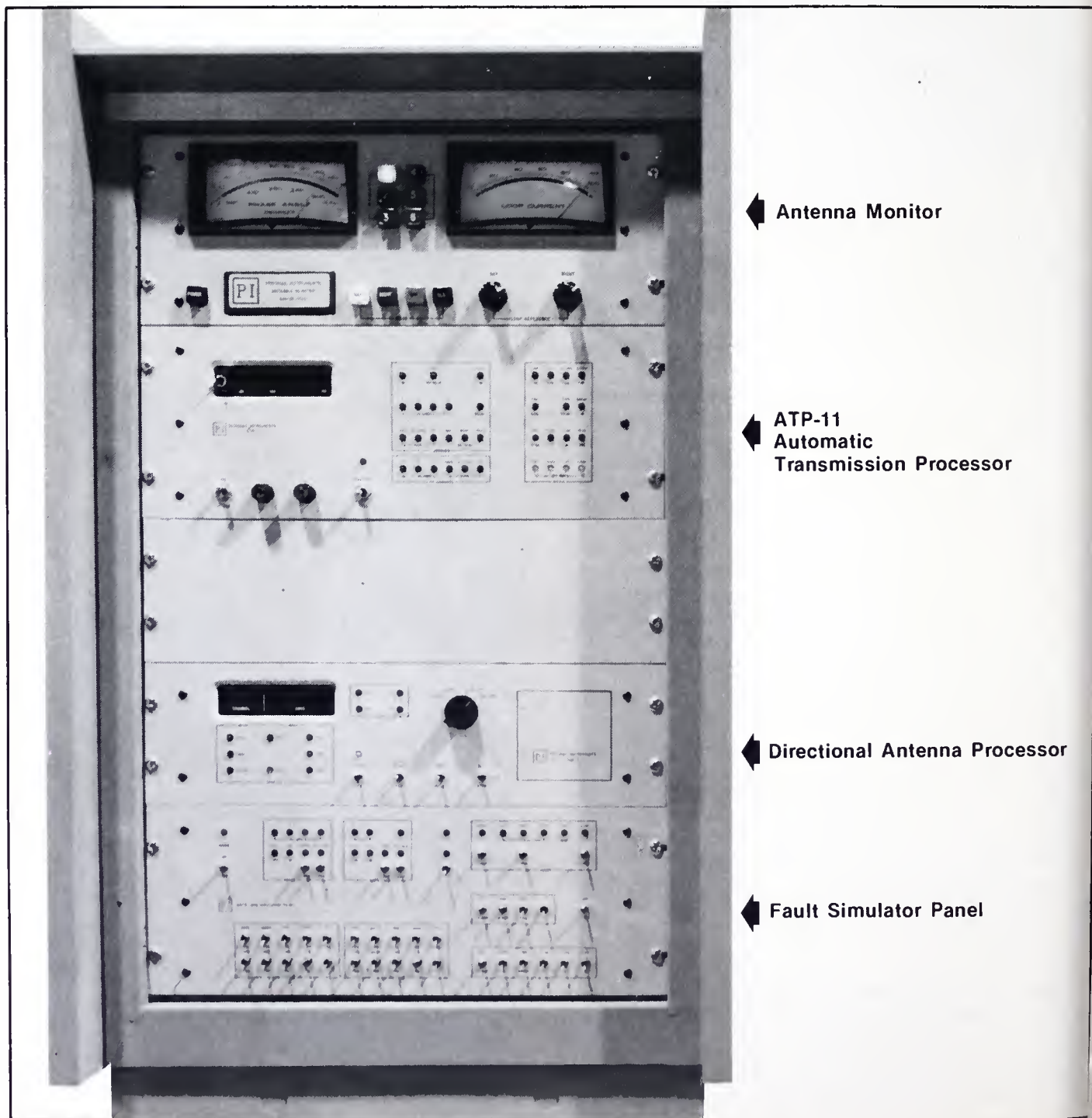
## ATS survey

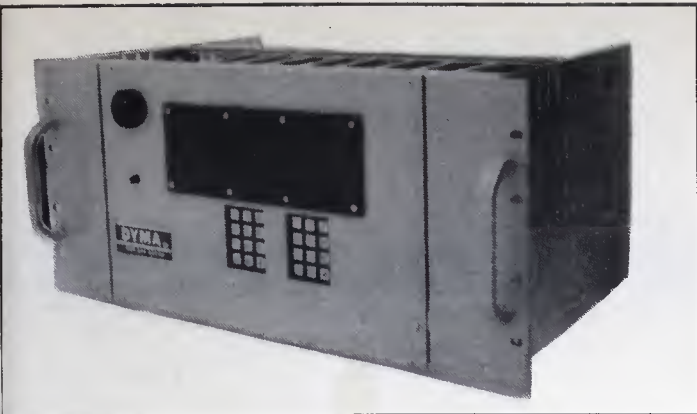
claims will allow very accurate adjustment of system gain and modulation level. This is intended to minimize the cross-talk problems caused by any unbalance in the performance of the individual audio channels. This unit also permits two sets of limits to be assigned to input parameters. One of these initiates an adjustment sequence; the other causes immediate system shut-down to save the equipment from damage in the case of a serious change in operation.

**Potomac Instruments**—This unit is unique because it

has been expressly designed for systems using directional antenna systems, although it may be used also with nondirectional AM or with FM stations. The system mates with the Potomac antenna monitoring system to automatically monitor all of the essential parameters of a directional antenna system when the commission authorizes such operation. The system will operate arrays of up to 12 towers, three patterns, three power levels, multiple transmitters and two co-located FM transmitters. When a transmitter change accompanies a change in the stations operation, the system even turns on the filaments

The Potomac ATP-11 system is designed for use with directional antenna systems, but may be used for nondirectional complexes as well. It mates with other Potomac system components to monitor transmission parameters: up to 12 towers, three patterns, three power levels, and multiple transmitters. Shown here is a portion of a demonstration system, with the ATP-11 highlighted, rack-mounted with other available components.





The QEI models 7775 (for FM) and 5775 (for AM) ATS units include their own modulation monitors for baseline modulation level sensing, reducing the station equipment necessary for interfacing with the ATS.

early and blinks a light to advise the operator that the change is about to occur. An optional rack-mounted printer will log up to 32 parameters at intervals ranging from ten minutes to three hours, or on command.

**QEI Corporation**—The QEI model 7775 FM ATS and model 5775 AM ATS units are unique in that they include their own modulation monitors for baseband modulation level sensing. This reduces the amount of station equipment necessary to interface with the ATS. The units are furnished complete with such items as antennas for off-the-air reception and necessary samplers. The modulation for the FM transmitters is controlled by adjustment of the composite signal using a system which controls the base band and subcarrier inputs without changing the pilot injection and phase.

**CCA**—While not responding with equipment descriptions at this time, CCA did advise **BE** that they were developing a new system which would be based on the use of dual transmitters. □

### ATS product literature

The following firms have responded to a request for information on ATS products. Circle the appropriate number on the Reader Service Card at the back of the magazine for more information on their products. Or, use the **BE** Buyers Guide (September issue) to contact them directly. And, of course, visit their booth or hospitality suite at NAB/Dallas.

|                                          |     |
|------------------------------------------|-----|
| CCA Electronics .....                    | 589 |
| DYMA Engineering .....                   | 590 |
| Harris Broadcast Products Division ..... | 591 |
| Moseley Associates .....                 | 592 |
| Potomac Instruments .....                | 593 |
| QEI .....                                | 594 |

## Let's see the competition beat this!!!

**Elcom's New Tone Generator & Transport Control**

\$395 INTRO PRICE



### THE ATG-25D DESK TOP MODEL

- A NEW DIGITAL 25HZ TONE GENERATOR AND CONTROLLER FOR YOUR PRODUCTION AUTOMATION RECORDING FACILITIES.
- COMPARE THESE FEATURES WITH OUR COMPETITORS AT ANY PRICE
- DIGITAL TONE GENERATION STABILITY : 0.25HZ
- AUTOMATIC PROGRAM LINE FADER FOR NOISE-LESS START.
- CONTROLLED AND EXTENDED TONE DURATION
- ADJUSTABLE TAPE STOP DELAY
- RACK MOUNT OR DESK TOP PACKAGE.

BY  
**Elcom Engineering Company**  
Post Office Box 10432  
SANTA ANA, CALIF. 92711  
Tel. (714) 544-5760

Circle (172) on Reply Card

## Extended Depth FIBERGLASS REINFORCED CASES For TRANSIT/SHIPPING



Available from a stock of over 100 sizes...Extended depths up to 36"...Thins line hardware and customized injection molded deflecting feet add to durability for transit handling...Extended depth, fiberglass reinforced cases are lower in cost than steel or aluminum...The availability is usually 4 weeks or less...



**PARSONS MANUFACTURING CORP.**  
1055 O'BRIEN DRIVE  
MENLO PARK, CA 94025, (415) 324-4726  
(213) 443-3277 in Los Angeles  
(503) 224-1007 in Portland, OR

Circle (173) on Reply Card  
March 1979 **Broadcast Engineering** 187

# Microphone roundup

## Part 2

Part 1 of this roundup appeared in the February, 1979, issue of **Broadcast Engineering** along with an article explaining how to select a microphone (pages 78 through 87). Just a few representative microphones have been chosen from each manufacturer to indicate the range of choices available. Detailed manufacturers' data for these and other microphones may be obtained by using the reader service card or by contacting the manufacturers at the addresses listed.

### HM Electronics

6151 Fairmount Ave.  
San Diego, CA 92120



System 22E

**System 22E**—Cordless RF mic system consists of a crystal-controlled VHF-FM pocket transmitter and matching receiver. Incorporates Dynamic Expansion Circuit, increasing dynamic range to 95 dB. Signal-to-noise ratio increased since floor noise is lowered up to 30 dB. Logarithmic compressor circuitry prevents overmodulation.

Circle (595) on Reply Card

**AD series**—Multiple mic antenna system prevents signal dropouts in wireless applications. Triple-antenna dipole setup along with combining circuitry eliminates phase-cancellation. Preamplifier circuit provides RF signal boost to offset internal system losses.

Circle (596) on Reply Card

### Coherent Communications

13733 Glenoaks Blvd.  
Sylmar, CA 91342



Mini-Mic

**Mini-Mic**—Omnidirectional electret condenser mic measures less than  $\frac{1}{2}$ "x $\frac{1}{3}$ "x $\frac{1}{3}$ ". Low-current FET deposited within mic capsule yields low noise and long battery life. Sensitivity to 60 dB below 1V rms/ $\mu$ bar. Frequency response is selected to perform as a lavalier mic, but does not compromise use as a hidden mic.

Circle (597) on Reply Card

**Artech**—Line of wireless mic products includes transmitters, receivers and accessories. In UHF and VHF models, the overall frequency response is 80 Hz to 20 kHz  $\pm$ 2 dB; typical dynamic range is 99 dB; S/N is 64 dB. Transmitters: hand-held mic/transmitter or pocket transmitter; compatible with low-Z dynamic mics and can power many condenser mics; up to 33 hours of battery life. Receivers: 150 $\Omega$  balanced mic-level output, separate earphone output, metered battery and signal level.

Circle (598) on Reply Card

**Accessories**—Rycote windscreens and shock mounts are designed for AKG and Sennheiser mics. Windscreens are non-reflective neutral gray and lightweight, unaffected by water, and have a positive retention dimple and Velcro closure. Shock mounts are lightweight with laminated wood pistol grips, positive locking swivels and cradle-type suspension.

Circle (599) on Reply Card

# AM stereo's impact on the industry

Excerpted from a speech to the Radio Club at their 69th Annual Conference

By Leonard R. Kahn, president, Kahn Communications

**Editor's note**—As the AM stereo issue continues to face the industry and the FCC, **Broadcast Engineering** continues to include news and conference coverage on this hot topic. The FCC's final decisions will affect a half-billion dollar plus industry; at least five firms with vested interests anxiously await the FCC decisions. And, broadcasters are ready to move with new equipment purchases following the long-awaited decision.

In the calm before the storm, the author of this article has taken time to speak to interested broadcasters about AM stereo. Previously delivered to the Radio Club at their 69th Annual Conference, this message is reflective in nature. It is not a comparison of the systems proposed and being tested. But, please note that **BE**, in sharing these thoughts, is not endorsing any current or proposed AM stereo system from any manufacturer. Furthermore, **BE** will entertain the publication of objective appraisals on AM stereo from manufacturers, station engineers and managers and leading consultants.

On September 14, 1978, the FCC unanimously adopted a Notice of Rule Making for AM stereo. Some of us have been waiting for this step for almost two decades. (RCA, Philco, Westinghouse, and Kahn Research, independently filed petitions for AM stereo in the late 1950s and early 1960s.)

While promptly acting on a similar request for an FM stereo Rule Change in 1962, the FCC denied proposals for AM stereo; partly because of the lack of interest on the part of AM broadcasters, and partly because the commission wished to aid the then very sick FM broadcast industry by allowing them to be the sole broadcast service offering stereo. Now, however, the commission, has shown all indications of moving quickly, and actually moved from the Notice of Inquiry phase to the Rule Making phase in only 15 months. This speediness was partially in response to the urgent leadings of AM broadcasters. There are expectations that AM stereo will be on the air with the full blessing of the commission by the end of this coming summer.

The reason for the dramatic shift of interest by the AM broadcasters is that AM has been seriously challenged by FM (now much healthier, indeed), and AM broad-

casters need to effectively use all available technology to best serve the public.

FM stations have now surpassed AM stations in audience and income in a number of major markets (Dallas, Washington, Detroit, and Philadelphia). While AM broadcasters still serve more listeners than FM, they are continually losing ground and should be released from artificial restraints.

AM stereo can help provide a healthy and proper balance in the aural broadcasting industries, allowing FM to reign supreme in the homes close to stations, while allowing AM to best serve distant homes and automobile listeners. At this time, neither FM nor AM requires any artificial restraint enforced on its competitor in order to maintain its viability. The public will be best served by allowing both systems to fully mature, taking advantage of all that technology can offer. Such elimination of artificial restraints is especially timely in view of the FCC chairman's recent statements concerning deregulation.

## Advantages of AM stereo

The obvious and well understood advantage of introducing stereo to AM radio is that it provides a major improvement in fidelity by faithfully

reproducing a dimensional characteristic which is lost in monophonic systems. This characteristic allows the listener to more closely approximate theater listening, enjoying the spatial characteristics of the music.

There has been a rebirth of interest in radio dramatic programs in the past few years and stereo can be most useful in enhancing dramatic effects.

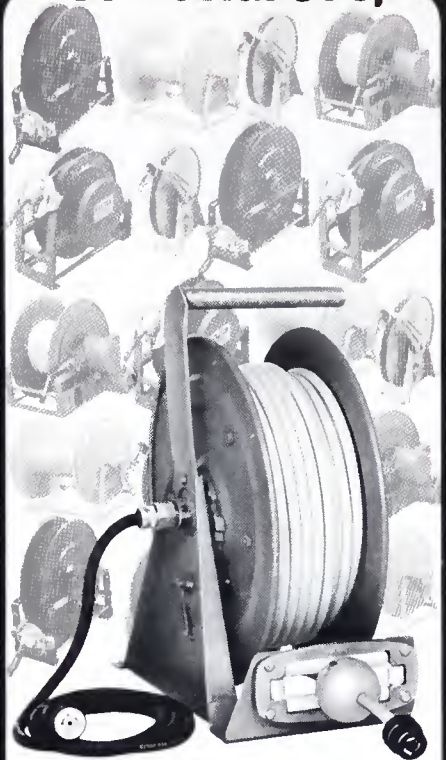
Also, in broadcasting certain news events, such as debates and news conferences, the stereo effect can be used to allow listeners to more readily follow a back and forth argument and ease the problem of determining which person is speaking. The importance of this effect can be judged by asking a secretary to transcribe a conference from a monophonic recording. The difficulty of understanding such recordings, as compared with transcribing from a stereo recording, provides ample proof of the utility of stereo reproduction.

An additional advantage of one form of AM stereo is the "cocktail party" effect, which helps listeners concentrate on one speaker when more than one person is talking. There have been studies showing how successful a human being with normal hearing is in separating one conversation from a number of conversations, even though the interference produces sound pressures commensurate with the desired conversation.

The "cocktail party" effect also can be used to alleviate significantly adjacent channel interference. If the stereo system spatially separates on the basis of frequency, adjacent channel interfering sounds can be made to fall all the way to the left-hand speaker for lower frequency adjacent channel stations, and all the way to the right hand speaker for higher adjacent channel frequencies.

Listeners to the desired signal can spatially discriminate against the

## Even With A Cast Of Hundreds,



## We're Always Glad To Do A Special

- Mix 'n match stock parts to custom design the ideal reels for your mobile unit or studio.
- Sizes, shapes, capacities unlimited. A wide choice of rewind options.
- Microphone cable, coaxial cable, power cable: hookup & pickup go smoother & faster with Hannay Reels.
- No other reel is remotely as efficient! Free fact-packed Reel Guide! Ask for your copy today.

Buy Hannay Reels and Wind Up With The Best



# HANNAY REELS

CLIFFORD B. HANNAY & SON, INC., WESTERLO, N.Y. 12193

Circle (174) on Reply Card



## VIDEO TAPE EXCHANGE

**USED BRAND NAME VIDEO TAPE  
EVALUATED - GUARANTEED  
SONY — SCOTCH — FUJI**

|        |         |        |         |
|--------|---------|--------|---------|
| KCA 60 | \$14.75 | KCA 10 | \$ 7.50 |
| KCA 30 | \$11.50 | KCS 20 | \$10.50 |

**SPECIAL-USED KCS 10 \$8.00**

VIDEO TAPE EXCHANGE  
855 AVE. of the AMERICAS N.Y., N.Y. 10001  
(212) 695-6644  
A DIVISION OF CINE FILM EXCHANGE, INC.

Circle (175) on Reply Card

## AM stereo

adjacent channel interference sounds. Actually, such an effect can be made available when receiving monophonic signals, and the "cocktail party" effect also can be applied to non-broadcast communication systems.

### Other advantages of AM stereo

Many AM broadcasters in expectation of AM stereo are sprucing up their stations at every point, from the microphone to the antenna. AM stereo is being equated to high fidelity, and at the same time stereo operation is initiated the quality of the equipment at all points in the broadcast system may be improved. During discussions with a number of broadcasters about AM stereo, the vast majority have indicated that they have budgeted considerably more money for studio equipment than the actual stereo exciter.

AM stereo will cost more than just the price of a new transmitter adapter. A major cost element is studio equipment. Also, the broadcaster must maintain two paths between the studio and the transmitter in order to handle the L and R information. But, again, it seems that most broadcasters willingly will make the investment in equipment that improves their signal and allows them to compete better in the marketplace.

The improvements that occur along with the introduction of AM stereo will not be restricted to the efforts of the broadcaster, but also will be found in the receiver manufacturing field. Actually, the set manufacturers may have the most to gain from the introduction of AM stereo. Estimates of increased revenue of 500 million to over 1 billion dollars per year have been published.

With all this at stake, it is to be expected that set manufacturers will stop treating the AM band as a stepchild. The weakest link in the present AM broadcasting system is the receiver. It is truly shocking to see how poorly the average AM receiver performs. Many receivers are limited in frequency response to 3 or 4 kHz, and introduce significant amounts of distortion. It is a test of manual dexterity to tune many receivers.

By use of modern filtering techniques, it is now possible to improve fidelity substantially and to improve selectivity from adjacent channel interference significantly. "Significantly," moans 20 or 30 dB. To

prove how reasonable it is to expect such improvements, examine the excellent selectivity characteristics of a number of modestly priced CB receivers.

Like their broadcast associates, a number of receiver manufacturers have indicated that they have decided to improve their product, but they are waiting for the advent of AM stereo to initiate these improvements.

There is another effect that is a by-product of binaural or stereo operation: For a given sound pressure level a binaural signal sounds louder and is more capable of competing with acoustical noise. This is most important in the automobile, where ambient acoustical noise is a serious problem, and should enhance not only musical reception, but also news and dramatic shows.

It is possible that the sum of these peripheral advantages will be greater than the stereo effect which helped set them off.

It should be noted that the AM broadcaster is not without enemies in and out of the government. (I have even heard such statements as "isn't it time to allow AM broadcasting to die?") There has been considerable discussion of reducing the separation between AM stations from 10 kHz to 9 kHz. There has also been consideration of even further reduction to spacing and limiting the fidelity to as low as 5 kHz to make more room for stations.

These proposals are not new but have been presented repeatedly for many years. With a perfunctory consideration of, for instance, the complexity of a shift of 9 kHz spacing in North America, it is easy to see why it has been generated with so little enthusiasm in this part of the world.

The FCC, fully cognizant of the fact that the best utilized megaHertz of spectrum is the standard AM broadcast band, has resisted any attempts at reducing the quality of AM broadcasting. More people in the United States rely on this megaHertz of spectrum for their information and entertainment than any other megaHertz. (The AM broadcaster, with more stations and more listeners, utilizes only 5% of the spectrum occupied by FM broadcasting.)

It is therefore important to the public, to the broadcaster and to the economy, that the commission move promptly in adopting appropriate rule changes.



George Tomek (left), news director of KTVY, and Ernie Schultz, director of information, discuss the day's scheduled news events. (Photographs courtesy of Eastman Kodak)

## Case study:

# KTVY-TV, Oklahoma City

There is a lot of action and viewer interest in the downtown demolition of a tall building—but not so many ways to cover an event that may be over in the matter of a second or two.

"We could have filmed the building falling in slow motion," Charles Stacey, photojournalist at KTVY, Oklahoma City recalls, "but that would have meant passing up using the camera's ability to show viewers an event from many angles and viewpoints."

Instead, the station sent every available photojournalist and used seven cameras, including one operated by remote control at the base of the building.

That night, Oklahoma City television viewers were treated to a heart-stopping sequence showing the building toppling, again and again, in instant replay fashion—clipped with a final shot of bricks and mortar seemingly hurtling onto the camera at the base of the building. Stacey says the hotel demolition story fit the concept of photojournalism at KTVY not because of the quality of the individual shots but because of the planning and integration of effort that went into the assignment. KTVY had once again taken a routine assignment, and given the story the visual excitement that earned it the 1977 Television News Photography Sta-

tion of the Year" award from the National Press Photographers Association (NPPA). The award is sponsored annually by Eastman Kodak Company.

The tradition of photojournalistic excellence was, in fact, the theme of KTVY's winning station entry. The news department was similarly honored by NPPA in 1968 and 1974, while chief photographer Darrell Barton was selected NPPA "News Photographer of the Year" in 1973. Stacey, another senior staff member, has made a strong bid for top individual honors during each of the last two years.

It all adds up to a station that is very conscious of the impact of visuals in news reporting.

"Our big investment is not in on-air talent," Ernie Schultz, director of information for KTVY, says. "We emphasize putting people on the street, digging for news and developing interesting visuals to help tell the story."

Fourteen KTVY staffers are well-rounded photojournalists capable of shooting film as well as reporting. Though some do more of one than the other, the most common combination is for a reporter to serve as photographer for one story, and trade places with another reporter for the next.

"The ideal and most honest way to cover a story would be to have no

narration," Schultz says. "Ideally, the participants in an event would be the only ones the viewer heard from. That is a great deal more accurate and effective than having a reporter stand up and tell the viewer what has happened. In practice, most stories fall short of the ideal, but having news teams made up of two photojournalists helps tie the words and pictures together as closely as possible. If we don't use visuals effectively, we are wasting the power of television. There are no secrets or tricks—just the ability to look past surface events to see the real story.

"Two things make our visual coverage of the news challenging," Stacey says. "First, Oklahoma City is not a hotbed of fast-breaking spot news. The big murder, the dramatic fire, the typical gunman-hostage situation are rare occurrences here."

The stickler is that KTVY eschews many of the visually interesting spot news events, simply because they are not important stories.

"We seem to have become more selective about the spot stories we use," Stacey points out. "Not every accident makes it on the air, nor every fire. The news team on the scene can dump a story if team members don't think it's worth it, and the assignment desk can't override that decision except in



Charles Stacey (left) and Dave Smith prepare to cover a story in the rural town of Cement, OK.



For a story on circuit-riding city managers, Stacey and Smith followed their subject as he made rounds of city halls in Cement and Apache, OK.

Filming the city manager in a moving car provided a relaxed, natural attitude and lent an air of realism to the film report.



unusual cases."

Schultz agrees. "We cover a broad section of the state, and so must consider whether a story is interesting to a large number of people. What may seem to be an event of purely local interest may on closer examination, have relevance to a broader audience. So we can't arbitrarily decide that this type of story will be covered, while this other type won't. Each event must be weighed on its own merits."

News gathering has changed since KTVY won its first station of the year award in 1968, but what has surprised Schultz has been that television news hasn't changed as much as had been predicted.

"When we won the last time, in 1974, ENG hadn't made much of a penetration in television news," he recalls. "But it was predicted that it would revolutionize the industry in only a few years."

"Changes have been made," Schultz continues, "but chiefly in the area of compressing the clock. Both film and ENG techniques have been improved to allow getting visuals on the air much more quickly. With ENG, the deadline is now. The same things make news a made news 10 years ago, and our way of covering events hasn't changed that much. ENG has given us a new set of tools that lets us give live if we need to."

The NBC Television affiliate operates seven CP 16 cameras and one Ikegami electronic news gathering unit. Three of the film cameras are used for sports, farm news, and special projects. The ENG unit is used for late-breaking news and long events such as meetings of the legislature and sports. KTVY's attitude has been to use ENG where electronics offered the opportunity to do a better job, and film where the advantages of the lightweight compact CP 16 cameras were desirable.

"A lot of us like the reliability of the film cameras," Stacey says. "We will shoot more than a million feet of film in a year, and lose only a story or two because of camera malfunction. And usually that can be blamed on abuse."

In addition to mounting cameras in the path of falling buildings, the KTVY staff has operated CP 16 cameras in weather so bad once a crew had to stop and pour water out of an Angenieux zoom lens before they could continue filming.

KTVY photojournalists work

our-day week which includes two 8-hour days and two 12-hour days. The long days give reporters added time to work on a story, or to make progress on two assignments in the same time period.

Even Schultz, who was president of the Radio and Television News Directors Association in 1977-78, gets out with a camera and shoots a story occasionally.

Some members of the KTVY staff say Schultz promotes a lack of hierarchical distinction among his news team. Newer members often turn to veterans like Barton, or News Director George Tomek for advice and help, but the newest recruit may serve as producer for a story on which the most experienced reporter functions in a subordinate role.

This broad interchange of assignments has meant that the KTVY staff as a whole consistently performs to a high level. Indicative of the depth of the photojournalism staff is the fact that 11 persons shot film for the station's winning entry.

The films in the entry covered a broad range of news events including a hotel fire, a plane crash in the mountains, old people playing bocci, a new congressman winning an uphill battle and little league football.

"These all had one thing in common," Schultz says. "Good use of the basic syntax of visual reporting. Every story should have a beginning, middle and end. Such things as camera angles, proper lighting, and the use of close-ups are all part of the visual reporting language."

Vivid visuals are more than a means of attracting viewers, he emphasizes.

"Let's be honest," he says. "There are a great many people who get all their news from television. If we can't bring the important stories to them in an interesting way, an event might as well not even have happened for many viewers."

"If society was so comfortable with television that it would erect no barriers as to what we can and cannot cover, I think the level of news reporting would improve," Schultz says. "We could ignore some of the eye-catching stuff we have to run because we can't gain access to where the real news is being made. Then the real power of television to inform could finally be realized." □



A small town restaurant provided the locale for much of the city manager's report. Here, Stacey uses a CP 16 camera to maneuver in the tight confines of the restaurant.

Reporter-photographers Bella Shaw and Michael Rosenthal discuss a mutual project as the film is edited.



# Broadcast quality may mean a new exciter

By Brad Dick, director of engineering, KANU/KFKU, University of Kansas

The term broadcast quality often is used to describe something of very good quality, usually equipment performance. For years the goal of every hi-fi affectionato was to have a stereo capable of reproducing sound with broadcast quality. Times have changed, however, and it seems that broadcast quality is no longer the high standard toward which the listener should strive. Could it be that the receiving equipment actually is capable of better performance than the transmitters? This question led KANU to examine that possibility.

**Typical transmitter/receiver**  
Using manufacturer supplied

data, KANU examined 85 FM receivers in 26 different areas. These data enabled not only receiver comparisons, but they also generated a "typical receiver." A composite set of specifications was drawn up from the data sheets that resulted in a typical inexpensive receiver costing less than \$200. The

performance shown is the average for all of the receivers in the \$200 price class.

The same process was followed to measure exciter performance. Four presently available, relatively new exciters were used to generate the "typical exciter."

The results are as follows:

|                     | Receivers       | Exciters      |
|---------------------|-----------------|---------------|
| Distortion          | 0.28%           | 0.40%         |
| Separation at 1 kHz | 42.3 dB         | 37.5 dB       |
| Frequency response  | +0.55 - 1.36 dB | 0.92 - 1.0 dB |
| Signal-to-noise     | 67.5 dB         | 66.67 dB      |

Figure 1 Demodulated composite baseband. Pilot and SCA on. Note lack of intermodulation. (10 kHz, 10 dB/div.)

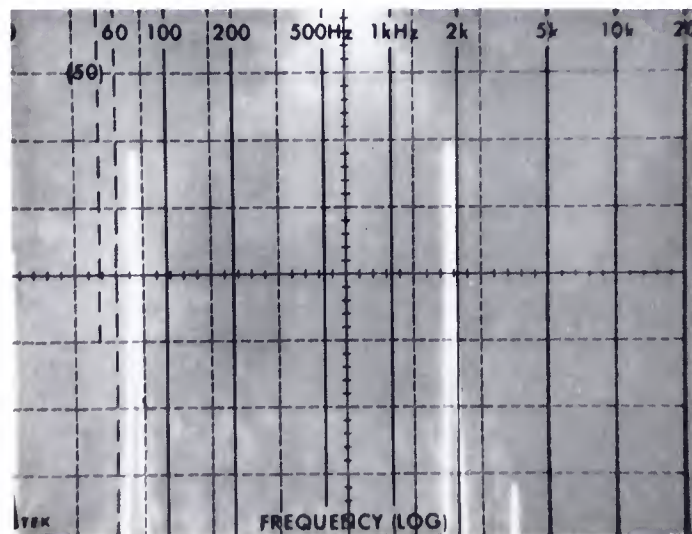
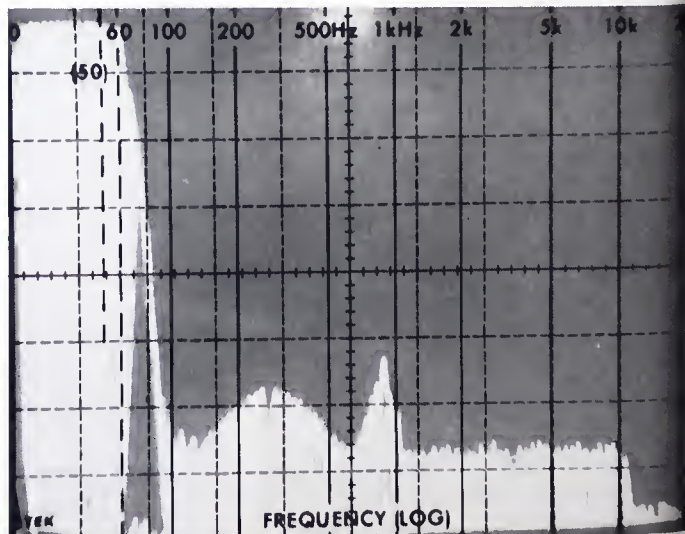


Figure 2 Sweep of L = R from 50 to 17 kHz. Notice lack of interference around 67 kHz. 0 - 100 kHz. (10 kHz, 10 dB/div.)



Note that \$200 buys a lot of performance. The most interesting aspect of these specifications is not that they are really quite good, but that the "typical" modern broadcast exciter is not capable of even matching the receiver specs. This means that the average listener can buy for \$200 a receiver capable of better performance than his local station is likely capable of broadcasting. If older equipment had been considered, the results would have been even more dramatic. With these facts in mind, KANU decided to examine a new exciter from Harris, the MS-15.

### The Harris MS-15 system

The MS-15 is a completely new exciter from the ground up. Even the packaging is different from other Harris products. The mainframe has room for 13 plug-in modules, each securely held in place by its own locking bar. The upper front panel drops down to reveal the input and output filters, metering circuits and power supply components. The rear panel has both a barrier strip and a multipin socket with identical connection points for both audio and interfacing requirements.

The exciter has dual front panel metering for checking any of 20 signals and voltages, a feature which makes it extremely easy to spot check all-important parameters and signals. Each module has its own on card voltage regulator, and front panel LEDs tell at once if any regulator fails. Modules can be inserted or removed with the power on without harm. The mainframe has already been wired for future quadraphonic broadcast, and space for the necessary modules has been provided so conversion will be easy.

One new Harris development on the MS-15 is called the Dynamic Transient Response (DTR) Filter. By a clever series arrangement of three filters, the DTR filter inaudibly reduces modulation overshoots to less than 2%. This filter can allow a two-to-six dB increase in loudness with no audible effect. (Our local "golden ears" tried for hours without success to detect when the filter was switched in or out.)

The RF module is VSWR protected and can be shorted or left open without damage. An automatic circuit senses the VSWR and shuts down the output state if it exceeds a particular level. Both forward and reflected power can be read on the front panel meters. The bandwidth of the RF module is so wide that there are no tuning adjustments of

any kind! A single jumper is used to select either the upper or lower half of the FM band.

The exciter uses a 10 MHz TCXO reference oscillator and programmable divider in the AFC system. The synthesizer provides outputs at almost all of WWV frequencies for easy zero beating and the exciter can be programmed to any carrier frequency in the FM band in 50 kHz

increments. To change frequency, all one has to do is move a couple of jumpers, and again, no tuning.

The stereo section uses a new method of generation. Called Digitally Synthesized Modulation (DSM), the generator is capable of extremely good separation. (Harris warns that only good test equipment can be used to measure its performance, which KANU's tests soon verified.)

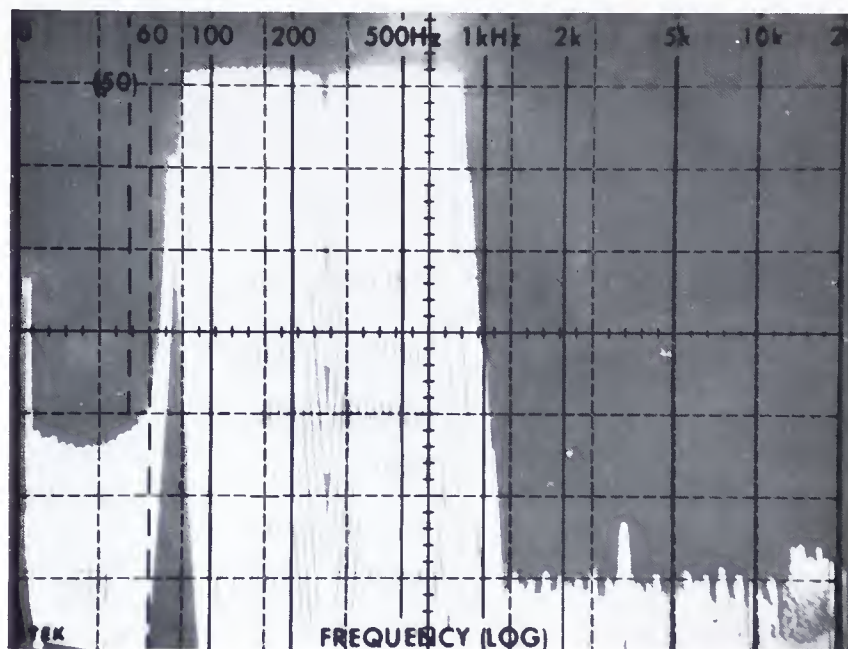


Figure 3 Sweep of L = R from 50 to 17 kHz. Notice lack of interference in SCA region. 0 - 100 kHz. (10 kHz, 10 dB/div.)

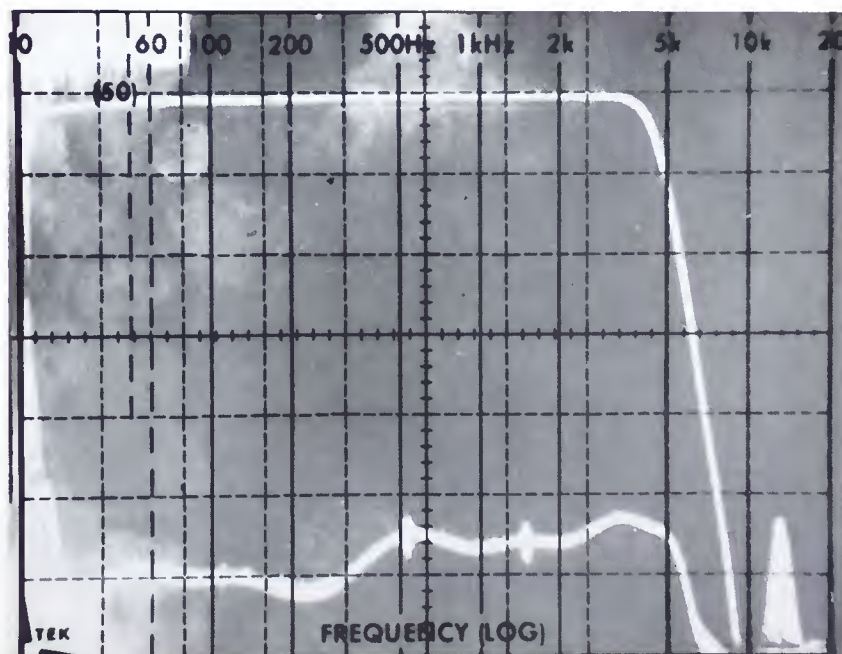


Figure 4 Separation test. Top trace = left channel, bottom trace = crosstalk into right channel. 0 - 20 kHz. (2 kHz, 10 dB/div.)

## Exciter performance

Equipment manufacturers often overlook the need for instruction manuals. But the MS-15 comes with two manuals which weigh a total of five pounds: one contains simplified operating instructions and basic

circuit descriptions; the second contains all the information needed for servicing. Detailed circuit descriptions with complete alignment instructions have been included along with flow charts for troubleshoot-

ing. (For audio and RF broadcast gear this is a first; hopefully, other manufacturers will follow Harris' lead.)

### Performance

Over the past year KANU began using new test procedures which allow rapid, yet thorough, examination of exciter performance. Central to these tests are a Tektronix 5L4N spectrum analyzer and a precision 75  $\mu$ s deemphasis filter. Backing up this equipment are two sets of modulation monitors.

First, the standard tests were run for measuring THD and IM distortion, both of which turned out to be 0.1% or less. Figure 1 shows the composite base band of the MS-15 exciter after demodulation. Notice that there is no 38 kHz present. The analyzer is reading 80 dB down and still no 38 kHz product is visible. The 76 kHz signal is over 70 dB down.

The next test, the hardest for any exciter to pass, requires very good phase response and almost perfect linearity throughout the modulator. In Figure 2, the exciter is swept with  $L = R$  signals at 100% modulation from 50 to 17 kHz. After setting the oscillator frequency, the analyzer sweeps and records any spurs or products generated. This test is very exhaustive because by checking the complete 50 to 17 kHz band rather than a single frequency any errors in the modulator process will be detected. A single frequency test will not necessarily show up problems. Figure 2 shows that the crosstalk,  $L + R$  to  $L - R$ , is greater than 56 dB. Of more importance to a station with SCA is the region around 67 kHz. Note that the signal products in this area are better than 65 dB down. Keep in mind that the photo shows all spurious signals created from  $L = R$  modulation.

Figure 3 shows spurious signals created by modulating only the  $L = -R$  channel. Again, the oscillator frequency was set and the analyzer then swept the base band. Crosstalk is about 45 dB. Note, however, that the area around 67 kHz is again very clean. The products at 67 kHz are 70 dB down, an extremely good figure.

Harris uses the term Dynamic Stereo Separation when discussing stereo generators. The idea is that single frequency tones are fine for tests but separation under actual program conditions is more meaningful. The MS-15 specifies a Dynamic Stereo Separation of 40 dB

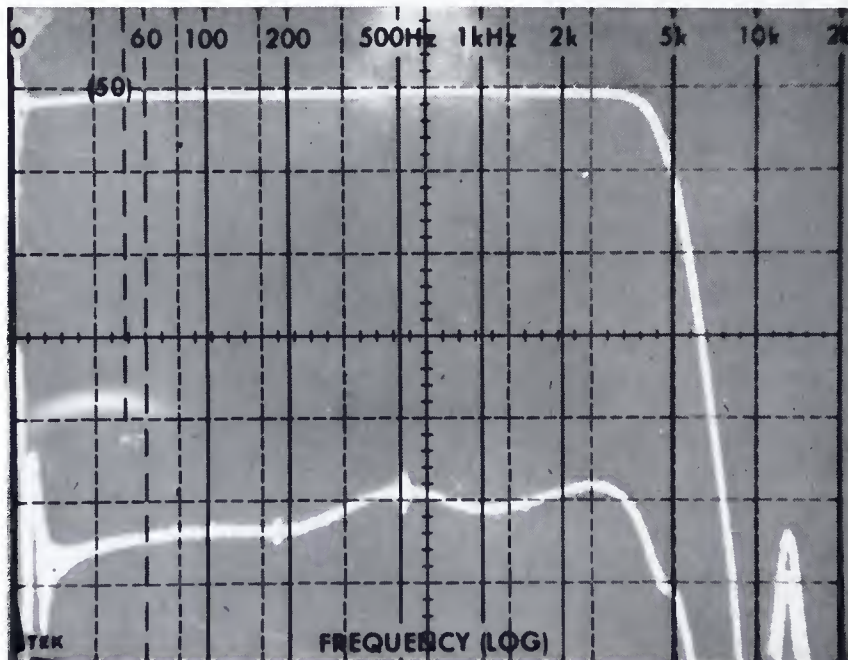


Figure 5 Separation test. Top trace = right channel, bottom trace crosstalk into left channel. 0 - 20 kHz. (2 kHz, 10 dB/div.)

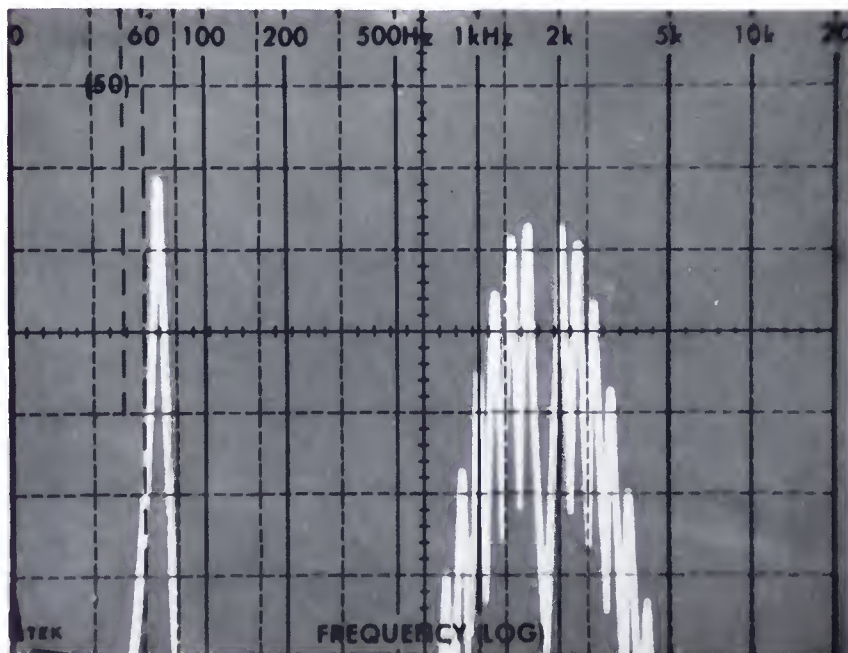


Figure 6 SCA to main crosstalk. Maximum deviation of SCA = +5 kHz. 0 - 100 kHz (10 kHz, 10 dB/div.)

minimum and Stereo Separation as 5 dB minimum. It turns out these are conservative figures.

While a true dynamic test is difficult to record on a spectrum analyzer, the result of a similar test is shown in Figures 4 and 5. In these figures the oscillator output was fed to the appropriate exciter input through the 75  $\mu$ s deemphasis filter. The upper trace shows full modulation on the left and right channel, respectively, and the lower trace is the opposite channel output. The photos show all possible crosstalk from the opposing channel from 50 Hz to 17 kHz. The separation from left to right is over 52 dB across the band and over 48 dB from right to left. The results were spectacular, 50 dB of separation across the band is nothing short of unusual. No other exciter or stereo generator KANU measured could come even close.

#### SCA/main channel crosstalk

Two other tests were performed in the audio analysis of the exciter. The first concerned SCA to main channel crosstalk. The SCA was modulated at 100% ( $\pm 5$  kHz) with a 599 Hz tone. This represents maximum excursion of the SCA carrier. Note that the carrier has disappeared, indicating 100% modulation. Although difficult to see, Figure 6 shows the crosstalk to the main channel to be over 68 dB down. Figure 7 was obtained from a

LS spectrum analyzer on Max store. In this position, the analyzer updates the display any time the input exceeds the presently stored level. Both the main channel and SCA channel were modulated with program material for 3 minutes at 100% peaks. The material was quite dense and the average modulation was very high. The figure shows the excellent separation between main and SCA channels. The notch at 58 kHz is 65 dB down.

Figure 8 was taken from the output of a McMartin TRE 5 SCA receiver. (KANU felt that if it could obtain satisfactory results here, the SCA operators would be happy.) The main channel was again modulated at the 100% level at frequencies from 50 to 17 kHz. After the frequency was set, the analyzer could sweep the output of the TRE receiver. Any display on the analyzer would indicate crosstalk from the main channel. The photo shows that all crosstalk in this test was at least 56 dB below the SCA carrier level.

The results of this test are very impressive. The printed specifications from Harris obviously understate the exciter, in most cases by significant amounts. Although the cost of the exciter is fairly high, the

features, performance and construction make it well worth the price. Any station considering updating its FM exciter would do well to consider the MS-15, especially if SCA is involved. ☐

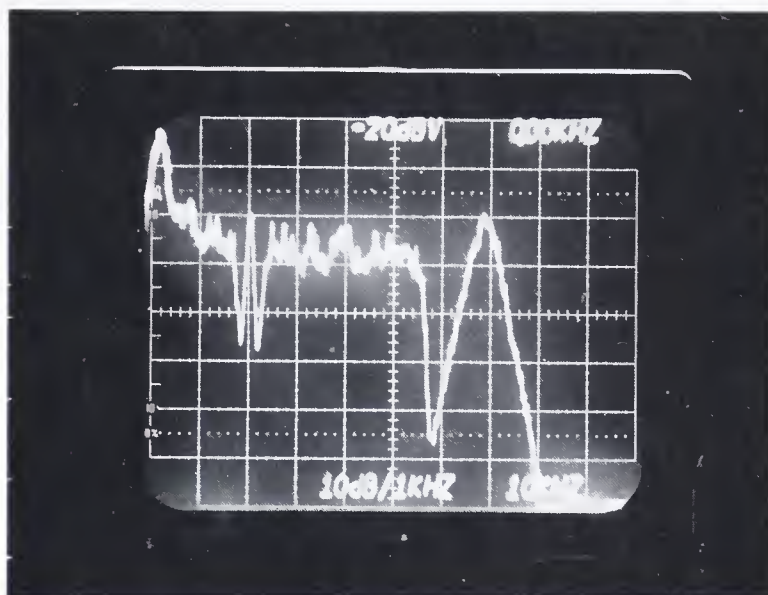


Figure 7 Maximum input levels stored for three minutes. Notice excellent main to SCA separation. 0 - 100 kHz. (10 kHz, 10 dB/div.)

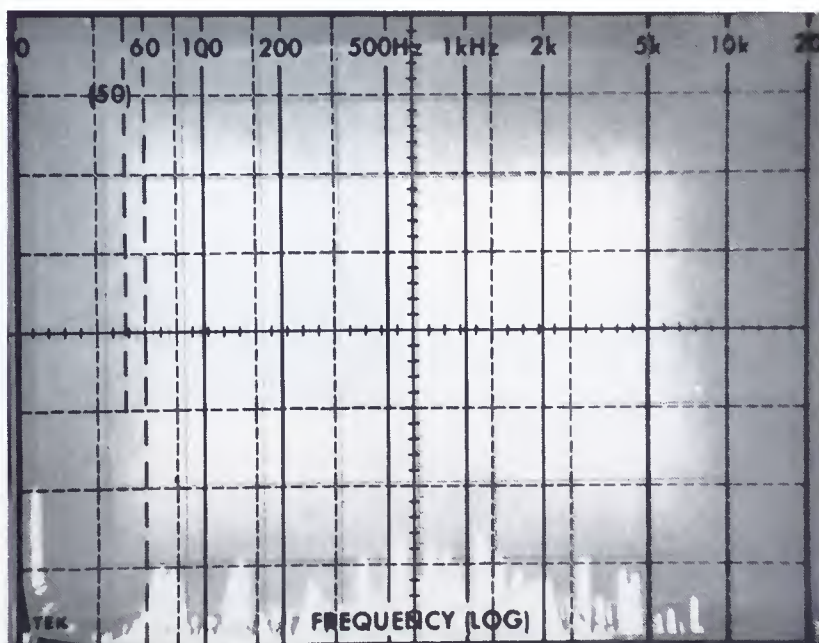


Figure 8 Crosstalk measure on TRE 5 SCA receiver using 150  $\mu$ s deemphasis. (2 kHz, 10 dB/div.) (100% SCA deviation = the -10 dB graticule marking.)

**Editor's note**—With this issue we begin a new department of information to serve broadcasters. It will contain letters from our readers and the industry, short technical notes on advances not long enough for a formal article, highlights of staff visits to stations

and manufacturers and notes of trends that do not fit into our other regular departments. This department provides us a means of communicating briefly on facets of the industry which we have not been able to include before.

## SMPTE and Bay Area broadcasters vibrant with industry activities

Following the SMPTE meeting in San Francisco, I took a few days off to visit a number of radio and television stations in the Bay Area, plus a couple of manufacturers, to discuss a number of aspects of the industry. In particular, I wanted to see what was going on at some various stations while I was in the Golden Gate Area.

### The Ampex tour

At Ampex in Redwood City, I got the grand tour of their spectacular facilities and had an opportunity to discuss broadcast equipment with Mark Sanders, general manager,

videotape recorder group, audio-video systems division. Sanders and I discussed a good many topics, but one I was particularly interested in was the fulfillment of orders for broadcast equipment. Elsewhere in the industry I had heard rumors of complaints that several manufacturers (definitely not Ampex) were having problems with meeting delivery schedules. Sanders assured me that extreme care is exercised at Ampex in order entry and fulfillment and that major equipment orders are generally being filled in 30 to 60 days. Production seems to be so well organized at Ampex that the

exact time for an instrument coming off a production line can be pinpointed well in advance. The only reason why an instrument shouldn't be shipped on schedule, according to Sanders, is if it should fail to pass Ampex's exhaustive QC tests, and this is a relatively rare occurrence.

### A visit to Dolby

I visited the staff at Dolby Laboratories in downtown San Francisco to review the status of Dolby's efforts to help broadcasters reduce audio noise. Because of the interest by broadcasters in top quality

## Eidophor wows audiences

The Eidophor Projection System by Conrac was used at the Miss America Pageant to astound an audience of 23,000 at Atlantic City's Convention Hall. According to Don Pike, engineering supervisor at NBC, the Eidophor provided the brightest picture imaginable in spite of the 5 kW to 10 kW spotlights used on stage.

Ranging up to \$425,000 for a color version, the Eidophor system claims virtually no degradation in color brilliance or hue compared to the original as viewed on a professional TV receiver; unprecedented large image display (up to 50 ft wide screens); image display compatible with a wide selection of sources—TV cameras, VTRs, TV receivers; character or graphic generators, or radar scan converter; and flat screen display for wide angle viewing with low loss and distortion.

This system is expected to have applications where large audiences, such as major sporting events, concerts or rallies, cannot see fine details without optical enlargements.

This system is distributed



through Conrac's System-E Division, 32 Fairfield Place, West Caldwell, NJ 07006. John Lawton Jr., general manager of the division, and Lynn Blascovich, marketing manager, described features of the system and some of its restrictions. "The picture width," they said, "is crucial; optimum viewing ranges from 1-½ to 10 times the picture width. Also, speakers should not be located behind the screen

since there are no perforations for sound transmission."

The system is available with a variety of lenses to accommodate various viewing situations, up to 7,000 lm output, and with remote controls possible. Purchase or leasing plans have been devised to suit customer needs.

For details of this system, contact Conrac directly or circle 600 on the reader service card with this issue.



- Take One or Two
- As Needed for Relief
  - of Systems Proof Headaches.



# BROADCAST ENGINEERING'S AM & FM Proof of Performance Manuals...



Give fast relief for those minor "aches and pains" that arise as you prepare, perform and log the results of your annual systems proof. Here's what you get:

## THE AM PROOF

The AM Proof-of-Performance Manual is a complete guide to the AM E.P.M. Like the FM Proof-of-Performance, this manual includes *all* the required logging forms and everything you need to know to complete your performance measurements...including a chapter devoted to testing for transmitter harmonic output suppression.

## THE FM PROOF

Broadcast Engineering's FM Proof-of-Performance Manual includes: All required logging forms for pulling *both* mono and stereo proofs. A complete chapter of FCC Rules. Dozens of helpful troubleshooting tips and time-saving measurement and logging techniques. Detailed procedures on how to *pre-test* your station before pulling the Proof. And more.

### *Both Proof Manuals show you...*

- how to prepare the test equipment
- how to connect the test equipment
- an efficient method of measurement and a look at the performance requirements
- how to use the data summary sheet and evolve the graphs
- how to comply fully with FCC rules and standards

# BROADCAST<sup>®</sup>

## engineering

P.O. Box 12901, Overland Park, Ks. 66212

Please send me \_\_\_\_\_ copies of the FM  
Proof-of-Performance Manual @ \$7.95 each

Please send me \_\_\_\_\_ copies of the AM  
Proof-of-Performance Manual @ \$7.95 each

Please send me \_\_\_\_\_ sets of the FM and  
AM Proof-of-Performance Manuals @ \$14 for BOTH.

Volume discounts available on request.

☐ My check or money order is enclosed

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

NOTE Broadcast Engineering pays the postage on all orders!

March 1979 *Broadcast Engineering* 199

## Feedback

sound, especially in FM stereo, Dolby's business in noise reduction appears to be quite prosperous. Dolby is continuing to look for new market areas to penetrate, and some of these are expected to be revealed at NAB in Dallas.

One of these areas could be the incorporation of Dolby into VTRs and VCRs. This would be an even greater possibility should the TV industry go the direction of stereo for the audio portions of the programs such as we witnessed at SMPTE in New York for stereo TV as demonstrated from Japan.

There is rumor that manufacturers of tape editing systems may be moving toward incorporating Dolby noise reduction in their editing machines. One manufacturer already doing this is Bosch-Fernseh with use of Dolby in their BCN 40/50 editing systems. By the time NAB-Dallas rolls around, other manufacturers may be using this feature also.

### KBHK

At KBHK (Channel 44), I discussed the operation of an independent station with John Nielsen, engineering manager. Unlike the VHF stations, KBHK does not produce news programs but has found a good marketplace in other programming. Nielsen gave me a tour of the facilities under construction which soon will be operational. He said that one of their major problems is in finding and keeping good people for the engineering division. This concurs with the problem mentioned in the final SMPTE conference session where many stations express concern about obtaining qualified people at all levels of engineering and maintenance. Nielsen said that they have tried many avenues and that they simply have not found a convenient way to recruit new people into the industry.

### KSAN

Just down the street from Dolby, I visited KSAN 95FM, and it was a madhouse of activity. A British group known as "The Clash" had just finished a recording, and engineer Beverly Wilshire was getting ready to switch into the mid-afternoon news as I toured these facilities. KSAN uses the Dolby noise reduction in broadcasting, but the facilities are located at their transmitter rather than in the studio. Engineer Rick Sadle gave me the grand tour and showed me not

only their studio facilities but described in some detail their remote recording truck.

### KRON

Later in the evening I was able to get a complete tour of KRON (Channel 4), an NBC affiliate. Engineer Craig Bass gave me a thorough tour, filled me in on their service to the area, and arranged for me to witness the production of their 1-hour news program beginning at 6:00 PM. This session was of particular interest to me because Channel 4 features an old acquaintance of mine from Cleveland, John Hambrick, as anchor man. Channel 4 uses the Grass Valley switcher and E-MEM switcher and video effects machine to enhance their celebrated news program. Channel 4 which employs 72 engineers, is giving a greater emphasis to ENG now than previously, and is stepping up their production capabilities to provide local programs, especially in the area of developing commercials for large San Francisco accounts.

### KPIX

At KPIX (Channel 5) a CBS affiliate, I arranged with Don Lincoln to scale the tower at Mt. Sutro. If you haven't met Don, you might want to read his article beginning on page 38 of the January issue of **Broadcast Engineering**. Don walks our readers through these facilities and appears himself in several pictures. Together we scaled the tower and got a magnificent view of San Francisco from the 6th level, over 700 ft above ground. In addition to briefing me on the KPIX transmission facilities, Don also introduced the Channel 7 staff (in the same building) to me. I did not visit the KPIX studios on this visit, mainly because KPIX is getting ready to move to new headquarters just a few blocks from Dolby Laboratories. When this move is completed, **BE** will cover the new installation's design and features.

### KNBR/KYUU

At KNBR/KYUU, an NBC affiliate, I discussed station operations with Bill Newbrough, manager, technical operations. This visit was almost like an old homecoming because Newbrough used to work with Pat Finnegan who wrote extensively for **BE** in the past. Newbrough gave me a tour of their facilities, showed me their engineering control console,

and seemed particularly pleased with the performance of their relatively new McCurdy control console and their banks of 10 automatic cartridge machines. They have 20 engineers on the staff, including four females.

### KKHI

At KKHI, high in the St. Francis Hotel, I visited with engineer, Steve Woodlord, and classical music librarian, David Knight. They also use the Dolby noise reduction equipment and indicated that their loyal listeners have expressed great appreciation for the high quality of their programming and transmission. Since they simulcast on AM and FM, listeners in San Francisco can also get their beautiful music on their AM dial at 1550. I listened to this channel on my way up to Mt. Sutro and enjoyed some beautiful music.

### KGO

At KGO, an ABC affiliate, I was able to talk to radio and television people under the same roof. Although the engineering department for Channel 7 was locked up in planning sessions, I was able to get a tour of the facilities and see one studio in operation, tour the engineering control center, and see the installation for two new Ampex recorders. The Ampex equipment had been uncrated just the day before, but they were working perfectly. There are more than 380 people on the KGO Channel 7 staff, 80 of whom are involved in developing a crackerjack news program.

On the radio side of KGO, I talked extensively with Veldon Leverich, chief engineer. Of all the people I visited with in San Francisco, Leverich asked the most penetrating questions regarding the health of the broadcast industry as we saw it from the publishing side and delved most deeply into the business of publishing broadcast magazines themselves. He then gave me the tour of the facilities and showed me the control rooms, new studio construction areas, and the maintenance/design engineering section. I saw some consoles in production which are not available commercially, and I expect to be publishing an article on these developments when they are completely in use.

**Bill Rhodes**, editorial director.

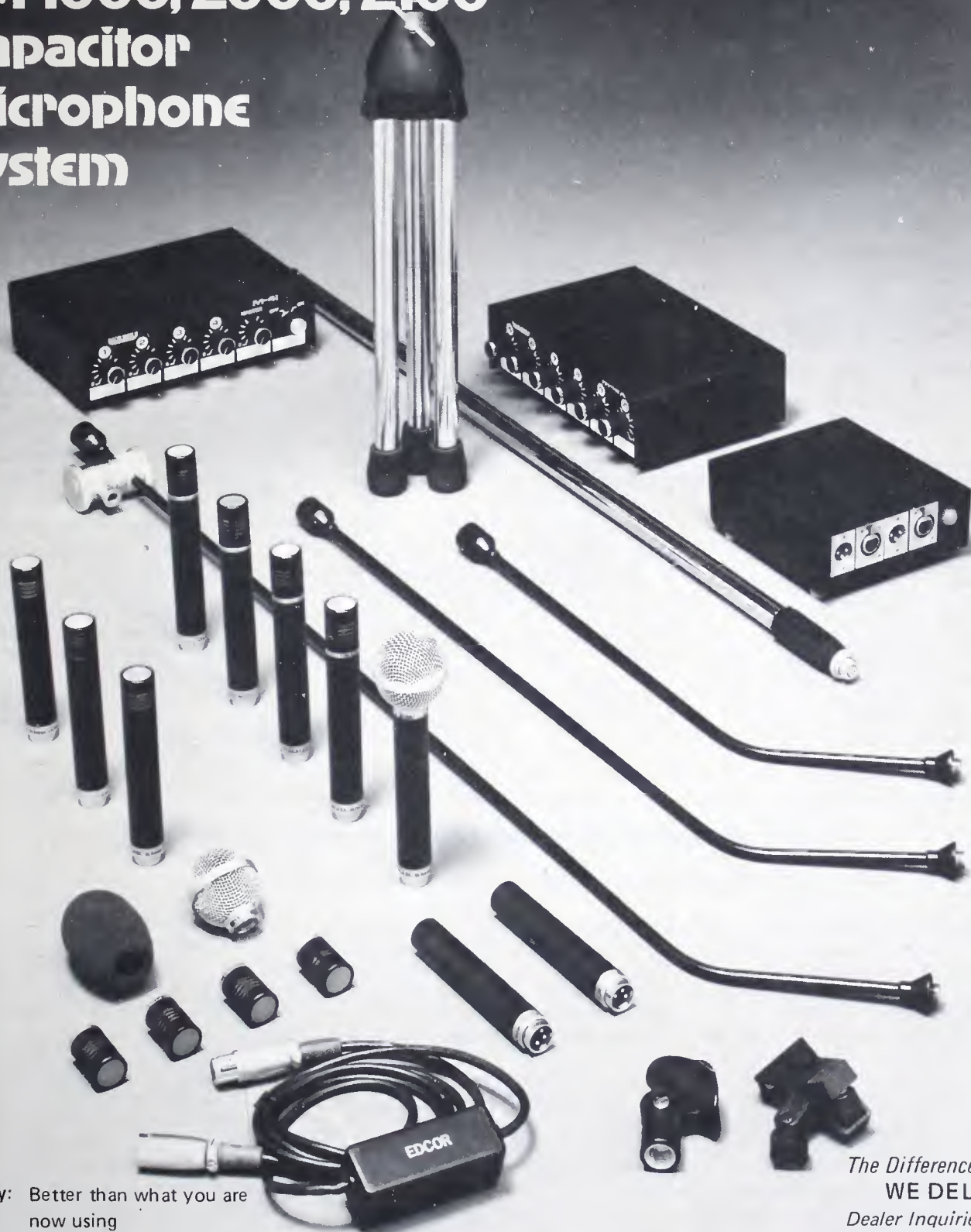
# Edcor Cabrec

## CM 1000, 2000, 2100

### Capacitor

### Microphone

### System



**Quality:** Better than what you are now using

**Pricing:** A shade less

**Service:** Quicker than what you are use to

**Specs:** Please compare

**Delivery:** How quick do you want them?

*The Difference*  
**WE DELIVER**  
*Dealer Inquiries Invited*

*Edcor*

16782 Hale Avenue • Irvine, CA 92714 • (714) 556-2740

Circle (169) on Reply Card



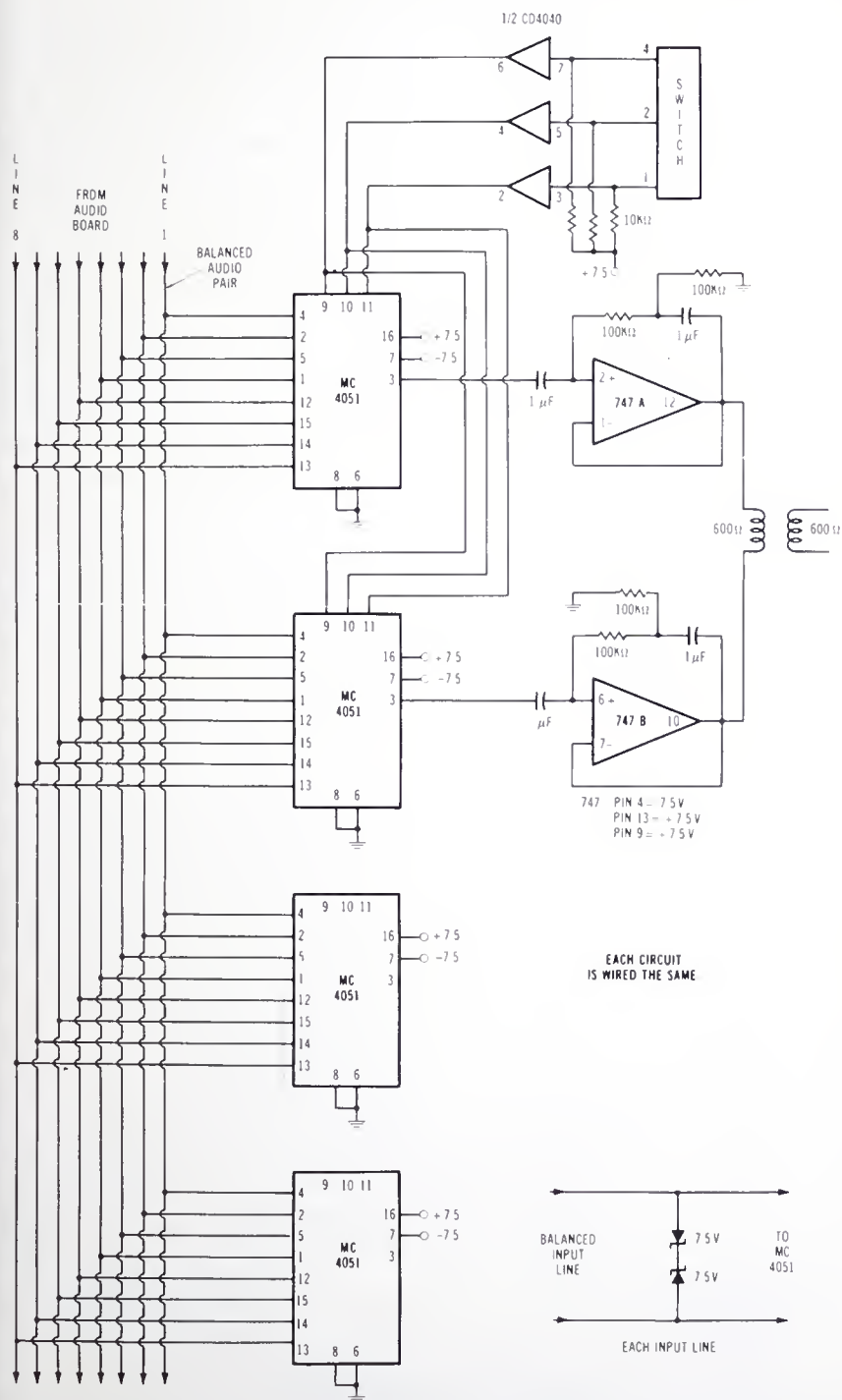
and one 7912 voltage regulator, one bridge rectifier, filters and two 7.5V zener diodes.

The on/off switch was placed in the back of the unit to prevent accidental turn off. The MC4051s should always be powered up before any input signal is applied. That will prevent the chip from latching up.

We used wire wrap techniques to build the boards, being very careful

to dress the audio wires neatly and in a straight line (not crossing each other) and using shielded audio wire for all inputs and outputs.

We built an 8x10 matrix (80 crosspoints) and contained it in a 1½"x19"x15" package. The cost was less than \$8 per crosspoint. Crosstalk between channels on the MC4051 is specified at 100 dB. On our output lines, crosstalk was between 70 and 80 dB down. □



Send us your

## Station-to-Station

ideas. We'll send you the NAB Engineering Handbook



If your equipment tips or other operating ideas are selected by **Broadcast Engineering** to appear in Station-to-Station, you will receive a free copy of the prestigious *NAB Engineering Handbook* (or a cash payment, if you prefer).

The latest *Handbook* contains over 1,000 pages and 1,000 illustrations covering every aspect of AM, FM and TV operation and maintenance; recommended procedures, fundamentals, standards, rules and how-to instructions.

Station-to-Station affords you an opportunity to share your expertise with readers throughout the industry: how you solved a nagging technical or production problem, modified a circuit for more flexibility, redesigned a studio or facility, developed new test procedures or employed an operating idea to save time and money. By sharing your knowledge, you'll share in the wealth of information contained in the *Handbook*.

Send your items to: Station-to-Station editor, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. Please indicate if you want to receive the *Handbook* or prefer to receive a check.

The *Handbook* can also be purchased directly from the NAB at \$30 a copy for NAB members and \$45 a copy for non-members. Write to: Station Services Dept., NAB, 1771 N Street, N.W., Washington, D.C. 20036.

# Video Jacks Plugs Patch- Cords

GENUINE  
WESTERN ELECTRIC

BRAND NEW GUARANTEED  
(WHILE PRESENT STOCKS LAST)

CURRENTLY USED BY THE NETWORKS  
AND THROUGHOUT THE BROADCAST  
INDUSTRY

AT SURPLUS PRICES

|                    |        |
|--------------------|--------|
| 477B JACKS, 75 OHM | \$5.00 |
| 372A HAIR PIN      | \$6.00 |
| 358A PLUGS         | \$3.50 |

LARGE STOCK AUDIO JACKS, PLUGS,  
PATCH CORDS, PATCH BAYS

SCREEN ROOM POWER FILTERS

P-LINE—TELEPHONE LARGE  
EQUIPMENT STOCK  
IMMEDIATE DELIVERY

TELECTRIC  
CO.

1218 VENICE BLVD.  
LOS ANGELES, CAL 90006  
213-748-2281

Circle (195) on Reply Card

## Station-to-Station

### Automatic recording of EBS messages for rebroadcast

By Paul Hurd, chief engineer, WHDH/WCOZ, Boston, MA

The EBS system at WHDH/WCOZ consists of two receivers. A Rivers Du-Alert 2 receiver monitors WCBS or WABC, in New York, for national level tests or emergencies. A TFT model 760 monitors the local FM relay for state emergencies.

A constant audio output is available on the TFT receiver. The Rivers unit was modified to provide a constant audio output. This was achieved by taking the audio signal from the receiver, before the monitor switch or relay, at the input to the decoder board and routing a parallel feed to the rear panel and a two position barrier strip. As we are feeding the audio to a high impedance bridging input on the cassettes machine, there is no problem with loading.

The output of the receiver is connected directly to an inexpensive cassette recorder's audio input. As shown on the schematic, the remote start feature of the cassette machine is connected to the relay (KH 4703-1 or equal). The cassette machine is placed in the record mode and left engaged constantly.

When the EBS receiver goes into the alert mode, the normally open contacts of its alarm relay close, completing a ground return for our K1. The external K1 is latched through one set of contacts and a N.C. reset switch. To indicate reception of a test, 24 VDC is also fed to a lamp mounted on the rack panel. A third set of contacts switches the cassette machine remote start. A normally open switch was also installed to permit testing of the cassette machine without

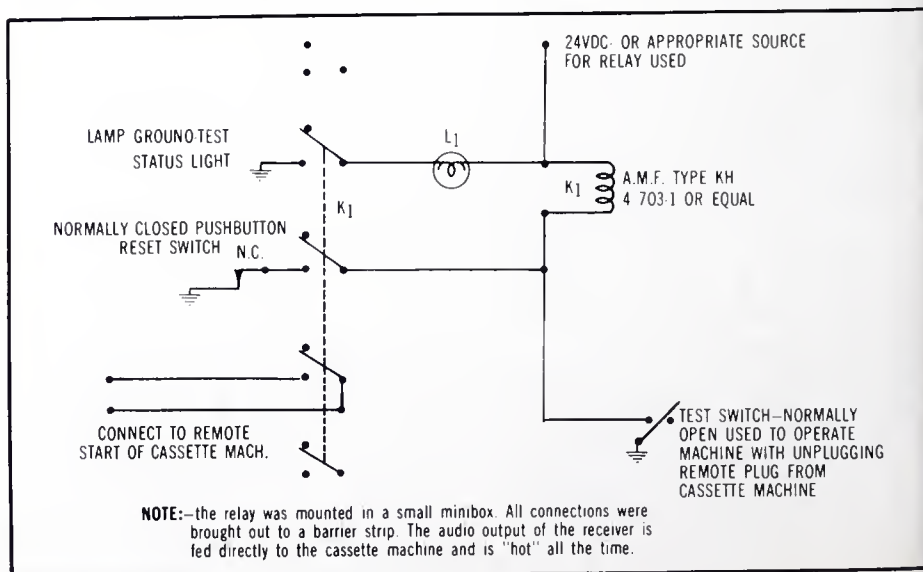
having to unplug the remote control.

An operator's first reactions when the EBS receivers' alarm goes off is to reset the alarm condition. By building a silent external alarm system, using constant audio from the receiver, the EBS alarm may be reset without resetting the aircheck system. The aircheck is left running long enough to determine the nature of EBS alert. If it is a test, then the cassette is rewound to prevent confusion in later playback. If the message is an emergency message, such as NOAA alerts for storms, hurricanes, tornados, etc., then the message may be dubbed to cartridge or aired directly from cassette. This system insures that the operator will not have to manually copy information, with the potential for serious errors, and will guarantee the ability of the station to accurately rebroadcast emergency messages.

A side benefit of the aircheck package is a backup on our own log keeping. By playing back the cassette we may confirm whether or not we have received EBS tests and not logged them, or if there is in fact a failure in our EBS receiver.

If the relay contacts, provided on the EBS receiver, are already in use with an external alarm panel, such as the WHDH/WCOZ, we simply use steering diodes to isolate the two relays.

By using an inexpensive machine such as a Panasonic RQ-413-AS or a Sony TC-110, you can easily provide a simple, reliable, carefree method of ensuring the broadcast of critical information in time of emergency.



# new literature

.....

## Snap-action switches

**Cherry Electrical Products**—A 16-page handbook contains national standards for snap-action switches and is designed to give switch users a working knowledge of switch testing methods. Application procedures, specifications, markings, creepage and clearance distances and electrical life requirements are also included.

Circle (550) on Reply Card

## Broadcast transmitters

**Bayly Engineering**—A 32-page brochure contains information on the broadcast transmitters to be marketed in North America by Bayly, a member of the AEG-Telefunken group. Transmitter configurations, as well as technical data on longwave, mediumwave and shortwave transmitters are detailed.

Circle (551) on Reply Card

## Electronics magazine

**Ampex**—A semiannual magazine offered by Ampex has been developed to increase the flow of information within the electronics community. *Horizons* will feature articles on developments made by Ampex engineers and researchers in various disciplines.

Circle (552) on Reply Card

## Antennas

**Phelps Dodge**—A catalog sheet illustrates the series of super power, circularly polarized FM broadcast antennas with descriptions of the three models in the series. Electrical and mechanical specifications also are included.

Circle (553) on Reply Card

## Drafting aids

**Webtek**—The By-Buk Brand Printed Circuit Drafting Aids Catalog No. P-55 is a 12-page publication which contains hundreds of shapes, patterns, and conductor line tapes for the preparation of printed circuit artwork. Patterns and shapes are shown for 2-times and 4-times scales with basic dimensional references in standard and metric measures.

Circle (554) on Reply Card

## Wire terminals

**AMP**—A Purchasing Man's Guide to Wire Terminals is a 12-page brochure which explains the terminology and characteristics of crimp-type terminals. Illustrations of application tooling from simple handheld crimping tools to fully automated lead-making machines.

Circle (555) on Reply Card

## Applications articles

**Semiconductor Circuits**—The November 1978 issue of *Watts Up*, the corporate publication for Semiconduc-

**NEW!** The most useful  
audio tool your  
station may ever buy.



**FORGET THE PAST!** The new ARA-1612 "electronic patch panel" will provide your sterec or mono station with flexibility and performance that, until now, you could only wish for. And at about the same price as todays patch panel systems.

Local and remote access to all station audio sources simultaneously and individually. No more signal degradation due to branching or impedance mismatches. No more operator interruptions due to patch panel limitations. In fact, the basic system can feed from 16 sources to 12 different locations at once. Expansion capabilities to 45 in and as many out as needed.

In addition the ARA features — local and remote lighted output status displays — individual, gain adjustable, input amplifiers — programmable output cards for stereo and/or mono feeds — dual, instantaneous switch over, power supply for 100% on air reliability — balanced in and out — and a lot more. All backed by a 2 week trial period and our famous 2 year warranty. Priced from \$1099.

Don't delay! Write, call collect or contact your nearest RAMKO Rep. today. Ask for our new full color brochure, #ARA 379.

**RAMKO** RESEARCH

11355 "A" Folsom Blvd.  
Rancho Cordova, Calif. 95670  
(916) 635-3600

Circle (176) on Reply Card

March 1979 *Broadcast Engineering* 205

# TOWER WARNING LIGHTS



## Complete Kits

New/Improved solid state microwave control for easier maintenance. Many special features. 300mm Beacons • Flashers • Obstruction Lights • Photo Controls • Isolation Transformers • Lamp Failure • Alarm Systems • Meets all FCC/FAA Regulations • Technical Support Provided.

# HUGHEY & PHILLIPS

3050 N. California St., Burbank, CA 91504

Circle (90) on Reply Card

## Numbers can make all the difference.

It is always a serious error to ignore numbers or talk about them in vague terms. BPA (Business Publication Audit of Circulation, Inc.) guarantees the circulation figures of our member magazines — issue after issue. When you advertise in BPA-audited magazines, you get precise, nonpromotional numbers.

# BPA

We count, so  
your ads will.

## New literature

tor Circuits, contains applications articles on such topics as watch temperature specifications, power source selection, partitioned power and backup batteries in uninterruptible power supplies. New product and literature descriptions also are included.

Circle (556) on Reply Card

### Minicomputer accessories

Minicomputer Accessories—The Winter '79 catalog contains 64 pages of over 800 products including line-printer ribbons, printwheels, computer paper, binders and furniture for the computer room. Also included are in-stock cables and connectors available on a 24-hour-shipment basis plus special cables designed and built on a modified-standard or a custom-built basis.

Circle (557) on Reply Card

### Broadcast equipment

Micro Communications—A 10-page bulletin contains illustrations and specifications on such equipment as circular polarized TV and FM antennas, diplexers, combiners, direction couplers and notch filters.

Circle (558) on Reply Card

### Micro-miniature switches

CW Industries—A 2-page technical bulletin describes the new additions to their line of micro-miniature switches. A line diagram with callouts illustrating the construction and operation features as well as detailed specifications and possible circuit configurations are included.

Circle (559) on Reply Card

### PC terminals

CTS of Asheville—Data sheet 2100B contains two printed circuit terminals available for wire-wound Series AW potentiometers produced by CTS. Electrical and mechanical specifications as well as features and constructions are detailed.

Circle (560) on Reply Card

### Storage oscilloscopes

Gould—A 6-page bulletin contains illustrations and descriptions of two digital storage oscilloscopes designed for flicker-free and fade-free viewing of long-term events and transients. Advantages of digital signal storage and specifications of two portable dual trace models are included.

Circle (561) on Reply Card

### Transmission cable

Brond-Rex—An 8-page brochure on the various configurations in signal transmission cables contains technical data and charts which examine twisted pairs, three types of coaxial cable, twin-and-tri-lead, flat flexible transmission tape cable and fiber optics. Charts range from a comparison of signal transmission cables to coaxial cable characteristics.

Circle (562) on Reply Card

# Perfect Timing

## MASTER CLOCK SYSTEMS



### CHOOSE THE RIGHT ONE FOR YOU!

If seeing the same time on all your clocks is important, select **ES 192** - Line Frequency timebase, for only \$286.

If a guaranteed accuracy of three seconds per month is what you want, choose **ES 160** - \$775.

How about one second per month? **ES 160/1** - \$935.

Or National Bureau of Standards accuracy! **ES 190** is synchronized to Radio Station WWV to provide a Master with unquestioned accuracy. \$935 with receiver and antenna.

For a Time/Temperature Master, ask for **ES 196** - \$675

**ESE Master Clock Systems** are simple to install. All Masters have a Serial Time Code output, able to drive twenty slave displays without buffering. Slaves range in size from .3" LED to 4" Electromagnetic displays, priced from \$130 to \$404.

IF YOU ALREADY HAVE A SYSTEM AND WANT TO EXPAND IT, get the **ES 167** Serial Time Code Generator (\$130), then add any number of our low cost slaves.

Many, many options and accessories are available. Ask us about them. Our brochure tells the whole story, but not for long. We keep adding new products.



Write, Wire or Call: (213) 322-2136

142 SIERRA STREET • EL SEGUNDO, CALIFORNIA 90245

### Tape noise reduction system

**DBX**—A product specification sheet contains information on the model 208 8-channel tape noise reduction system. Photographs, specifications and applications are included.

Circle (563) on Reply Card

### Power processors

**TRW Power Semiconductors**—An 8-page booklet describes the various techniques for designing power processors with high-power Darlington transistors and Schottky diodes. Six proven designs of switchers used for low-voltage, high-current switching power supplies are illustrated.

Circle (564) on Reply Card

### Video and control systems

**American Laser Systems**—An 8-page brochure describes the application and use of optical communicators to transmit high quality video, audio and control signals. A discussion of how this wireless, license-free means of communication works is followed by numerous examples of where the systems are used in network television, entertainment, medicine, industry and automated industrial control.

Circle (565) on Reply Card

### Data logger

**Datel**—A 20-page catalog announces a micro-power cassette data logger. The system is contained in a module, occupying 134 cubic inches, weighing less than two pounds and operating from a single 12 Vdc source. It requires 900 mW when recording. The catalog features system anatomy, inter-connection block diagrams, timing information and system specifications.

Circle (566) on Reply Card

### Semiconductor replacement guide

**GTE Sylvania**—The third supplement of the 1978 Sylvania ECG Semiconductor Master Replacement Guide is a 32-page publication containing data on 47 new ECG devices and approximately 3230 industry parts numbers.

Circle (567) on Reply Card

### Engineering note

**Oranetz**—True-RMS or Average Sensing in AC Measurements—Which is Best for your Application?, the fourth in a series of engineering notes on power system measurements, defines the problem and offers suggested solutions.

Circle (568) on Reply Card

### Power supply journal

**Semiconductor Circuits**—A 12-page issue of Watts Up at Semiconductor Circuits features four tutorial mini-articles on power source applications. New products and a catalog and engineering guide also are included. □

Circle (569) on Reply Card

Circle (177) on Reply Card

**REPLACEMENT TRANSFORMERS**  
FOR GATES, COLLINS, RCA, ETC.



**HEAVY DUTY REPLACEMENT UNITS**

GATES BC1E PLATE TRANSFORMER...\$350.00  
GATES BC1F PLATE TRANSFORMER...\$350.00  
GATES BC1H PLATE TRANSFORMER...\$350.00  
GATES BC1T PLATE TRANSFORMER...\$350.00

GATES BC1G MODULATION TRANSFORMER...\$400.00  
GATES BC1T MODULATION TRANSFORMER...\$400.00  
GATES BC5P MODULATION TRANSFORMER...\$1000.00

**FILTER CHOKE:**

5.0 HENRIES 1.0 ADC...\$175.00  
8.0 HENRIES 1.5 ADC...\$200.00

**MODULATION REACTOR:**

40 HENRIES 0.6 ADC...\$400.00  
35 HENRIES 1.0 ADC...\$500.00

MANY OTHER PLATE, FILAMENT, AND MODULATION TRANSFORMERS ALSO AVAILABLE. CALL US FOR A FREE QUOTATION ON ANY TRANSFORMER OR REACTOR. LARGE STOCK AND FAST SERVICE ON CUSTOM UNITS. REWINDING SERVICES ALSO AVAILABLE.

24 MONTH GUARANTEE ON ALL ITEMS

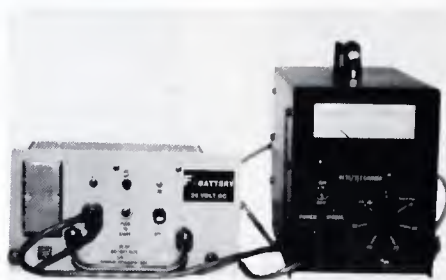
**Peter W. Dahl Co.**  
4007 Fort Blvd. • El Paso, Texas 79930

Circle (178) on Reply Card

## new products

### Battery packs

Frezzolini Electronics model HL33/35NC "F" battery packs are designed to supply power for the Ikegami HL-33 and HL-35 hand-held video color cameras and are interchangeable with Ikegami battery packs.



The battery features high-capacity sealed cylindrical nickel-cadmium cells with a capacity of 7 AH (ampere-hours) at 12.5 Vdc for 2½ hours camera operating time.

Circle (570) on Reply Card

### Surge protectors

Dymo Engineering introduces 12 hard-wired models of line surge protectors with power line hash, glitches and RF interference reduced to a minimum.



The surge suppressor absorbs the energy from transients that exceed the protection level and the ferrite filter suppresses spikes, transients and noise that fall below the level of the surge protector.

Circle (571) on Reply Card

### Microphone stand

Model PS-S microphone floor stand available from Atlas Sound features the exclusive touch control clutch instead of the customary rotary adjustment.



Standard features include solid steel legs for weight support, built-in retention locking assembly and a non-reflective black epoxy base with oversized triangular knob. The stand is suitable for auditorium and stage use, both indoors and outdoors, and terminates in US standard 5/8-inch - 27 male threads compatible with all microphone holders. Height extension is from 39-inches to 62-inches with telescoping to 36-inches for shipment.

Circle (572) on Reply Card

### Editing system

Mach One Digital Systems has introduced a computerized videotape editing system which provides a full range of editing capabilities including off-line editing, on-line editing, text editing and assembly (autoedit) functions.

The DEC LSI-11 computer is programmed to control nearly any

**CDE CORNELL-DUBILIER**

## Transmitting Mica Capacitors



**STOCK DELIVERY ON MOST RATINGS**  
ITT JENNINGS  
VACUUM CAPACITORS  
Amperex Vacuum Capacitors

**SURCOM ASSOCIATES**  
305 Wisconsin Avenue  
Oceanside, California 92054  
(714) 722-6162

Circle (179) on Reply Card

# PERFECT TIMING

## Low Cost ESE Right On Timers



- ES-300: Four digit incandescent display, one hundred minute timer (99:59) with six controls: Count Up, Count Down, Min-Set, Sec-Set, Stop, Reset. \$187.00
- ES-301: Identical to ES-300 except with planar, gas discharge display. \$206.00
- ES-302: Equivalent to ES-301 plus fast-set lever wheel programing. \$264.00
- ES-400: Three digit ten minute timer (9:59) with Start, Stop, Reset. \$109.00
- ES-510: Four digit sixty minute timer (59:59) with Start, Stop, Reset. \$139.00
- ES-500: Six digit, twelve hour combination clock/timer with five controls: Start, Stop, Reset, Fast Advance, Slow Advance. \$166.00

**STANDARD OPTIONS AVAILABLE:** Kit; Slave; BCD Output; Remote Connector; 6' Remote Cable and Pushbutton Set; 220V A.C., 50Hz; 9" or 19" Front Panel 3 1/2" 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.



WRITE, WIRE OR CALL TODAY

142 Sierra Street

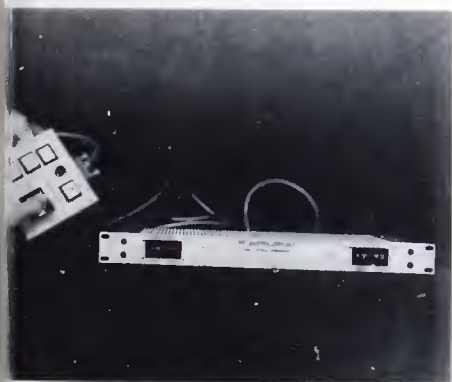
El Segundo, California 90245

(213) 322-2136

Circle (180) on Reply Card

### Video reticle generator

Gray Engineering Laboratories is marketing a video reticle generator which permits precise positioning of a title anywhere in the "safe title" area.



Designated the VR-116, the unit features independent control of both safe action and safe title limits programmable by frontpanel thumb-wheel switches. Two video outputs to monitors are provided and a remote control box allows the control unit to be located up to 18 feet from the base unit.

Circle (573) on Reply Card

### Head-worn microphone

A lightweight, head-worn microphone by Shure Brothers features dual monitoring capability for use in

## Consoles for All Reasons — The Logitek Custom Audio Series

A full line of **modular 1-12 channel** on-air and production consoles, designed for unbeatable quality and performance. **Mix and match** features to meet your needs. Standard features include: quiet **electronic switching**, **switch-selectable muting**, **8W cue amp**, and **separate headphone and speaker circuits**. Options include built-in **15 watt headphone amp**, bass and treble **equalization**, and **reverb**. Unequaled ease of operation, installation and servicing. At affordable prices. Write or call for illustrated literature on our full line of broadcast equipment.

From the leaders in broadcast innavation

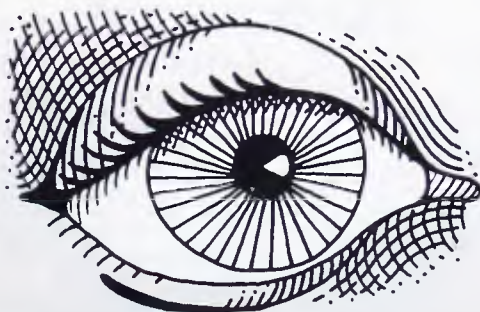
**Logitek** Electronic Systems

See us at NAB Booth 2111

P.O. Box 25304, Houston, Texas 77005

Phone (713) 523-7878

Circle (181) on Reply Card



## March of Dimes

TO PROTECT  
THE UNBORN AND THE NEWBORN

THIS SPACE CONTRIBUTED BY THE PUBLISHER

# Look!

Birth defects are forever.  
Unless you help.

# RESISTIVE PAD MANUAL

Where did you find the resistor values for the last pad that you built? In the back of a dog-eared equipment catalog? Did you fight with formulas and "k factors" from a textbook?

Here at last is a single data source for building all sorts of RESISTIVE PADS. Easy-to-use charts give precise resistance values for "T", "H", "Pi", and "O" pads in 1 dB steps up to 60 dB. Includes charts for 600 and 150 ohm pads plus 600-to-150 ohm matching pads.

RESISTIVE PADS also contains detailed explanations of VU meter pads, bridging pads, lattice splitting pads, and more!

Order your copy of RESISTIVE PADS for only \$6.95, postpaid.

**ELECTRIC SOUND OF MINN.**

P.O. Box 634

Anoka, Minn. 55303

Money back guarantee

Circle (183) on Reply Card

# TECHNICAL PROBLEMS PLEASE STAND BY



Tape tension in your video recorder or player is the most important factor for trouble-free operation. Using the TENTELOMETER® will save your tapes and help assure high quality reproduction. It is so easy to use, even a non-technical person can perform critical maintenance checks.

Send for our complete data sheet and a free copy of the 16-page tape tips instruction manual. Price \$195 complete.

50 Curtner Avenue  
Campbell, CA 95008  
(408) 377-6588

"See us at NAB, Booth 395"

Circle (184) on Reply Card

## New products

various studio and remote broadcast applications.



The unit, designated SM14, consists of a headband, unidirectional dynamic microphone and two integral earphone assemblies to permit separate sound source monitoring. The earphone assemblies have separate transformer and phone plug.

Circle (575) on Reply Card

### Color camera

The CEI-310 broadcast color television camera system from Commercial Electronics Corporation features a lightweight camera head, modular configuration for field production or studio use and an electronics unit which contains much of the electronics previously contained within the camera head.

The camera, with optional time code generator, supplies time of

day, frame count and other user-specified digital information for recording on videotape.

Operational controls include tint, auto white balance, black stretch



monitor switching, tally/call, master pedestal, manual iris, and a full complement of setup controls.

Circle (576) on Reply Card

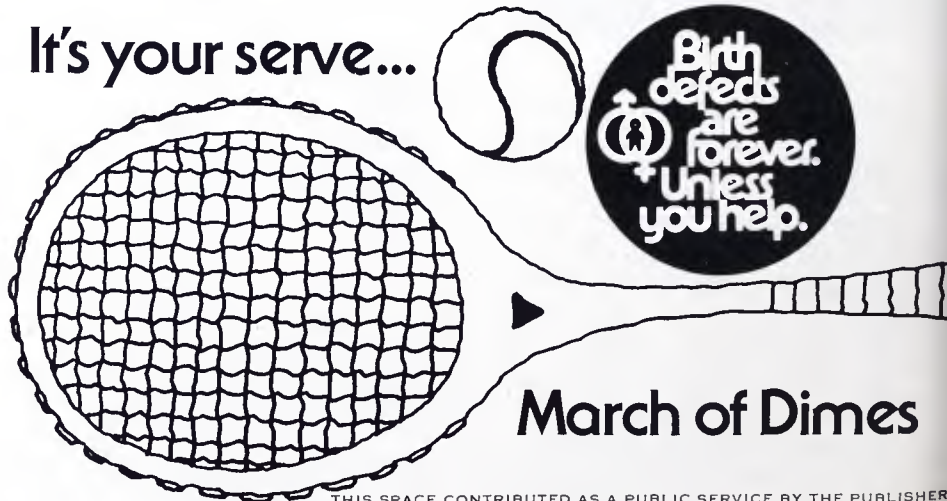
### Monitor headphones

Dynamic stereo headphones suited for sound monitoring while recording live performances or off-the-air are available from Sony. Accurate sound clarity and wide frequency response are possible with the lightweight, folding headphones.

The 50 cm cone-type drivers have a 110 dB/mW sensitivity with an impedance of 28  $\Omega$  at 1 kHz.

Circle (577) on Reply Card

It's your serve...



March of Dimes

THIS SPACE CONTRIBUTED AS A PUBLIC SERVICE BY THE PUBLISHER

### Camera platform

An adjustable balance, quick release camera platform designed to fit all of its model 50-D fluid camera heads has been introduced by O'Connor Engineering.

The adjustable balance feature allows the camera to be shifted back and forth on the head while the quick release feature allows instant removal of the camera from the platform with the camera mounting plate attached.

Circle (578) on Reply Card

### Oscilloscope

Tektronix's has introduced a general purpose plug-in oscilloscope that is totally compatible with all standard 7000-series plug-ins.



Technical features include full 1 GHz bandwidth, horizontal (X-Y) bandwidth of dc to 350 MHz, photographic writing speed of 20 cm/ns, full sweep-triggering capabilities to 1 GHz and vertical sensitivity of 10 mV/div to 1 V/div.

Circle (579) on Reply Card

## SELLING IN THE DOMESTIC MARKET ONLY?

Selling broadcast equipment or components in the U.S. only? There's one sure way to increase your market (and profit) potential. Sell to the thriving Latin American broadcast market.

Radio y Televisión makes it simple. It's an effective, economical way to pinpoint and prospect in this lucrative market. With this publication you can make selling export markets easy and profitable.

Radio y Televisión is the only publication that delivers the entire Latin American broadcast market. Every ad placed in RYT reaches over 10,000 key buying influences throughout Latin America.

Because Radio y Televisión is the Spanish language version of Broadcast Engineering, you're assured quality editorial that delivers readership. For the articles and ads.

Like to know more? Drop us a line. We'll send complete information on this unique publication and the dynamic market it serves.

### Radio y Televisión

P.O. Box 12901, Overland Park, Kansas 66212

## ¿Por qué los Transmisores y Transladores? ACRODYNE

son los preferidos de los ingenieros y duenos de estacion de Latino-america?

Preguntele a:

### COMEX CORPORATION

P.O. Box 17011  
Dulles Intl. Airport  
Washington, D.C. 20041  
Telef.: (703) 471-4215

TODOS LOS  
Detalles, Envios y los Ultimos Precios

Preguntele tambien acerca de Antenas,  
Torres, Lineas de Suministro,  
Conectores, y Equipo de Comprobacion  
de RF

Recuerdelo Bien  
COMEX AND ACRODYNE

Circle (185) on Reply Card

## Mark IV-T Metric Weatherminder

The original weather console designed especially for the announcer's table. Now equipped with dials reading Metric or combination U.S./Metric. The basic instrument cluster for local programming. Professional equipment at modest cost.

Department B

Texas Electronics, Inc.

P. O. Box 7225

Dallas, TX 75209 (214) 631-2490

Metric or U.S./Metric Readings for  
Wind Direction & Speed  
Barometric Pressure  
Remote Temperature

Also, a complete line of  
weather instruments, re-  
corders, sensors, controllers,  
etc.

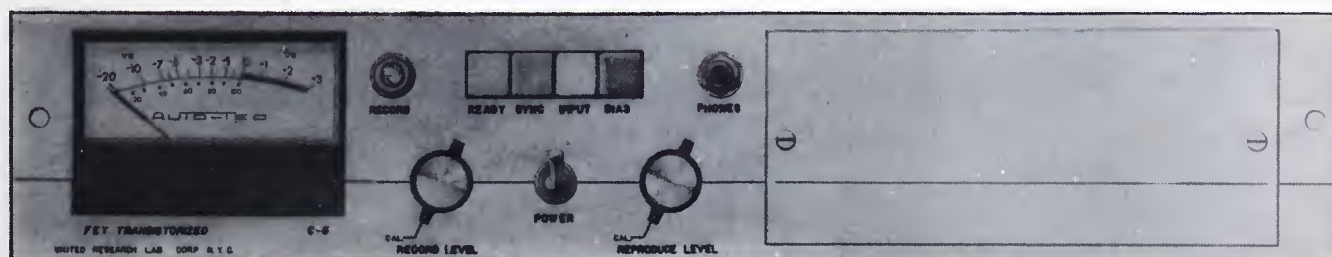


Circle (186) on Reply Card

MODEL C5 MONO \$745.00

**AUTO-TEC**  
RECORDERS

STEREO \$1490.00



SOLID STATE CONVERSION AMPLIFIER

For AMPEX 300, 350, 351 and 354 Recorders

See us at NAB Dallas  
Booth 375



**United Research Laboratory Corp.**

681 FIFTH AVENUE • NEW YORK, N. Y. 10022 • (212) 751-4663

Circle (187) on Reply Card

www.americanradiohistory.com

# professional services

## VIR JAMES

CONSULTING RADIO ENGINEERS  
Applications and Field Engineering  
Computerized Frequency Surveys  
345 Colorado Blvd  
Phone: (Area Code 303) 333-5562  
DENVER, COLORADO 80206  
Member AFCCE

## FRED A. NUDD CORPORATION COMMUNICATION TOWERS

Designed - Fabricated - Erected  
Complete Service  
U.S. & Overseas Installations  
(315) 524-2531  
1743 Route 104, Ontario, New York 14519

## Applied Video Electronics, Inc.

STUDIO SYSTEMS DESIGN AND INSTALLATION  
ENGINEERING REPAIRING/MODIFYING  
COLOR CAMERAS AND QUADRUPLIX VIDEO TAPE RECORDERS  
Post Office Box 25  
Brunswick, Ohio 44212  
Phone (216) 225-4443

## D. L. MARKLEY

& Associates, Inc.  
CONSULTING ENGINEERS  
3101B W. Harmon Hwy.  
Peoria, Illinois 61604  
(309) 673-7511  
Member AFCCE

## MIDWEST ENGINEERING ASSOCIATES

Consulting Engineers  
6934 A N. UNIVERSITY  
PEORIA, ILLINOIS 61614  
(309) 692-4233  
Member AFCCE

## EQUIPMENT LEASING

Broadcast Industry Specialists  
• Lease the Equipment of Your Own Choice  
• 100% Financing  
• Eliminate Obsolescence  
• Preserve your Bank Lines for Operations

PARK LEASING CO.  
1690 Financial Center  
Des Moines, IA 50309 (515) 288-1023

## Job Leads

### BROADCASTING JOBS!!

Discover the new job just right for your skills and experience. High-paying, prestige positions in RADIO... TV...and all MEDIA CATEGORIES. Beginners & pros welcome—nationwide opportunities! Write today for FREE DETAILS Job Leads Newsletter, 1680 Vine Street, Suite 820-KR, Hollywood, CA 90028.

## TOWERS

"Complete Tower & Antenna  
Installation & Service."

TINER COMMUNICATIONS SERVICE, INC.  
P.O. Box 3827, 15201 Hickman Road  
Des Moines, Iowa 50322, (515) 278-5501  
P.O. Box 817, 924 Brandenburg  
Cedar Hill, Texas 75104, (214) 291-1577

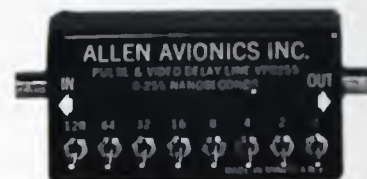
## Microphone Size Test Signal Generator Simulates Complex Program Material

- Generates "worst-case" peak-2-average ratio
- XLR-3 output connector microphone level 200 ohms
- Recording studios
- FM-AM-Stereo-TV-SCA
- Plug it into any mic level input and set OVU
- Adjust max peak limiting/compression
- Quickly and easily adjust max percentage modulation
- Check headroom on amplifiers and tape saturation
- Adjust SCA max percentage modulation last and sure

\$79.00 With Instruction Manual And Battery

COMMUNICATIONS INTERNATIONAL  
2 Briarway, Suite B, Houston, TX 77027  
713-621-3035

Circle (200) on Reply Card



## VIDEO L-C DELAY LINES

A complete line of passive switchable & strappable Variable Delay Lines manufactured specifically for the video industry. Finest specifications available anywhere. Lowest pricing. Delivery from stock. Call/Write for Video Catalog. We also manufacture a wide range of L-C Filters for video applications. All products manufactured in Mineola, N.Y. ALLEN AVIONICS, INC., 224 E. 2nd Street, Mineola, New York 11501. (516) 248-8080.

Circle (201) on Reply Card

## SMITH and POWSTENKO

Broadcasting and Telecommunications  
Consultants

2000 N. Street, N.W.  
Washington, D. C. 20036  
(202) 293-7742

## RALPH E. EVANS ASSOCIATES CONSULTING COMMUNICATIONS ENGINEERS

216 N. Green Bay Road  
Suite 208  
Thiensville, WI 53082  
Phone: (414) 242-6000 Member AFCCE

## E.M.R. ENGINEERING, INC.

P.O. BOX 766, CHANNELVIEW, TEX. 77530  
(713) 452-6147

CONSULTING ENGINEERS  
COMMUNICATION SYSTEMS  
ALLOCATIONS, BROADCAST SYSTEMS &  
MICRO-WAVE SYSTEMS  
FRED. L. ZELLNER

## FREE CATALOG

For a free government catalog listing more than 200 helpful booklets, write:  
Consumer Information  
Center, Dept. A, Pueblo,  
Colorado 81009.

# 23 ways to help assure your company's future.

If you believe that a continuous flow of new ideas is absolutely necessary to assure your company's future—and the future of the country as well—then you'd better send for this free booklet today

It describes twenty-three different ways you can help guarantee a continuous flow of college-trained minds and college-based research—minds and research that have been responsible for many of the most important ideas of our times. Computers. Radio. Television. Synthetics. Antibiotics. The list is almost endless.

If you'd like a copy of *How Corporations Can Aid Colleges and Universities*, write on your company letterhead to Council for Financial Aid to Education, Inc., 680 Fifth Ave., New York, N.Y. 10019

We can't afford to run out of ideas.



Council for Financial Aid to Education, Inc.  
680 Fifth Avenue New York, N.Y. 10019

A Public Service of This Magazine  
& The Advertising Council



**Make America smarter.  
Give to the college of your choice.**

# advertisers' index

|                                       |                                         |                                         |
|---------------------------------------|-----------------------------------------|-----------------------------------------|
| A.F. Associates.....25, 107           | Electro-Voice, Inc.....131              | PWH Electronics.....48                  |
| Alexander Mfg. Co.....88              | Electronic Engineering (EECO).....174   | Parsons Mfg. Corp.....189               |
| Allen Avionics.....209                | Equipto Electronic Corp.....150         | Peirce-Phelps, Inc.....166              |
| American Laser Systems.....181        | Eventide Clockworks, Inc.....156        | Philips Broadcast Equip. Corp.....137   |
| Amperex Electronic Corp.....47        |                                         | Potomac Instruments.....16, 152         |
| Ampex Corp.....9                      | Farinon Electric.....145                |                                         |
| Ampro Broadcasting, Inc.....24        | Fidelipac.....14                        | QRK Electronics.....126                 |
| Aristocart, Div. of                   | Fuji Photo Film U.S.A. Inc.....115      | QSI Systems.....157                     |
| Western Broadcasting.....154          | Fujinon Optical.....133, 135            |                                         |
| Asaca Corp. of America.....7          |                                         | RCA Electro Optics.....129              |
| Auernheimer Labs.....170              | GTE Sylvania.....116                    | ROH Corp.....146                        |
| Audi-Cord Corp.....136                | Garner Industries.....130               | RTI (Research Technology, Inc.).....64  |
| Auditronics, Inc.....169              | General Electric.....118                | Ramko Research.....205                  |
| Audio Consultants, Inc.....158        | Grass Valley Group.....3                | Rank Precision Instruments.....37, 143  |
| Audio Designs & Mfg.....5, 105        | Gray Engineering.....148                | Recording Supply Co.....52              |
| Audio-Technica U.S. Inc.....141       | Gregg Laboratories.....78               | Recortec, Inc.....123                   |
| Audio-Video Engineering.....187       |                                         | Ruslang Corp.....132                    |
|                                       | Halikainen & Friends.....178            | Russco Electronics, Inc.....74          |
| BTX Corp.....172                      | Clifford B. Hannay & Son, Inc.....190   |                                         |
| Belar Electronic Laboratories.....139 | Harris Corp., Broadcast                 | SWR, Inc.....15                         |
| Berkey Colortran.....10               | Products Div.....11                     | Schneider Optical.....108               |
| Beston Electronics, Inc.....120       | Hitachi Denshi America Ltd.....29, 31   | Scully Recording Instruments.....34, 35 |
| Bird Electronic Corp.....112          | Hughey & Phillips.....206               | Shallco, Inc.....170                    |
| Robert Bosch Corp.                    |                                         | Shintron Co.....146                     |
| (Fernseh Group).....179               | IGM/NTI.....121                         | Sintronic Corp.....177                  |
| Broadcast Equipment &                 | Ikegami Electronics.....41, 42, 43      | Warren R. Smith Co.....180              |
| Supply Co.....148                     | Image Magnification.....166             | Sony Broadcast.....26, 27               |
| Broadcast Video Systems.....170       | International Tapetronics Corp.....20   | Sound Technology.....120                |
|                                       | JSH Electronics.....88                  | Spectrum Video.....64                   |
| CSI Electronics.....127               |                                         | Spin Physics, Inc.....125               |
| Cablewave Systems.....33              | K & L Sound Service Co.....70           | Standard Tape Lab.....110               |
| Camera Mart.....4                     | Kaitronics Corp.....44                  | Stanton Magnetics.....151               |
| Canon U.S.A. Inc.....1                | Kliegl Bros.....168                     | Storeel Corp.....175                    |
| Capitol Magnetic Products.....171     | Knox Ltd.....38                         | Studer ReVox America, Inc.....60, 61    |
| Cetec/Vega.....17                     |                                         | Surcom Associates.....208               |
| Cezar International.....30            | L.W. International.....152              |                                         |
| Chyron Corp.....58                    | LPB, Inc.....46                         | TDK Electronics.....153                 |
| Cine Film Exchange, Div. of           | Laird Telemedia.....160                 | Tech Labs.....180                       |
| Video Tape Exchange.....190           | James B. Lansing Sound.....155          | Technics by Panasonic.....57            |
| Cinema Products Corp.....12, 13       | Leitch Video, Inc.....53                | Tektronix, Inc.....161                  |
| Cleveland Institute of                | Lenco, Inc.....55                       | Telectric Co.....204                    |
| Electronics.....93                    | Lightning Elimination Associates.....84 | TeleMation, Inc.....163                 |
| Cohu Electronics, Inc.....168         | Lines Video Systems,                    | Television Engineering/Wolf             |
| Colorado Video, Inc.....128           | Div. of Lines Music Co.....28           | Coach, Inc.....164                      |
| Comex Corp.....211                    | Listec Television                       | Television Products Co. Inc.....144     |
| Commercial Electronics, Inc.....71    | Equipment Corp.....170                  | Telex Communications, Inc.....23, 134   |
| Communications Intern'l.....212       | Logitek Electric Systems.....168        | Tentel.....210                          |
| Computer Magnetic Corp.               |                                         | TerraCom.....149                        |
| (CMC Technology).....117, 118, 119    | 3M Magnetic Tape Division.....21        | Texas Electronics, Inc.....209          |
| Consolidated Video Systems.....59, 62 | 3M Mincom/Video Products.....111        | Thomson-CSF Labs.....50, 51             |
| Continental Electronics               | Marconi Electronics, Inc.....47         | Time & Frequency Technology.....66      |
| Mfg. Co.....58                        | Marconi Instruments.....69              | Townsend Associates.....65              |
|                                       | Marti Electronics.....90                | Transector Systems.....77               |
| Peter W. Dahl, Inc.....208            | Mast Development Co.....150             | Triple I.....187                        |
| Datametrics.....114                   | McMartin Industries.....52              |                                         |
| Datatek Corp.....39                   | Mic Mix Audio Products.....140          | UMC Electronics.....22, 56              |
| Datatron, Inc.....23                  | Micro Communications, Inc.....46        | United Research                         |
| Delta Electronics, Inc.....54         | Microtime, Inc.....109                  | Laboratories Corp.....116, 211          |
| Digital Video Systems.....Cover 2     | Modular Audio Products.....178          | US JVC Corp.....18, 19                  |
| Dimension 3 Recording.....182         | Moseley Associates.....75               | Utah Scientific, Inc.....113            |
| Dolby Labs.....147                    | Mutual Broadcasting                     |                                         |
| Dyma Engineering.....182              | Systems, Inc.....79                     | VIF International.....90                |
|                                       |                                         | Vega.....17                             |
| ES Enterprises.....207, 209           | NEC America, Inc.....67                 | Video Associate Labs.....159            |
| ELPA Marketing                        | Nagra Magnetic Recorders.....165        | Videomedia.....Cover 3                  |
| Industries, Inc.....142               |                                         | Vital Industries, Inc.....Cover 4       |
| EMCEE.....167                         | O'Connor Engineering Labs.....63        |                                         |
| Edcor.....201                         | Oktel.....81                            | Westlake Audio.....49                   |
| Elcom Engineering.....110, 189        | Opamp Labs.....182                      | Wide Range Electronics.....86           |
| Electric Sound of Minn.....210        | Orban Associates.....32, 138            | Wilkinson Electronics, Inc.....36, 173  |
| Electrohome Ltd.....40                | Otari Corp.....85, 87, 89, 91           | Winsted Corp.....114                    |

.....

Advertising rates in Classified Section are 50 cents per word, each insertion, and must be accompanied by cash to insure publication.

Each initial or abbreviation counts a full word. Minimum classified charge, \$4.00.

For ads on which replies are sent to us for forwarding (blind ads), there is an additional charge of \$5.00 per insertion, to cover department number, processing of replies, and mailing costs.

Classified columns are not open to advertising of any products regularly produced by manufacturers unless used and no longer owned by the manufacturer or a distributor.

## TRAINING

**ELECTRONICS DEGREE** by correspondence. Earn A.S.E.T., then B.S.E.T. Free brochure. Grantham College, 2550 South La Cienega, Los Angeles, California 90034. 2-79-tfn

**FIRST PHONE** through cassette recorded lessons at home plus one week seminar in Boston, Philadelphia, Detroit, Atlanta or Seattle. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266. Telephone 213-379-4461. 8-78-tf

## SERVICES

**ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS.** Bottom line oriented. F.T.C. Brewer Company, P.O. Box 8057, Pensacola, Florida 32505. 7-71-tf

**HELIX-STYROFLEX.** Large stock—bargain prices—tested and certified. Write for price and stock lists. Sierra Western Electric, Box 23872, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-tf

**SMC CAROUSEL OWNERS!** WE sell direct replacement fiber gears for THOR motors. Save over \$100.00 for the cost of a new motor. In stock at \$4.95 each, PPD. (607) 432-5455, Ring Associates. 2-79-2t

**SAVED HUNDREDS: American Made (AGC Optional)** quality Head-Ends, V/V, U/V Converters, Camera Modulators. Factory prices. Send \$5.00 (or letterhead), Box 809, Boynton Beach, FL 33435. 11-78-3t eot

**TOWER SERVICE:** Erection. Sales. Service. Painting. Inspections. Maintenance contracts. Pioneer Tower Service, P.O. Box 253, Carrollton, Missouri 64633, (816) 542-0840. 8-78-tf

**ELECTRONIC EQUIPMENT AD SHEETS!** Quick! Productive! 10 cents a word. Ads received by Wednesday circulated Friday. Nationwide since 1971. 5 issues \$2. Subscribe 24 issues, \$7.50, get one and free! "Electronics Trader" (BE), Folly Beach, SC 29439. 3-79-1t

## WANTED

**WANTED:** Pre-1928 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-78-tf

## WANTED (CONT.)

**WANTED TO BUY:** 3M Drop Out Compensator for Oquad. D. Zulli, (213) 466-5441. 2-79-2t

**HIGHEST PRICES PAID** for 112 Phase Monitors and for clean, 12 year old or less, 1 KW and 10 KW AM Transmitters. All duty and transportation paid. Surplus Equipment Sales, 2 Thorncliffe Park Dr., Unit 28, Toronto, Ontario, Canada, M4H 1H2. 416-421-5631. 2-79-tfn

## PROFESSIONALS ACCREDITED

**PROFESSIONAL BACHELOR DEGREE**—earned with 4 or more years of Broadcast Business Management, Sales, or Servicing Experience. For FREE Information Write: Ebert PROFESSIONALS INSTITUTE, Box 1651, Dept. B, Columbia, Missouri 65201. 1-79-4t

## EQUIPMENT FOR SALE

**MICROTIME 2020-Plus** and **1600-ImagEx TBCs**, new, sacrifice \$17,250 and \$8888 respectively. **Athena 4000TSM** 16mm projector, factory refurbished, at half the current Mark-IV price. SoundDesign, Box 921, Beverly Hills 90213. 3-79-1t

**BROADCAST CRYSTALS** for AM, FM or TV transmitters, frequency change, repair or replacement of oven types. Also vacuum types for RCA, Gates, Collins, etc. transmitters. Quality products, reasonable prices and better delivery! Don't be without a spare crystal. Frequency change and service for AM and FM monitors. Over 30 years in the business. Eidson Electronic Co., Box 96, Temple, Texas 76501. Phone (817) 773-3901. 12-74-tf

**100 WATT GENERAL ELECTRIC TV Transmitter** on Channel 22. Switcher, Test Set, Synch Generator, Antenna with Feed Line. D. Zulli, (213) 466-5441. 2-79-2t

**1-200' SELF-SUPPORTING** tower, angle leg, 2-300, 1-180, 2-200, 48" face towers. All used TELCO towers. 1-275' tubular leg. 901-794-8625 DAY, 901-853-8037 nights. 1-79-4t

**PREVIOUSLY OWNED!** Tape Cartridges and Cartridge Parts. **REBUILDABLE AND AFFORDABLY PRICED!** CART MART, BOX 3066, FORT WORTH, TEXAS 76105, (817) 536-6437. 1-79-3t

**TWO SHARKES THREE INCH ORTHICON CAMERAS**, mint condition with lenses tripod dolly cam head. Varotal V zoom with extender. Make offer on two IVC test tapes and Tentel T2 tape tension gauge. Minimum camera package \$1,000. Zoom \$2,000. Howard Rutan, College of the Desert, 43-500 Monterey Avenue, Palm Desert, CA 92260. 2-79-2t

**AMPEX MODEL 1011** colortec, Model 1060 Amtec in excellent condition. Contact Mike Neibauer at 512-855-2213. 1-79-3t

**FOR SALE:** Sony EV210R VTR, Phillips 16mm Telecine Projector, Magna-tech 436 35/16mm Recorder w/stripe, 3&4 track heads, Audio Designs film footage counter 2 encoders, Spectra-Sonics 500 equalizers and 101 cards, Danner 600/85 faders, Nakamechi 700 Cassette Recorders, Altec 604E Speakers, Moviola mixed 4 gang synchronizer 2 heads and URS Amplifier. Contact Fred Porter, MediaSound, (212) 765-4700. 3-79-1t

**4 PC-70 TRUCK**, Ross Switcher 16 x 6, Op Amp 8 x 4, GVG terminal, Tektronics, Conrac. Cash or terms. (213) 425-3620. 3-79-3t

**FOR SALE—DATATRON 5050-200 EDIT CONSOLE** WITH JAM SYNC GENERATOR FOR TIME CODE EDITING. \$9500. BOB BRANDON, KPRC, HOUSTON, 1713-771-4631. 11-78-5t

**FOR SALE: RCA/TKP-45 CAMERA.** Complete package for studio and location. Excellent condition. (214) 824-0942. 3-79-1t

## EQUIPMENT FOR SALE (CONT.)

### BROADCAST EQUIPMENT FOR SALE

#### LATEST CMX 340 X EDITING SYSTEM

- 3 RCA TR 600 super hi-band recorders
- Vital 114-2A twenty input production switcher
- Grass Valley sync generator, processor, DAS
- Monitoring equipment
- Custom console

This system is new-equivalent (under warranty) completely interfaced, debugged and operational. Immediate delivery. \$420,000.

#### SINGLE CAMERA TV MOBILE UNIT

Fully equipped with:

- Hitachi SK-70 broadcast camera
- Two Ampex VR 3000s portable quad recorders
- Tektronic monitors and scopes
- Dodge Maxivan with 5 kva generator
- All necessary production equipment through walkie-talkies

Perfect condition - ready for broadcast quality production

Video Corporation of America  
Blair Benson (212) 355-1600

**STEREO PLAYBACK CART MACHINE** Audicord 106. Bought as backup. Never used. Best cash offer. Time Capsule, Inc., 28 Barnstable Road, Hyannis, Mass. 02601. 617-771-1434. 3-79-1t

**AVAILABLE JANUARY 1979:** Used GE transmitter Model TT50 driver and TF4 power amplifier currently tuned to Channel 9. Also Alford diplexer. Phone Mid-Florida Television, Orlando, (305) 423-4431 for information. 2-79-2t

**RCA VTY MODIFICATIONS KITS** for TR4/22/50/60/61/70. Splicer (single-frame), TEP Interface, Time Code Edit Interface Kit, Audio Splice Timing Mod (Audio Insert Editor), Wideband Audio Amplifiers, most mod kits, some modules available. LAWHED, LTD., 388 Reed Road, Broomall, Pa. 19008, (215) 543-7600. 4-78-tf

**EQUIPMENT FOR SALE:** G.E. Transmitter with attendant equipment Model TT59. 50 KW very good condition. Available approximately June 1. Bargain if you move. Reasonable if I move. Also, three PCP-90U cameras, excellent condition. Sold to highest bidder. Contact for details: E. B. Wright, 1018 West Peachtree St., Atlanta, Ga. 30309, 404-875-7317. 3-79-2t

**FOR SALE:** GE 35KW TV Transmitter, Type TT10A1 driver and TF3A amplifier presently operating on Channel 4. Just removed from service, available immediately. Includes VSBF harmonic filter and some spare parts. Priced to sell. Contact George St. Andre, WBZ-TV, 1170 Soldiers Field Road, Boston, Mass. 617-787-7050 3-79-1

## HELP WANTED

### MAINTENANCE - 1st FCC

Studio, ENG, transmitter. 2 yrs. experience in electronics maintenance and solid knowledge of digital technology necessary. E.O.E.

Send resume to Ken Erickson, Chief Engineer, WOAD-TV, 3003 Park 16th St., Moline, IL 61265

**TELEVISION ENGINEER:** Chief engineer for community college radio station and closed circuit TV, 4 channel audio studio, must be strong in maintenance and a good planner. Salary depends on experience. FCC 1st class license required. Reply to St. Louis Community College Personnel Dept., 5801 Wilson Avenue, St. Louis, Mo. 63110. AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER. 3-79-1

## Broadcast Engineering Personnel Service (coast to coast)

We specialize in the placement of well qualified people in the Broadcast Engineering Industry: TELEVISION & RADIO STATION; Chief Engineers, Assistant Chiefs, Maintenance Engineers, etc. MANUFACTURING, VIDEO SYSTEMS, CCTV, ITV, CATV; Engineering Management, R&D, Project, Design & Development, Maintenance & Service, Systems, Applications, Sales & Marketing. Nationwide Data Bank for Employers & Employees. No fee to Applicant, Professional, Confidential. Phone/Resume—Alan Kornish, KEY SYSTEMS New Bridge Center, Kingston, Penna. 18704. Employers inquiries invited. (717) 822-2196. Over \$1,000,000.00 in salaries placed. 2-79-tfn

**TV MAINTENANCE ENGINEERS AND TECHNICIANS.** For TV Production and sports facility. Maintenance Engineer required for quad tape, V/time code editing, studio cameras, slo-mo, coreboards and computer, IVC 9000, Eidophor video projectors, and much more. Technicians also required to work under maintenance supervisor in same areas. Contact: Bill Denton, MCI Productions, #10 Greenway Plaza, Houston, Texas 77046, (713) 627-9270. 3-79-2t

**WANTED:** Jr. Television Engineer for busy Hollywood Production House. Must be flexible and have a sincere desire to learn extensive maintenance in Computer Graphics and Animation. Good pay and benefits. Send resume to: Image Vest, Ltd., 845 N. Highland Avenue, Hollywood, Ca. 90038. Attention: Jim Martin. 3-79-1t

**CHIEF ENGINEER/CCTV:** Medical Institution seeking Chief Engineer for new CCTV and production facility. Strong Maintenance background in color production and RF Systems as well as management experience required. Starting \$20,755. Send inquiries to Director, AV/Telecommunications, Howard University Hospital, 2041 Georgia Avenue, N.W., Washington, D.C. 20060. 3-79-1t

**LIVE IN PARADISE...** Chief Engineer wanted. Minimum five years FM maintenance. KRUZ... Santa Barbara, California 93101. 3-79-1t

**TV MAINTENANCE ENGINEER—WMTV,** Madison, Wisconsin, has an opening for an experienced TV Maintenance Engineer with FCC First Class License. Must have a strong background in digital and analogue, as well as experience in TV maintenance. Send resume to Doug Christenson, Assistant Chief Engineer, WMTV, 615 Forward Drive, Madison, WI 53711, an Equal Opportunity Employer. 3-79-1t

**CHIEF ENGINEER—New U.H.F. T.V. station** located in major Northeast suburban market requires a 1st class licensed Engineer knowledgeable in all phases of T.V. station equipment. Attractive salary, benefits. Send complete resume, salary history and references to Dept. 149, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. All replies strictly confidential. 3-79-2t

**TV MAINTENANCE ENGINEER—Electronic Engineering** education or equivalent experience. ENG Maintenance experience desirable. Contact Harold Wright, WVIR-TV, Charlottesville, Va. 304-977-7082. An Equal Opportunity Employer. 2-79-3t

**TELEVISION MAINTENANCE ENGINEER:** With First Class FCC License, immediate opening, deal community, located in Alaska. Send resume, experience and salary requirements to: George Howard, Chief Engineer, Northern Television, Inc., Box 2200, Anchorage, Alaska 99510. An EOE. 2-79-2t

**PROGRAM DIR.:** Contemporary daytimer WDDT, Greenville, Miss. Call Jim Karr, Manager, (601) 338-0526. 1-79-4t

**CHIEF ENGINEER—WYYD,** Raleigh-Class C FM. Strong automation and studio maintenance experience required. Send resume to: Greg Rogers, Chief Engineer, WKIX, P.O. Box 12526, Raleigh, N.C. 27605. EOE. 2-79-2t

## HELP WANTED (CONT.)

**MAINTENANCE ENGINEERS** familiar with RCA Cameras and tape, Grass Valley Switching for East Coast Production Facility. Openings in studio, production van and disc unit. Resumes to Director of Engineering, E. J. Stewart, Inc., 388 Reed Road, Broomall, Pa. 19008. 3-79-2t

**CATV TECHS TCI—SUNNYVALE, CA.** Experienced in system maintenance desired. Solid background in basic electronics. Must be motivated to achieve additional responsibilities. Plant under rebuild. Installing all new electronics. S/A Headend, Sylvania Amps. Start March 1. Send resume to C.E., Peninsula TV Power, Sunnyvale, 94086 or call (408) 245-7700. 3-79-1t

**WIC-TV,** Channel 11, Pittsburgh, Pa. seeking a chief engineer for our top ten VHF Network affiliate. The applicant must have experience in all phases of managing a TV Engineering department, including operations, administration and labor negotiations. We are an equal opportunity employer, male/female. Send resume and salary requirements to Box 2883, Pittsburgh, Pa. 15230. 2-79-2t

**OPENING FOR STAFF ENGINEER** with consulting firm in Florida. Require good theoretical and practical background in television and FM radio. Contact Bill Kessler, (904) 376-3157. 2-79-3t

**ASSISTANT CHIEF ENGINEER** and Studio Maintenance Supervisor wanted for new UHF-TV operation with construction starting in June, 1979. Position has excellent growth potential with young, aggressive company. Send resume with salary history to: James R. Seaman, Director of Engineering, Television Corporation of Virginia, 123A Windsor Castle Dr., Newport News, Va. 23602. 3-79-1t

**MAINTENANCE ENGINEER:** Three to five years experience in broadcast equipment maintenance, 1st phone required. Applicants must have expertise in one or more of the following areas: ENG, quad VTR's, digital. Station has modern facilities, and good wage levels. Contact Chief Engineer, WNEB-TV, Box 531, Saginaw, Mich. (517) 755-8191. 2-79-2t

**NEW DUPLICATION FACILITY IN MIDWEST** has immediate opening for experienced Maintenance Technician. Heavy background must include current VTR Formats and Terminal Systems. Salary commensurate with experience. Current FCC 1st class license helpful, but not required. Excellent benefit program. Send resume and references to Director, Technical Services, Columbia Pictures Videocassette Services, 1501 Landmeier Road, Elk Grove Village, Illinois 60007. 3-79-1t

**SOUTH FLORIDA STATION NEEDS CHIEF** with DA experience and ability to handle all aspects of station's engineering. Salary commensurate with ability, experience. Send resume to Jim Glassman, Vice President, WGMA Radio, Hollywood, FL 33024. Please do not call. EOE, M/F. 2-79-2t

**CHIEF ENGINEER—We** are a UHF Network affiliate in Central Virginia looking for a chief with management ability and a maintenance background. Salary in the mid-twenties plus fringe benefits. Contact Harold Wright, WVIR-TV, Charlottesville, Va. 22902, 804-977-7082. Equal Opportunity Employer. 3-79-2t

**VIDEO ENGINEER—Syracuse University** needs a qualified Video Engineer for studio maintenance and operations. The person must have an AAS in electronics (or an equivalent combination of education/experience) and three years experience in color studio maintenance procedures. The annual salary is \$12,200. Syracuse University's liberal benefits include free employee tuition (12 cr. hrs./yr., transferable to spouse), free tuition for the employees children (four years undergraduate), and an annual one-month vacation. Send resumes before 2

**EVANGELICAL CHRISTIAN MINISTRY** has frequent needs for experienced network level and station TV engineers and operators. Locational needs vary but include Boston, Atlanta, Dallas and Tidewater area of Virginia. Send resume to Personnel Office, CHRISTIAN BROADCASTING NETWORK, INC., Virginia Beach, Va. 23463. Equal Opportunity Employer. 1-79-3t

## The ideal job It's new every day!

If you like to travel, enjoy hands-on problem-solving, and want to expand your creative capabilities with the industry leader — this is the ideal opportunity for you.

RCA Broadcast Systems Tech Alert is looking for individuals who have experience with broadcast equipment (such as cameras, video tape recorders, transmitters, or audio equipment), preferably on state-of-the-art RCA equipment.

Your responsibilities will include: checkout of newly-installed RCA Broadcast Systems products in the field, resolution of technical problems and instruction of customers in the operation and maintenance of equipment. An engineering degree or equivalent would be desirable. Relocation is not a prerequisite.

RCA offers excellent starting salaries and a comprehensive benefits program.

Call collect or send your resume, with salary requirement, to:

R.R. Willoughby, Mgr. Empl.  
RCA Broadcast Systems,  
Dept. BE  
Bldg. 3-2  
Camden, NJ 08102  
(609) 338-2501

An Equal Opportunity Employer  
F/M.



## VIDEO TAPE MAINTENANCE TECHNICIAN

RCA American Communications, Inc. has an opening at our Vernon Valley Video Tape Center, Vernon Valley, New Jersey (near Great Gorge) for an experienced Video Tape Maintenance Technician.

You will be responsible for journal maintenance of studio equipment such as RCA TR 600 Video Tape Recorders, TK28 B RCA Film Chain, and Grass Valley switching equipment.

Experience in digital technology necessary plus maintenance of Sony Cassette Recorders.

Minimum of 2 years related experience is required. We offer an excellent starting salary and a full range of company benefits.

To arrange an interview, send resume and salary requirement to:

Ms. Amy Beasley  
RCA American Communications Inc.  
201 Centennial Avenue  
Piscataway, NJ 08854

We are an equal opportunity employer  
F/M/V/H.



## TELEVISION MAINTENANCE ENGINEER

San Francisco-based major corporate teleproduction facility has an opening for maintenance engineer. The system includes: RCA TR600 and TPR10 VTRS, RCA TK and TKP45 cameras, time code editing, etc. Candidate must have: broadcast experience, strong digital electronic background, the ability to work closely and get along well with people in a production environment. FCC first-class license and degree helpful, but not mandatory. While the duties are mainly technical, there is some operation involved. Send resume and salary history in confidence to:



MANAGEMENT RECRUITMENT, DEPT. 3616  
P.O. BOX 37000, SAN FRANCISCO, CA 94137  
Equal Opportunity Employer

**BANK OF AMERICA**

A CHRISTIAN  
BROADCASTING COMPANY  
Television Chain growing Fast  
needs top Engineer  
Miami/Ft. Lauderdale,  
midwest positions also available  
Send Resume immediately to:

Doug Greenlaw, VP/GM  
WHFT-TV  
P.O. Box TV-45  
Miami, Fla. 33169

3-79-3t

**BROADCAST**  
engineering

Advertising Sales Offices

KANSAS CITY, MISSOURI  
Helen Hull, P.O. Box 12901,  
Overland Park, KS 66212;  
Phone: (913) 888-4664

NEW YORK, NEW YORK  
Joe Concert, One Penn Plaza, Suite 2532,  
New York, NY 10001;  
Phone: (212) 564-8454

FT. LAUDERDALE, FLORIDA  
Brinker and Brinker,  
2240 N.E. 53 Street,  
Ft. Lauderdale, FL 33308;  
Phone: (305) 771-0064

CHICAGO, ILLINOIS  
Jim Reilly, 1011 E. Touhy Ave., Suite 245,  
Des Plaines, IL 60018;  
Phone: (312) 299-2601

SAN FRANCISCO, CALIFORNIA  
John MacKay, 703 Market St., Room 1109,  
San Francisco, CA 94103;  
Phone: (415) 546-1040

LONDON, ENGLAND  
John Ashcraft & Co., 12 Bear St.,  
Leicester Square, London, WC2H 7AS,  
England;  
Phone: 930-0525

AMSTERDAM, HOLLAND  
John Ashcraft & Co., John J. Lucassen,  
Sloterweg 303, 1171 VC-Badhoevedorp,  
Holland;  
Phone: 2968-6226

TOKYO, JAPAN  
International Media Representatives, Ltd.  
2-29, Toranomon 1-chome, Minato-ku,  
Tokyo 105, Japan;  
Phone: 502-0656

## Electrical Engineers

Get on our  
wavelength  
and join the  
#1 team today!



Construction of new broadcast facilities in New York City provides openings for engineers to participate in the design of TV studios, Video Tape facilities and digital systems for the future. All positions offer generous starting salaries commensurate with background and qualifications plus an outstanding program of employee benefits. We currently need individuals with expertise in the following areas:

**AUDIO/VIDEO SYSTEMS ENGINEERS** EE degree or equivalent, with some experience in broadcast studio or equipment design.

**EQUIPMENT PLANNING ENGINEERS** EE degree or equivalent with a minimum 6 years experience in TV broadcasting equipment design. Participate in advanced development and equipment improvement.

**R.F. SYSTEMS ENGINEERS** EE degree or equivalent required with a minimum 3 years design and overall systems responsibility including TV, AM/FM, microwave and 2-way communications. FCC license preferred.

ABOVE POSITIONS BASED IN NEW YORK CITY

OTHER TECHNICAL POSITIONS AVAILABLE IN LOS ANGELES

Qualified applicants should send resume with salary history and requirements to: Mr. Hector Villanueva, American Broadcasting Companies Inc., One Lincoln Plaza, New York, New York 10023. An equal opportunity employer/male and female.

American Broadcasting Companies, Inc.



# CREATIVE FREEDOM



## Z6

# EDITING SYSTEM

a fresh new approach to creative editing. The Z-6 has more of what you are looking for than any other VTR editing system.

## Microprocessor Based Editing Control System

### WHAT YOU NEED!

**Flexibility** — the Z-6 utilizes the computer industry's standard IEEE S-100 buss electronics. A part of your Z-6 is a tried and proven Z-6 micro computer. Moreover your Z-6 interface requires NO mechanical modifications to your VTR. Your transports are factory reliable.

**Accuracy** — with "micro-loc"™ the Z-6 is "clock" accurate. The frame of video you see is the frame of video you edit. "Micro-loc" is an exclusive Z-6 technique which obviates the need for SMPTE time code. For the control track editing is as accurate as the "old standard".

**Reliability** — the Z-6 is software based. The Z-6 future is the future of the computer. Every Z-6 is state of the art year after year and software upgradeable.

### Z-6 HAS WHAT YOU WANT!

**Features** — the Z-6 comes with a 99 event memory. Bi directional shuttle controls, auto search, cruise control, event tag, rehearse, perform, review edit and many more features far too numerous to mention. . . there's even a built in electronic scratch pad for calculations. All the features of conventional editing systems plus many they haven't even thought of. The Z-6 was conceived and designed by professional editing people.

**Human Engineering** — the keyboard is simple. Each primary function has a dedicated button. No shifting or typing. The Z-6 keyboard is layed out logically. The CRT display is organized in a similar fashion. The status of your production is simply and accurately displayed throughout the editing process. Cursors prompt the operator to the next logical function and error messages appear when an illogical command is attempted. The Z-6 edits, it relies on you only for the "creative decisions".

**Flexibility** — the Z-6 can edit the most demanding production you can give it, with consecutive event mode changes, simultaneous tape searching, event memory recall, automatic computation of times and durations, custom programmed pre rolls and post rolls, automatic return to last event edited.

However, if you are a novice, the Z-6 will operate like the simplest control track editing system you have ever used except it will be the most accurate. Forget the numbers, durations, roll times, events. Simply shuttle to the pictures and rehearse and/or perform the edit. The Z-6 can handle your novices and your pro.

### THE Z-6 HAS IT ALL!

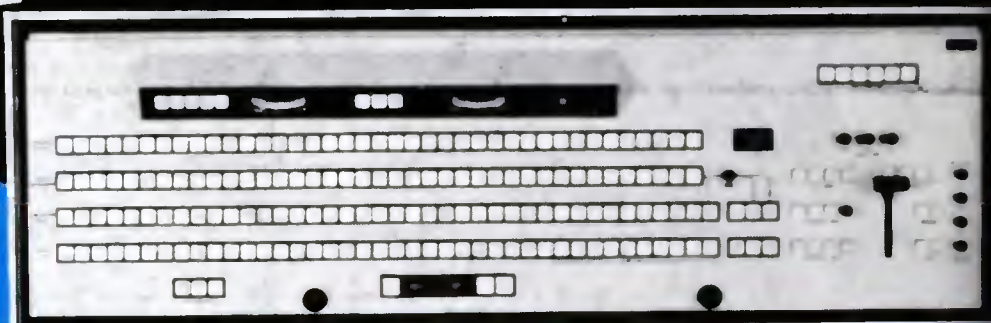
For the first time you have a first class production without the hardware hassle - it's that simple. YOUR EDITING SYSTEM SHOULD HAVE "Z-6 APPEAL"

\*pat. pend.

**Videomedia**  
Professional Television Systems

250 North Wolfe Road, Sunnyvale, CA 94086 408/733-6500  
Circle (2) on Reply Card

# THE VITAL BUSINESS CONNECTION MAKES TV AUTOMATION TOTAL = VIMAX-200



The dream of every TV broadcast station management is to have total automation married with a business computer system with minimum interruptions

Vital Industries, Inc., has done it, and done it more than once with all four leading business services.

You can now see our actual total TV automation system in use in one of several TV stations in the first 15 US TV markets.

We have over 30 technical automation systems in use since 1972. This total proven experience makes it also possible for us to offer a building-block approach of a 32 event preset system to stations as a first step towards total automation.

Our In-depth experience in programming microprocessors in the "Squeezoom," "PSAS" and on-air automation has given us a position of leadership in TV automation. Call us toll free, 1-800-874-4608, continental U.S.

#### MAIN OFFICE:

3700 N.E. 53rd Ave., Gainesville, Fla. 32601  
Phone 904/378-1581 TWX 810-825-2370



**VITAL INDUSTRIES, INC.**  
A HIGH TECHNOLOGY COMPANY

MORRELL BEAVERS Midwest  
2644 North Seventh St.  
Terre Haute, Indiana 47804  
Phone 812/466-3212

BARRY ENDERS  
ROBERT McALL Northeast  
34 Autumn Lane  
Hicksville, N.Y. 11801  
Phone 516/735-0055

GORDON PETERS Southwest  
P.O. Box 912  
Arlington, Texas 76010  
Phone 817/467-0051

ERIC KING Southeast  
Fox Hill Road  
Lynchburg, Va. 24503  
Phone 804/384-7001

BARRY HOLLAND West Coast  
7960 West Beverly Blvd.  
Los Angeles, California 90048  
Phone 714/497-4516

Circle (3) on Reply Card