

BROADCAST **engineering**®

February, 1976/75 cents

EBS Deadline Is Firm

page 26

**Building
TV Sets**

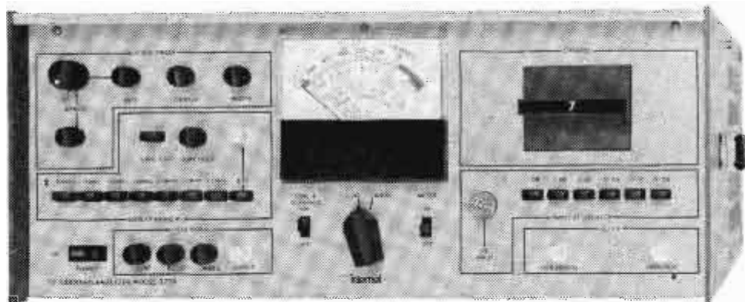
**Station
Inspection**

**Solid State
Relays**



NAB a BARGAIN

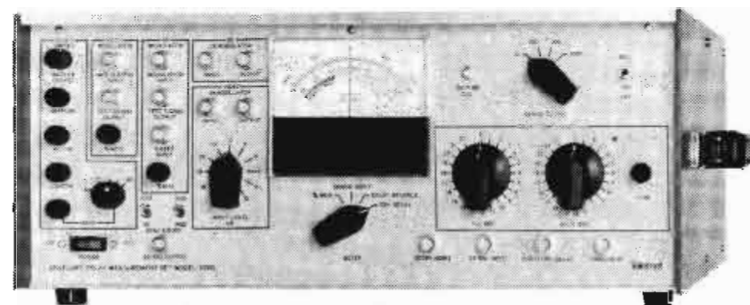
A 10% discount on all orders placed with Telemet at the show.



3706 TV Sideband Analyzer

Fast becoming the industry standard—All solid state circuitry with single channel, crystal-controlled, plug-in tuner.

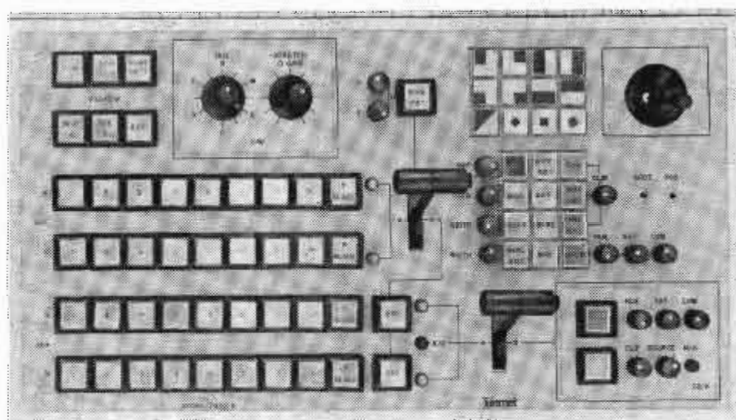
SAVE \$480 (VHF)



3705 Group Delay Measurement Set

Built-in Video Sweep Generator ☐ Test Signal generated with or without sync and blanking ☐ Accuracy: $\pm 5\%$ of range used to ± 4 ns ☐ Frequency Ranges: 0.1-10 MHz and 25-250 MHz

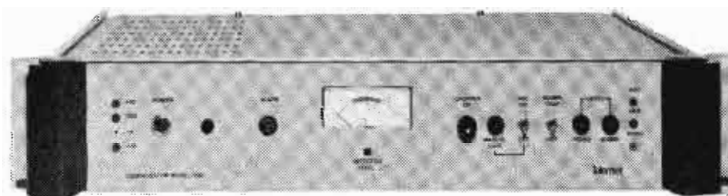
SAVE \$450



7960 Expandable Production Switcher

All the effects you need at a price you can afford. Available from 9x4 to 29x8 plus 12 wipes, wipe modulation, softwipe, spotlight, positioner, chroma keyer downstream layer, etc.

SAVE \$1,500 (7960-A15)



4501 VHF/UHF Broadcast Demodulator

Now available to 1 mv sensitivity ☐ New! Tunable all VHF configuration ☐ New! RF shielded converter for UHF configuration ☐ In/Out Switchable Traps ☐ Envelope Delay inverse to origination—Switchable In/Out ☐ Easy Measurement of Inter-carrier Frequency, Modulation Depth, and Color Amplitude.

SAVE \$380 (VHF)

Now you can save more than the cost of your trip to NAB when you place your orders for Telemet equipment at the show. The 10% discount applies to all Telemet products—as long as your properly exe-

cuted order is delivered by station personnel to us at our booth #300 at the NAB show. That's just our way of encouraging you to attend the most important industry-wide event of the year.

10% discounts apply to orders placed at the booth only, for equipment and prices listed in our current price list. All Telemet standard sales policies will be in effect for these orders. This discount does not apply for OEM accounts and supplants all quantity and educational discounts.

- | | | |
|--|--|--|
| ☐ Sideband Analyzers | ☐ Modulators | ☐ Pulse Distribution Amplifiers |
| ☐ Video Test Signal Generators | ☐ Demodulators—Fixed Frequency | ☐ Clamper Amplifiers |
| ☐ Envelope Delay Test Set | ☐ Demodulators—Variable Tuned | ☐ Monoscope Generator |
| ☐ Differential Phase and Gain Measuring Systems | ☐ Video Signal Conditioners | ☐ Video Routing Switchers |
| ☐ Remote Control Vertical Interval Test Sets | ☐ Audio Monitors | ☐ Video Production Switchers |
| ☐ Video Sweep Generators | ☐ Audio Distribution Amplifiers | ☐ Chroma Keyer—RGB |
| | ☐ Video Distribution Amplifiers | ☐ Chroma Keyer Decoder—NTSC |

A Geotel Company
Telemet

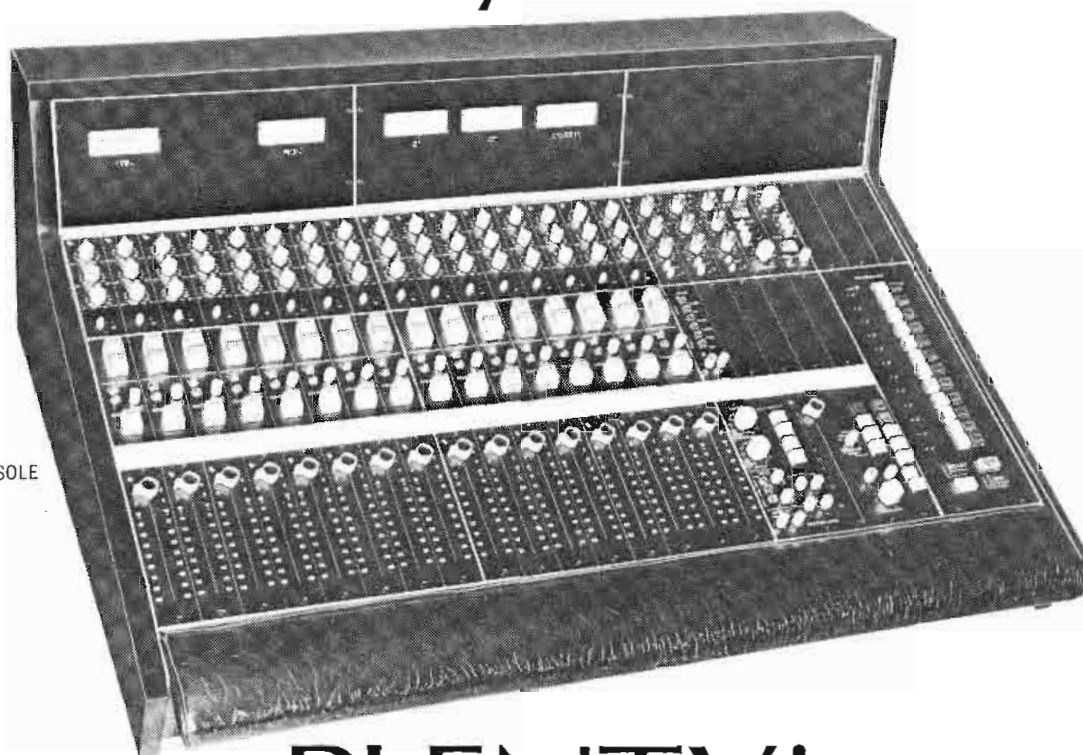
For immediate product information, Call Ken Schwenk, Director of Marketing, Telemet, 185 Dixon Avenue, Amityville, NY 11701 (516) 842-2300.

See us at Booth 300.

For More Details Circle (1) on Reply Card

What is a company like us doing in a nice industry like this?

COMPACT BROADCAST CONSOLE
(Studio or Portable)



PLENTY!

Automated Processes' audio broadcasting equipment is now being used by ABC, CBS, NBC, PBS and NPR, among others, and our recording consoles by nearly every Major Record Label in the World.

We gained our reputation where audio is everything! Automated Processes is the leading U.S. manufacturer of audio consoles for recording studios worldwide.

Automated Processes applies its advanced design and production capabilities to broadcast consoles, putting at your fingertips the same on-air reliability, modular construction, flexibility of features and performance that have made us leaders.

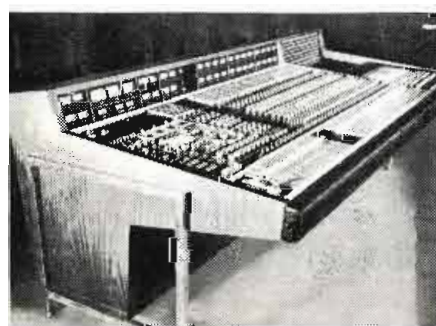
Bring our superior technology into your control room. Call or write for details today, they are yours for the asking.

Here are some of our more than 100 audio products available:

- D.C. Control Consoles
- Conventional Consoles
- Audio Switching Systems
- Tape Synchronizers
- Microphone Preamps
- Line Amplifiers
- Audio Distribution Amplifiers
- Power Amplifiers
- Equalizers
- Compressor/Limiters
- Faders

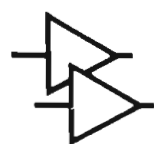


INPUT CHANNEL
Mono-Stereo-Quad



COMPLETE AUDIO PRODUCTION CONSOLE.

Meet us at NAB, Booth No. 711.



AUTOMATED PROCESSES, INC.
789 PARK AVENUE, HUNTINGTON, NEW YORK 11743 • 516-427-6024

- 26 The New EBS Rules.** Answers to the most often asked questions on the new EBS rules and equipment. Includes a list of manufacturers currently offering type-accepted equipment. **Joseph Wu.**
- 32 Set Construction Techniques.** Tips on how to build portable and permanent sets for television. **Ron Whittaker.**
- 41 Be Prepared For a Station Inspection.** A consulting engineer reviews the rules most often violated—according to the FCC—and includes a checklist that should help us all avoid ulcer gulch. **John Mullaney.**
- 49 Solid State Relays.** An update on what's been happening in the development of new components. Includes example circuits and tips. **Pat Finnegan.**
- 51 BE Puts dbx To The Test.** Our Audio Editor tests the dbx noise reduction system and reports on its practical uses in broadcasting. **Dennis Ciapura.**
- 53 When You Goof, Keep It Moving.** An old timer in the industry recounts some humorous incidents in broadcasting and opens the door on a new BE column: Blue Bananas. **Phil Whitney.**
- 55 Television At The Pan Am Games.** Our Video Editor reports on the Pan Am Games that were televised in Mexico. **Joe Roizen.**

About the Cover

Our cover picture comes to us from WIPR-TV, San Juan, Puerto Rico. But the big news is on page 26 and the new EBS Rules and equipment.

Departments

Direct Current	4
Industry News	8
SBE Journal	14
Cable Engineering	CE-1
Globecasting	62
People in the News	65
Zoom In	67
New Products	73
Ad Index	86
Classified Ads	87

EDITORIAL

Ronald N. Merrell, *Director*
Carl Babcoke, *Technical*
Pat Finnegan, *Maintenance*
Howard T. Head, *FCC Rules*
Robert A. Jones, *Facilities*
Walter Jung, *Solid State*

Rainelle Harris, *Editorial Assistant*
H. G. Roesler, *Cartoonist*
Dudley Rose, *Graphic Designer*
Joe Roizen, *Video*
Archer Taylor, *CATV*
Dennis Ciapura, *Audio Editor*

CIRCULATION

Evelyn Rogers, *Manager*

ADVERTISING

Mike Kreiter, *Director*



Copyright, 1976, Intertec Publishing Corp. All Rights Reserved: Material may not be reproduced or photocopied in any form without written permission of Publisher.

Regional Advertising Sales Offices on
Advertisers' Index page.

Broadcast Engineering is published monthly by Intertec Publishing Corp., 1014 Wyandotte Street, Kansas City, Missouri 64105. Telephone: (913) 888-4664.

Broadcast Engineering is mailed free to qualified persons engaged in commercial and educational radio and television broadcasting. Non-qualified subscriptions in the U.S. are \$6.00 one year, \$10.00 two years, \$13.00 three years. Outside the USA add \$1.00 per year to cover postage. Single copy rate 75 cents. Back issues rate \$1.00. Adjustments necessitated by subscription termination at single copy rate.

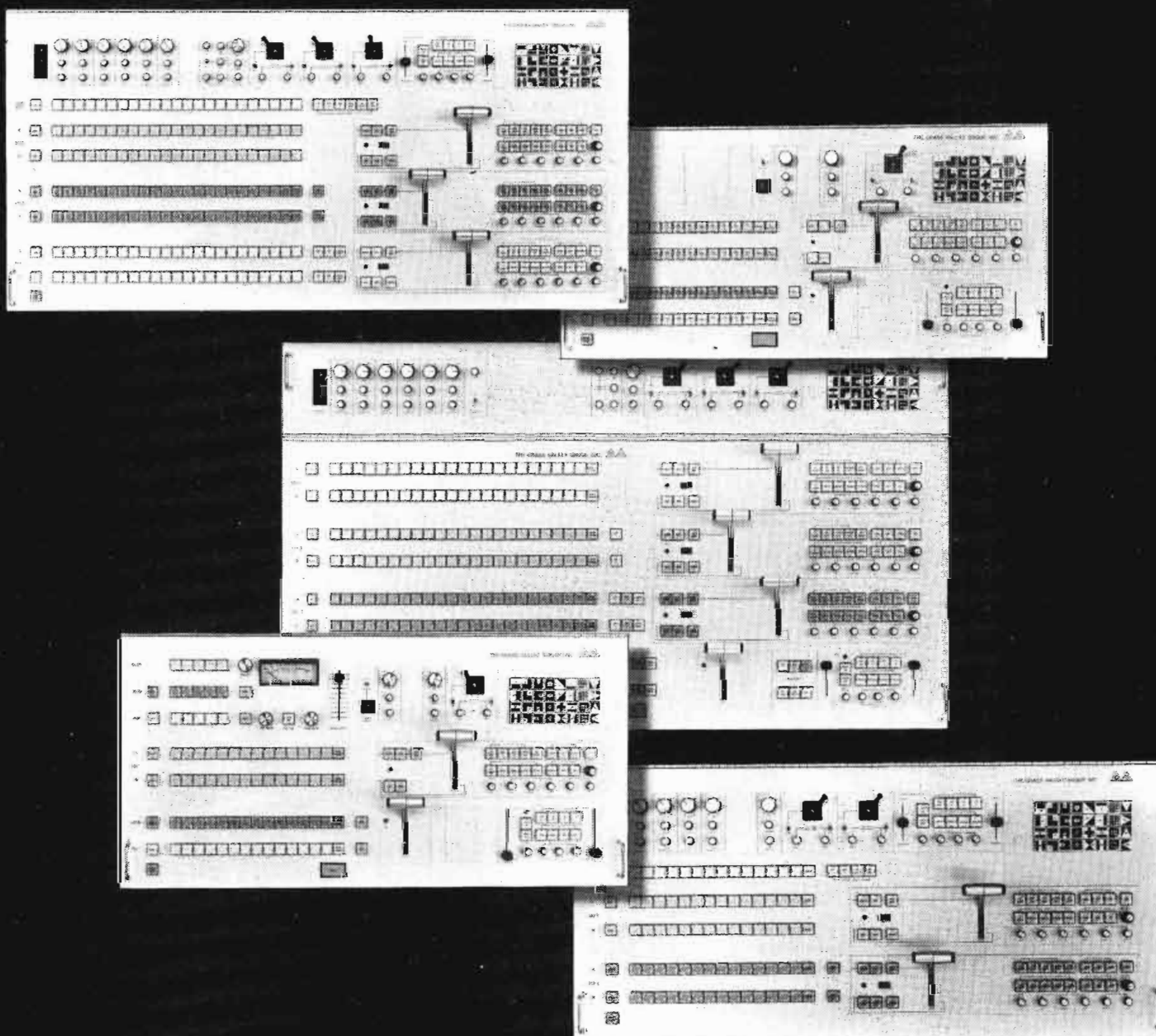
Controlled Circulation postage paid at Indianapolis, Indiana.



Robert E. Hertel, *Publisher*

INTERTEC PUBLISHING CORP.
Subsidiary of HOWARD W. SAMS & CO., INC.

1600 SERIES SWITCHING SYSTEMS ARE AVAILABLE IN STANDARD CONFIGURATIONS FOR ALMOST ANY APPLICATION—IN NTSC, PAL, AND PAL-M VERSIONS



THE GRASS VALLEY GROUP, INC. 
A TEKTRONIX COMPANY

Station Plaza East
GREAT NECK, NY 11021
(516) 487-1311

4419 Van Nuys Blvd, Ste 307
SHERMAN OAKS, CA 91403
(213) 990-6172

1644 Tullie Cir, NE
ATLANTA, GA 30329
(404) 634-0521

P.O. Box 482
MABANK, TX 75147
(214) 887-1181

810 W Bristol Street
ELKHART, IN 46514
(219) 264-0931

DIRECT CURRENT FROM D. C.

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

EBS Keeps Up Its Record

In keeping with the finest tradition of the Emergency Broadcasting System (EBS), the Commission is struggling to unravel an increasingly involved snafu generated by the adoption of the new two-tone signalling system for EBS.

The present deadline for the adoption of the system is April 15 of this year. NAB asked the Commission to extend this date for at least six months stating that the broadcasting industry is "in a state of confusion" and is "ill prepared" to meet the April 15 deadline. NAB insists that stations asking what the cost of new equipment would be have been given answers in the \$100 to \$700 range, and were also informed that the Government would issue a schematic from which station engineering personnel could build the required units for as little as \$50.

Several manufacturers of the signalling units have been granted FCC type-acceptance, and at least one of them has shouted "foul", stating that he has proceeded with the production of the units in good faith and has accumulated an expensive inventory. Commercial units are in the \$300 to \$700 price range.

It is going to take more than the Commission's usual wisdom to unravel this one. With the deadline so close at hand, some sort of extension seemed inevitable, it didn't happen. The deadline stands firm as we go to press. An article answering the most asked questions on EBS and including a list of manufacturers offering type-accepted equipment is included in this issue of BE.

Congress Gets Into the TV Allocations Act

The House Communications Subcommittee is making plans to let a research contract for a major study of the Commission's TV spectrum management. The study will concentrate on a review of the present TV channel allocations structure set up in 1952, and the need for and desirability of standards governing the performance of TV broadcast receivers.

The Subcommittee's action comes just as the Commission has been

(Continued on page 6)



Out In Front



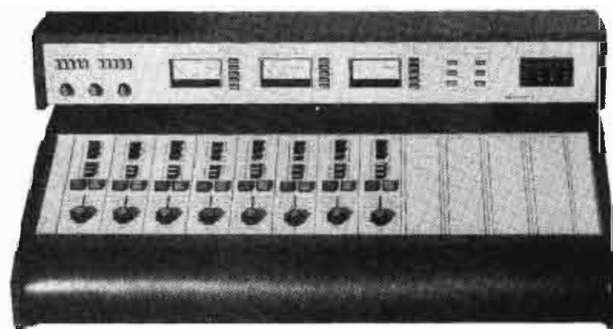
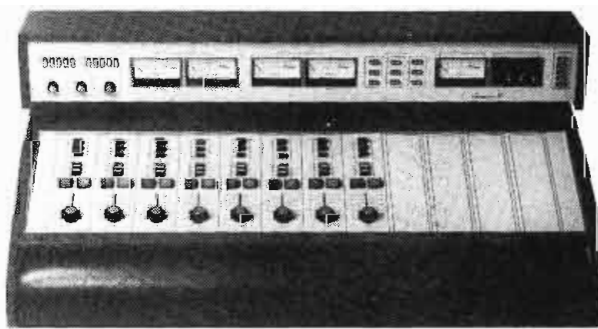
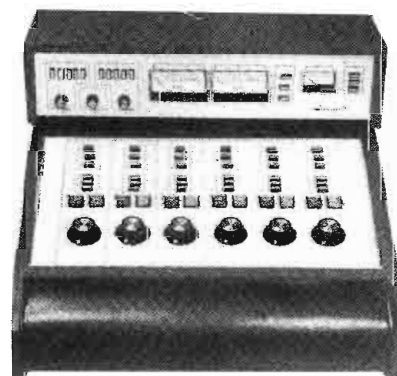
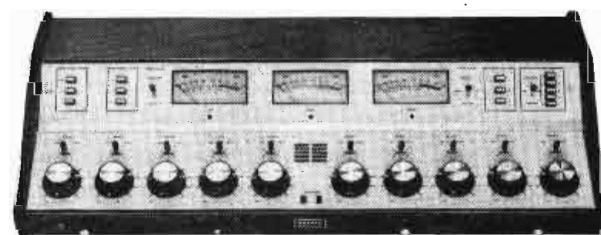
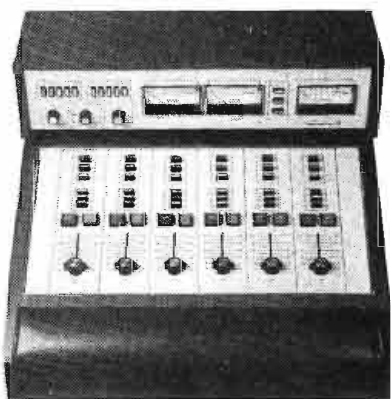
Our Western heritage taught us it's the only place to be. And today that's where we are . . . out in front with audio console **CHOICE** and **PERFORMANCE!**

The choice of eleven models leads the industry. Choose from four to twenty-four mixers. Four to seventy-two inputs. Choose mono, stereo, quad-capable . . . for radio, TV, recording and special applications.

And performance? State-of-the-art performance above industry standards. Performance so outstanding that we **GUARANTEE YOUR SATISFACTION.**

Put your station **OUT IN FRONT** with a Sparta console.

Call us now.



5851 Florin-Perkins Road, Sacramento, Ca. 95828 (916) 383-5353 • Telex 377-488 • Cable SPARTA

DIRECT CURRENT FROM D. C.

(Continued from page 4)

deluged by thousands of pages of comments in its own inquiry into the VHF-TV allocations standards, occasioned by a report of the White House Office of Telecommunications Policy (OTP) insisting that a substantial number of additional VHF channels could be "dropped in" the top 100 markets. The Commission may reach some sort of decision this year, but there is an awful lot of papers to sort through in the process.

Expansion of FM Broadcast Table Under Study

The Commission has under study a proposal which would increase the number of FM broadcast channel assignments. A report is being prepared by the Commission's Chief Engineer's office which studies the effect of reducing the present 200 kHz separation between FM broadcast carriers to 150 kHz or even 100 kHz. A reduction from 200 kHz to 100 kHz could double the present 100 FM broadcast channels available in the 88-108 MHz band.

The Chief Engineer's report will be based on computer studies which calculate service radii and assignment "efficiencies" for the various frequency separations. Multiple interferences are combined by the use of the computer program, and the resulting efficiency is given in statistical terms.

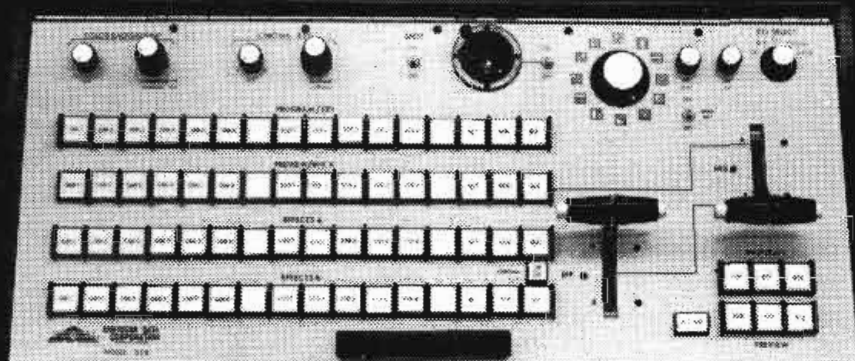
Don't expect early action on this one either. Both the Commission's Broadcast Bureau and the Commissioners themselves will have to be convinced that the overall effect of reducing the channel separation is in the public interest.

Short Circuits

The Commission has instituted an inquiry into the effects of automobile ignition interference...The Commission has declined to delete the requirement for the "beep tone" on telephone recordings although an exception has been made in the case of broadcast networks...The Commission has proposed to require TV stations to transmit emergency notifications visually as well as aurally for the benefit of the deaf...The Commission in a letter to a manufacturer has emphasized that r.f. amplifiers used to drive remote modulation monitors are not subject to FCC type approval, but the overall monitoring system must meet the requirements...It's time to plan for the NAB convention in Chicago. The Chicago Flower and Garden Show will be held at the same time. Their attendance numbers are staggering, so it will pay to keep this in mind. This magazine will give special pre-show coverage in the March issue and post-convention wrapup in the May issue.

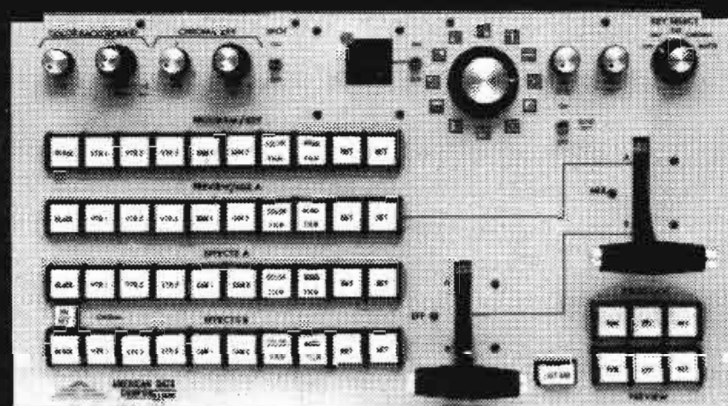
an **ECONOMICAL** Choice!

With the **MAXI-**



\$10,795

or the **mini**



\$8,295

The **MAXI** features 16 inputs and the **mini** has 10. All inputs may be composite or non-composite. Four busses are standard but when combined with an "QBQS" (one bus quad split) the capabilities of an 8 bus system is attained. The keyer is down-stream to the effects enabling wipes (or Quads) to be done behind ALL keys including chroma keys. Other **STANDARD** features are; a program channel processing amplifier, an internal blackburst-color matte generator, a 12 pattern **programmable** special effects generator, a positioner and a spotlight, a cutbar, program and preview output switching, "split handles" on mix and effects, a 3-input keyer with a rate adjustable "blink" feature. All this plus more, much-much more! Ask any one of **over 50** satisfied users of the ADC 556.

OPTIONS?

Not many but there are a few—an RGB chroma keyer, Audio-follow-Video, and OBQS, Pattern modulator, longer control cables.



AMERICAN DATA CORPORATION

AN **AIRPAX** COMPANY

315 WYNN DRIVE, N.W. P. O. BOX 5228 HUNTSVILLE, ALABAMA 35805 TEL. 205-837-5180

ADC SOUTHEAST
205-837-5180

ADC SOUTHWEST
713-941-7272

ADC MID-ATLANTIC
301-460-1454

ADC NORTHEAST
617-237-2600

ADC WEST
213-387-7756

A new generation of cartridge tape machines.

here
Beucart is coming.
See the revolutionary Beucart on page 13.

For More Details Circle (51) on Reply Card

Ascertainment guidelines Have been revised

The Commission has revised its guidelines for ascertainment of community problems by commercial broadcast renewal applicants to provide a simplified procedure by which these applicants can carry out their required ascertainment of community problems and needs on a continuous basis.

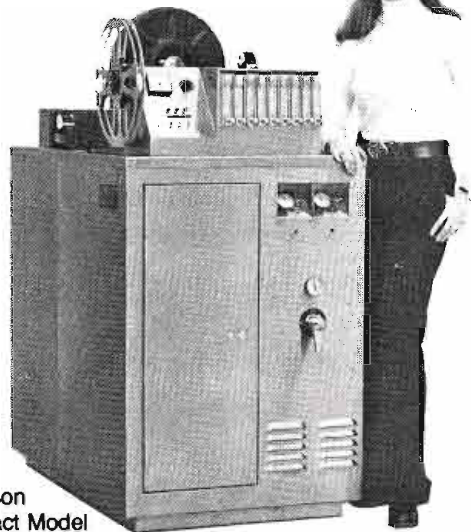
The action was the result of a further inquiry and rulemaking proceeding begun on May 6 to develop standards for the ascertainment of community problems and needs by commercial applicants. Ascertainment guidelines for non-commercial educational licensees have been proposed in a further inquiry and rulemaking in Docket 19816.

Under the new guidelines, the Commission eliminated the require-

ment that an applicant compile a compositional survey, and instead will require licensees to maintain, in their public files, a listing of certain demographic aspects of the city of license including total population figures, and numbers and proportions of males, females, minorities, youth and the elderly in the community.

The Commission also compiled a list of structural and institutional elements common to most communities—agriculture; business; charities; civic; neighborhood and fraternal organizations; consumer services; culture; education; environment; government (local, county, state and federal); labor; military; minority and ethnic groups; organizations of and for the elderly,

(Continued on page 10)



Jamieson Compact Model

Jamieson No.1 in TV!

Why is the Jamieson Processor No. 1 in TV?

The best answer is from someone who owns one. Someone you know owns a Jamieson. Probably a lot of people you know. Why not ask them about it? The best way to get an unbiased appraisal of its performance.

Or ask us ... we'll be more than happy to tell you about the Jamieson Processors and give you references.

JAMIESON'S ADVANCED DESIGN TECHNOLOGY FEATURES

- Film advance virtually tension-free. The demand top-overdrive film transport uses no clutches, floating rollers or film sprockets.
- Smaller machines take only half the floor space.
- Solution volumes reduced 15 times over open-tank designs.
- Temperature in primary solutions is controlled to an accuracy of a few hundredths of a degree.
- The elliptical shape of the tube protects the film and provides high induced turbulence.



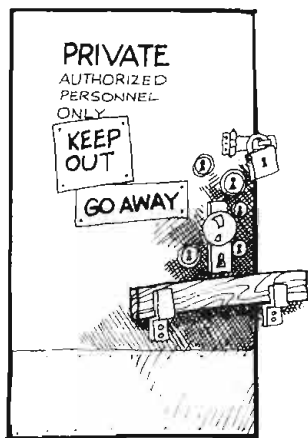
JAMIESON FILM COMPANY
a division of Kreonite, Inc.

6911 FOREST PARK ROAD • DALLAS, TEXAS 75235
PHONE: 214-350-1283 • TELEX: 73-0932

Please send information on Jamieson Processors and a list of some users.

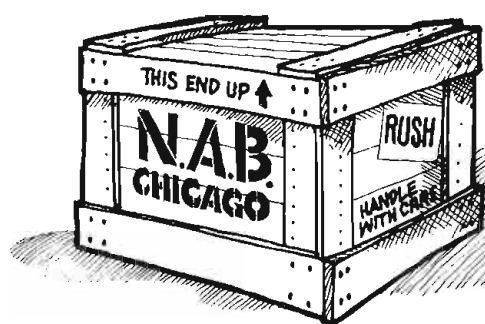
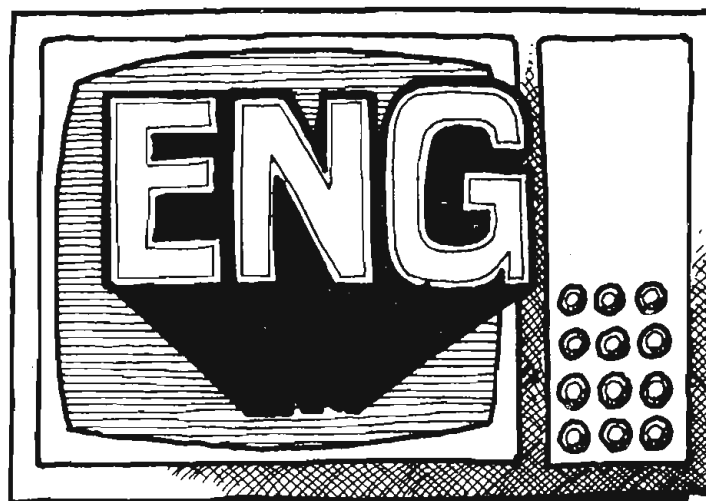
Name _____ Title _____
Firm _____ Phone _____
Address _____ City _____
State _____ Zip _____ JAMIESON FILM COMPANY
6911 Forest Park Rd. Dallas, TX 75235

A second **SECRET** has been uncovered!



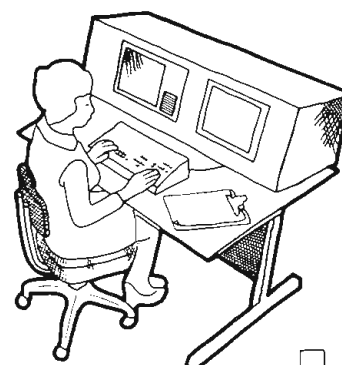
We tried to keep the door slammed on a second new x-pandable system under development. But the word is out.

Would you believe a fast, flexible, accurate time code ENG system for under \$20K? And the 34X is x-pandable, too!



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

Nobody can keep a secret in this business.



cmx systems

AN ORROX COMPANY
3303 Scott Boulevard, Santa Clara, CA 95050
Phone: (408)988-2000 Telex: 910-338-0554

For More Details Circle (8) on Reply Card

women, youth and students; professions; public safety, health and welfare; recreation and religion.

Interview Checklist

A licensee will be required to interview leaders from each of the elements on this checklist unless it can show an element is not present in its community. The Commission also included an optional category "other" in the checklist to make

allowances for certain elements not on the checklist but peculiar to a given community.

Interview Numbers

While it did not set a minimum on the number of interviews, the FCC established a reasonable number of interviews required to preclude a challenge to the "gross quantitative sufficiency" of a community leader survey. For cities of

license with populations under 25,000, the number would be 60 community leader interviews; for cities of 25,000 to 50,000, the level would be 100; for populations of 50,000 to 200,000 the number is 140; 200,000 to 500,000, 180; and over 500,000, the level is 220.

The Commission said it now would allow up to 50 percent of the community leader interviews to be conducted by non-management level employees under proper supervision.

The remaining interviews to be conducted by management should be allocated in such a way as to bring the officials and principals of a station into contact with a variety of leaders, particularly those who speak for the interests of racial and ethnic minorities and women, the FCC said.

While it retained face-to-face interviewing as a staple of leader consultations, the Commission said it was liberalizing the format of these interviews to allow licensees to include less formal contacts.

The Commission said while it expected the ascertainment process to be continuous throughout the license term, it was requiring licensees to submit their community leader checklists only with their renewal application.

It said based on these interviews, a licensee must present programming to meet some community problems. The Commission said it was extending to all commercial licensees, the current requirement that television licensees annually list no more than 10 problems they have discovered and the programs broadcast to meet these problems. These annual lists must be kept in the station's public file and submitted to the Commission with the renewal application.

The Commission said it was retaining the requirement that licensees conduct general public surveys of their community. These surveys may be conducted at any time during the license term and are to be placed in the licensee's public file together with a narrative statement of the sources consulted and the methods followed in conducting the survey, it said.

It said it would experimentally exempt all stations located in

(Continued on page 12)

We've packaged our compact Criterion three different ways.

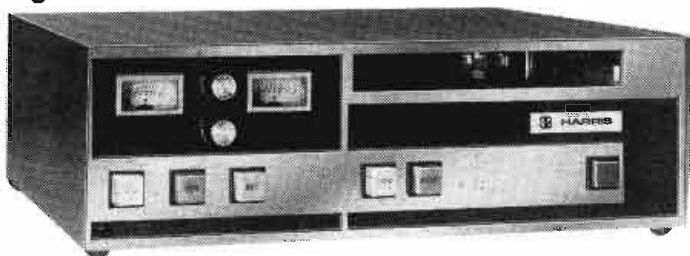
Criterion I ... only 8-1/2" wide. Direct capstan drive comparable to the finest reel-to-reel machines. Speed accuracy of 0.2%. 1, 2 or 3 cue signals available for automatic equipment. Handles A & B cartridges. Mount two units side by side in a standard 19" rack.

Criterion II ... offers both record and playback in a single unit.

Handles A, B and C cartridges. Fits in 7 inches of standard rack space.

Criterion III ... combines three playback decks in a single compact unit. One, two, or three decks may be operated at the same time, each feeding a different program input. Handles A & B cartridges. Mount twin playback units side by side in 12-1/4" rack space.

For more information, write Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.



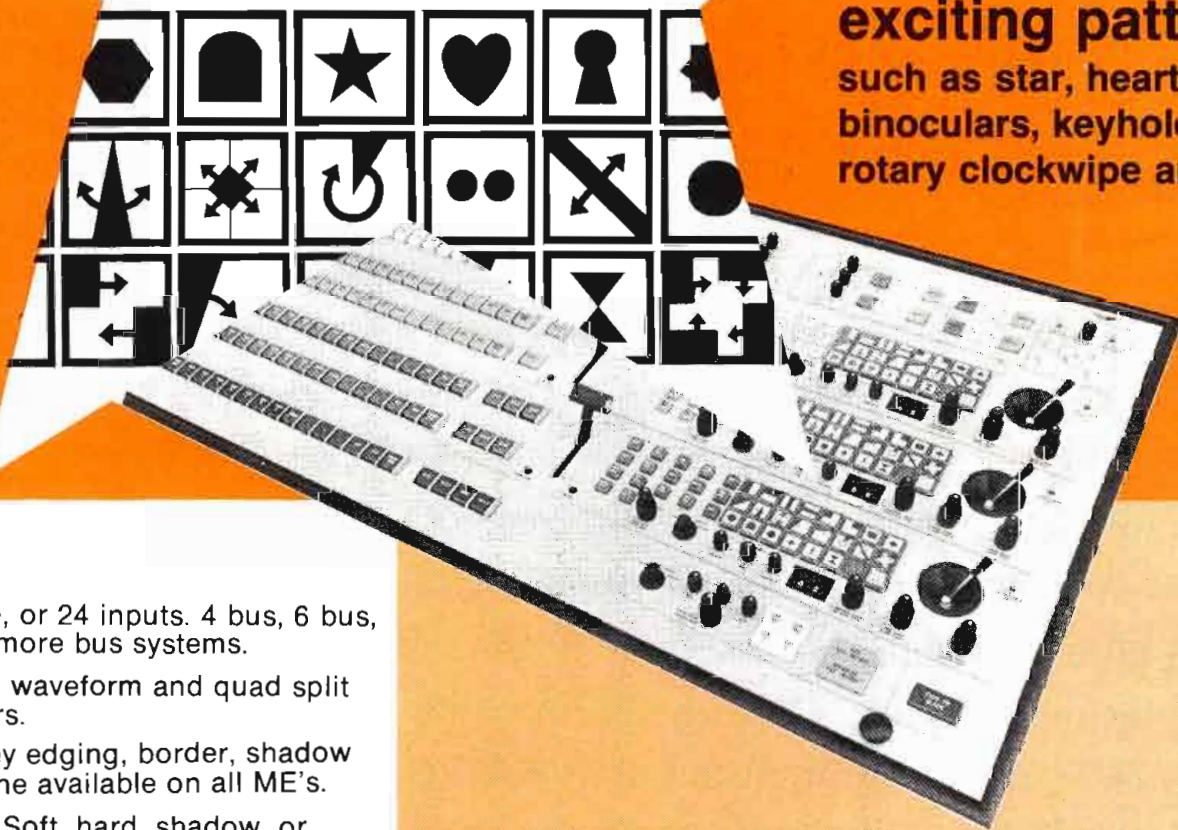
HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

Harris...originators of the tape cartridge machine.

For More Details Circle (9) on Reply Card

VIX-114 production switcher with STAR studded features

**Choice of over 80
exciting patterns
such as star, heart,
binoculars, keyhole,
rotary clockwise and more**



- 12, 16, 20, or 24 inputs. 4 bus, 6 bus, 8 bus or more bus systems.
- All digital waveform and quad split generators.
- Digital key edging, border, shadow and outline available on all ME's.
- Vari-key. Soft, hard, shadow, or see-thru key.
- Digital quad split. Wipe or dissolve in each quadrant.
- Electronic vignette. Adjustable soft pattern edges.
- Superb linear chroma keyer. RGB or encoded.
- New digital, drift and jitter-free proc. amp on output.
- Ready to interface for computer aided operation.
- Many more state of the art and operational features described fully in series 114 brochure.

Do not fear to discover a superior product in the VIX-114 series switchers. Ask to see the demo tape for a sample of what we can do for users of switching equipment.

The VIX-114 series video switching systems are conceived and designed by the largest specialized independent video switching company in the USA. Vital Industries, Inc. is holder of US patents on digital effects and analog rotary effects. Vital VIX-114 series switchers open new vistas in production of television commercials and programs to yield maximum pleasant visual impact.



GOOD ENGINEERING IS VITAL

VITAL INDUSTRIES, INC.

MAIN OFFICE: 3700 N.E. 53rd Ave., Gainesville, Fla. 32601 • Phone 904/378-1581

MORRELL BEAVERS Midwest
2644 North Seventh St.
Terre Haute, Indiana 47804
Phone 812/466-3212

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 817/261-6855

ERIC KING
Fox Hill Road
Lynchburg, Va. 24503
Phone 804/384-7001

GORDON PETERS West Coast
7960 West Beverly Blvd.
Los Angeles, California 90048
Phone 213/653-9438

For More Details Circle (10) on Reply Card

Renewal Changes

(Continued from page 10)

smaller communities—those with populations of under 10,000 persons, and not within a Standard Metropolitan Statistical Area—from Commission inquiry into the manner in which they became aware of community problems and needs.

It said these licensees still would be required to remain conversant with community problems, but the exemption would allow the licensee to choose the method by which it becomes aware of these problems. It said licensees in these small markets would be required to prepare annual problems-programs lists and to submit them to the FCC with their renewal applications.

The Deadline

The Commission said any interview for which credit is sought on a renewal application must be recorded and available in the public file no later than the day the renewal application is filed with the Commission.

The revisions will become effective 30 days after Federal Register publication for licensees whose authorizations expire on or after December 1, 1976.

The Commission said renewal applicants whose licenses expire prior to December 1, 1976, would be expected to follow existing guidelines in the 1971 Primer on Ascertainment of Community Problems by Broadcast Applicants.

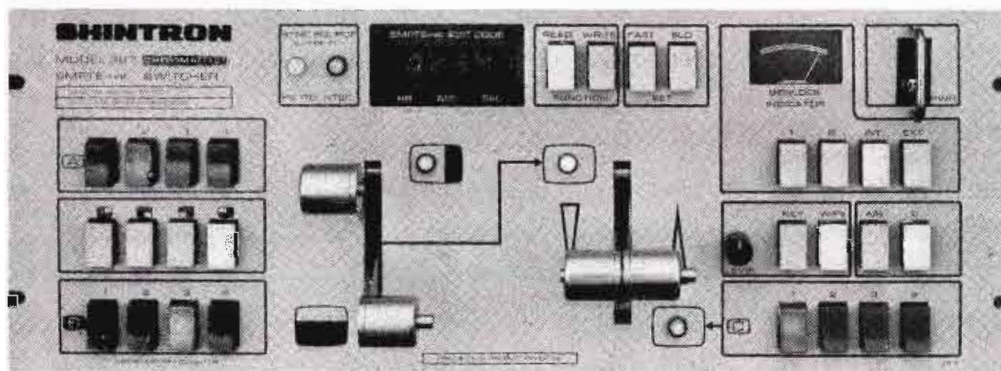
At the same time, the Commission adopted a Primer on Ascertainment of Community Problems by Broadcast Renewal Applicants setting forth in question and answer form the guidelines to be followed in conducting community leader and general public surveys. The purpose of ascertainment is to ensure that licensees fulfill their obligations to "operate in the public interest" by a "diligent, positive and continuing effort to discover and fulfill the problems, needs and interests of the public within its service area," the FCC said.

FCC proposes Antenna changes For AM

The Commission has proposed amending its rules governing certain aspects of the design of directional antennas for AM stations, to allow the antenna designer increased latitude in developing a radiation pattern meeting FCC allocation requirements.

The ability to assign a station to a particular community which will render the minimum service required by the rules, and at the same time, afford adequate protection from objectionable interference to existing stations, the FCC said, may depend on the employment of a directional radiation pattern of the proper shape and size. However, it said, in the mathematical design of the pattern, shape and size are interrelated, and a pattern of the necessary shape may be unduly large.

PROFESSIONALS SPECIALIZE



MODEL 367 SMPTEmat Switcher

- Color Switcher
- Color NTSC Genlock Sync Generator
- SMPTE Edit Code Reader/Generator
- Interface Panel

Post Production Switcher

▼ \$3,500

CHROMATIC DUET

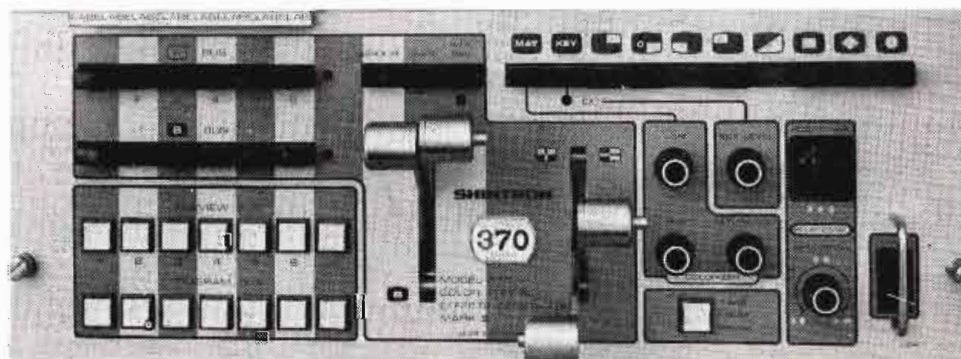
▲ \$4,320

MODEL 370

Special Effects Generator

- 10 Basic Wipe Patterns
- Dissolve to Effects
- Built-in Color Background Generator
- Over 1000 Units Sold

Production Switcher

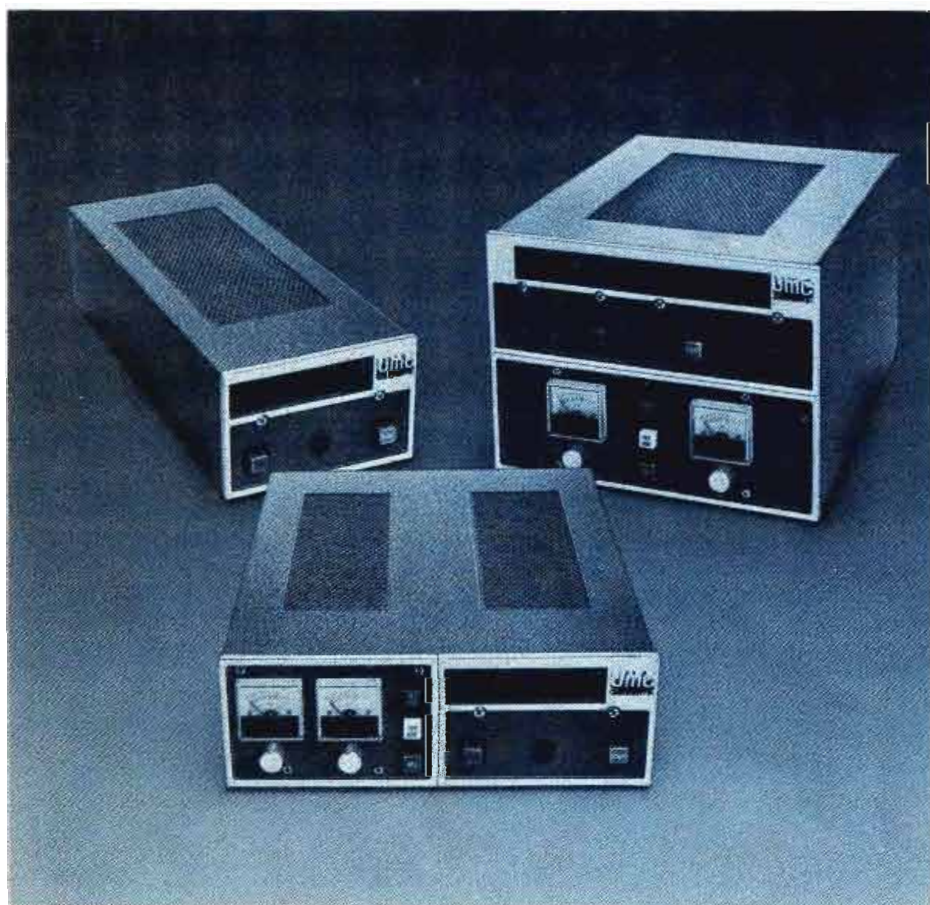


SHINTRON
Cambridge, MA 02142 (617) 491-8700

... The Precision People

Beaucart is here.

The hottest, coolest cart machine you can use!



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

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

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

UMC

**BEAUCART DIVISION
UMC ELECTRONICS CO.**

460 Sackett Point Rd. North Haven, CT 06473 (203) 288-7731



Chapter growth booming

The Signal office has received word of more Chapters forming around the country. Close to home, the old Philadelphia Chapter is being revitalized by Larry H. Will, acting president, who works for the State of New Jersey, Public Broadcasting Authority, at 1573 Parkside Avenue, Trenton 08638. He may also be reached at (609) 882-5252. Farther out in Central Pennsylvania, a group is gathering under the leadership of Chuck Baker who lives at 761 Wertzville Road in Enola, Pennsylvania 17025. Down the coast, in Atlanta, Georgia, Bob Wehrman, also an SBE Board

member, is organizing some people, and he may be contacted at Radio Station WSB, 1601 W. Peachtree, Atlanta 30309. Finally, in the Midwest, contact Greg Smith if you live in the St. Louis area. He works at KPLR-TV, 4935 Lindell Blvd., St. Louis, Missouri 63108; the telephone number is (314) 367-7211.

The SBE **Signal** office has received many letters regarding subscriptions. As a rule, **The Signal** is not available to non-members of the Society, however, for further information, please contact Vincent Flanders, SBE, P. O. Box 88123, Indianapolis, Indiana 46209. SBE

members who have missed an issue should also direct their questions to Vince Flanders and let him check the computer mailing list.

A reminder to all Chapters considering a Regional Convention in 1976—the closing date for SBE confirmation is March 15, 1976. This process includes notifying all the Chapters in the area and then contacting both Vince Flanders in Indianapolis, and SBE President Glenn Lahman in Pittsburgh. Lahman's address is: KDKA, One Gateway Center, Pittsburgh, Pennsylvania 15222.

Welcome, Chapter 40

Congratulations go out to the San Francisco, California, group which has now become SBE Chapter 40. Art Leberman is chairman; Chuck Taylor, vice-chairman; and Robert Daines, secretary/treasurer. All correspondence should be directed to Bob Daines, Telemet, Western Regional Office, 1261 El Curtola Blvd., Walnut Creek, California 94595 or (415) 938-8887.

(Continued on page 16)

SPECIAL OFFER EXTENDED UNTIL MARCH 15th!
DIGITAL ACCURACY!



REMOTE DISPLAY
+ SEPARATE HOLD
& RESET CONTROLS
+ SMALL SIZE,
2" x 2" x 4"

TIMER FEATURES

- + FITS ALL AMPEX, RCA.
- + EDITOR ACCESSORY OPTIONAL.
- + FITS VIDEO CART WINDERS.
- + AVAILABLE FOR IVC & OTHER MODELS.

- + RUBBER DRUM PREVENTS TAPE DAMAGE.
- + DRUM TOLERANCE +0.001 inches.
- + FREE, NO OBLIGATION, EVALUATION. (write for details)



VAMCO ENGINEERING

Box 7512
Tulsa, Oklahoma 74105
Call Collect (918) 252-4142, 747-7812
leadership through creativity in design

MONO

Scully
FLUTTER BAR
RECONDITIONING

**ALL
METAL
FACE**

**1/4
INCH
TAPE**

AMPEX
NON-POPPING GATE
SPRING MODIFICATION

STEREO

Magnecord
FOR OLDER MODELS:
POLE PIECES
CAPS W/GUIDES
REPLACEMENT HEADS

DIRECT REPLACEMENT HEADS

**MMI HEADS EQUAL OR EXCEED
ORIGINAL EQUIPMENT SPECS.**

SEND US YOUR ASSEMBLY. We will ultrasonically clean everything — install new heads if yours cannot be relapped — replace any worn or missing minor hardware — adjust — test — ship back PRE-PAID your assembly (not some other).

36 HOUR SERVICE — LOANERS AVAILABLE

INSTALL YOURSELF. Buy MMI heads with complete written and pictorial instructions.



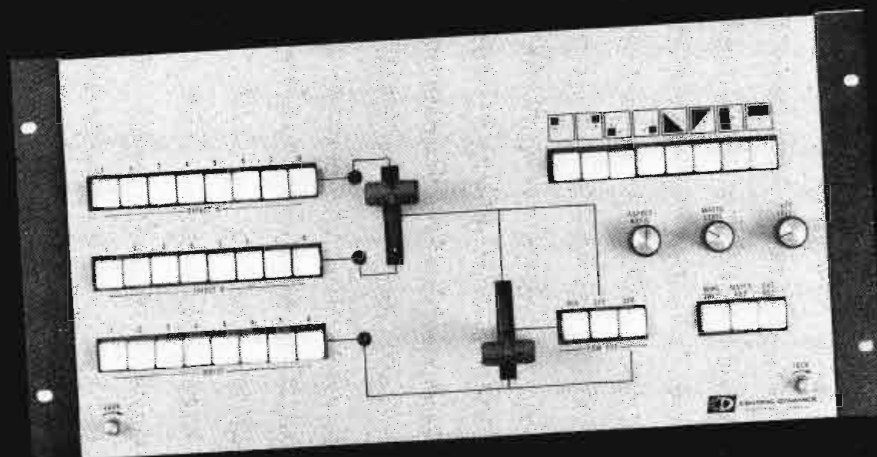
For More Details Circle (13) on Reply Card

For More Details Circle (14) on Reply Card

BROADCAST ENGINEERING

small... is sometimes BIG ENOUGH!

Central Dynamics Introduces the New VS-10 TV Color Production Switcher for Mobile, CATV, Industrial and Educational Applications



Priced at Only \$3350,
we believe it represents
a major value break-
through for professional
programming with true
broadcast quality

You don't always have to be *big* and sophisticated to make it as a TV Color Production Switcher. The low cost VS-10 is an 8-input, 3-bus, compact, self contained, vertical interval, solid state switcher with ample sophistication for professional programming with *true broadcast quality*. Impressive special effects, mix amplifier, wipe/key amplifier, output selector and broad operational capabilities provide real production talent. A unique automatic special effects preview allows presetting keys and wipes for smooth, dramatic transitions to effects. The VS-10 lets you chroma key, matte key, wipe or dissolve to keys, dissolve or wipe between program sources, dissolve to special effects, or insert titles. Other standard features include a Cut Bus and true On-Air tally system. The VS-10 is compatible with NTSC, PAL-M and PAL color systems. All this... plus the proven reliability of the largest and most sophisticated Central Dynamics Production Switchers.

Sometimes . . .
SMALL is Big Enough!

Control Features

- Wipe** - Fader positions A & B signals. Aspect Ratio. Control varies configuration of 4 corner patterns.
- Keys** - Wipe Keys on or off. Key Level Control adjusts slicing level of key signals. Matte Level Control adjusts luminance value
- Mix** - Fader proportionally controls output signals from the Direct Bus and the Key/Wipe Amplifier.
- Switches** - Crosspoint and Output Selection switched in vertical interval with illuminated momentary pushbuttons. Wipe, Key Mode & Pattern switches are mechanically interlocked pushbuttons. Tally lights on each input bus indicate "on-air" signal.

Specifications

- Video** - 8 loop through inputs (BNC) externally terminated.
1 V p-p composite or 0.7 V p-p non-composite synchronous signals.
1 External/Chroma Key input terminated internally. (CDL Chroma Keyer Module is optional)
- Pulse** - 1 Sync input (BNC) externally terminated, 2 to 6 V p-p.
- Tally** - Relay interface with 14-pin Amphenol connector with mating connector.

Power - 115 VAC $\pm 10\%$ 60 Hz or 230 VAC $\pm 10\%$ 50 Hz (switchable), 50 VA.

Mounting - Rack frame mountable with hinged front panel.
19" (483 mm) W x 8- $\frac{1}{4}$ " (22 mm) H x 7" (178 mm) D. All external connections are on rear of frame. 18 lbs. (8.5 Kg.)

Unit includes module extender.
Operating & Maintenance Manual.

Central Dynamics has earned a reputation as one of the unquestioned leaders in TV Broadcast Equipment. Our standard line of production switchers are priced from \$11,000 to \$70,000.

The VS-10 is the first of a series to be *engineered* and *priced* to fill the gap between inexpensive, inadequate switchers and the more sophisticated, expensive ones.

Solid-state technology, and volume production techniques allow the VS-10 to be offered at this remarkable price.

However, you purchase the VS-10 with complete confidence that it is backed by the engineering experience, integrity and reputation of Central Dynamics.

We are convinced, as you will be, that the VS-10 *Broadcast Quality*, TV Color Production Switcher is the best value available on the market. We're delivering production units now.

Order yours today . . . at only \$3350.



CENTRAL DYNAMICS LTD

Canada:
147 Hymus Blvd., Montreal, Que., H9R-1G1
514-697-0811

U.S.A.
230 Livingston Street, Northvale, N.J. 07647
201-767-1300

For More Details Circle (15) on Reply Card

CANON ANNOUNCES THE ULTIMATE STUDIO LENS



	PV18x12B (for 1"/25mm Plumbicon*)	P18x16B2 (for 1 1/4"/30mm Plumbicon)
Focal length	12-216mm	16-288mm
with 1.5x range extender	18-324mm	24-432mm
with 2x range extender	24-432mm	32-576mm
Maximum relative aperture	1:1.6 (f=12-172mm) 1:2.0 (f=216mm)	1:2.1 (f=16-230mm) 1:2.7 (f=288mm)
Zoom ratio	1:18	1:18
Image format covered	12.8 x 9.6mm; 16.0mm dia.	17.1 x 12.8mm; 21.4mm dia.
Minimum object distance from front vertex	0.7m (27.6")	0.7m (27.6")
Object dimension at minimum object distance: Wide:	103.2 x 77.4cm; 129.0cm diameter	
Tele:	5.3 x 4.0cm; 6.7cm diameter	
Back focal distance	62.65mm (in air)	78.08mm (in air)
Glass compensation	69.2mm (BK7)	70.2mm (BK7)
Wavelength range for color correction	400-700nm	400-700nm
Weight	17kg (approx. 37 lbs.)	17kg (approx. 37 lbs.)
Dimensions	466.5mm length x 284mm width x 260.5mm height	
Focus and Zoom control	Manual, with plug-in interchangeable servos	
Range extender control	Plug-in servo/manual	

*TM N.V. Philips of Holland

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

Judge for yourself. Compare the specifications below. Factor in Canon's nationwide service and comprehensive loaner program. And see a demonstration.

For more information, please write or call:

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

© 1975, Canon U.S.A. Inc.

For More Details Circle (17) on Reply Card

February, 1976

17



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

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

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

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

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

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

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

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

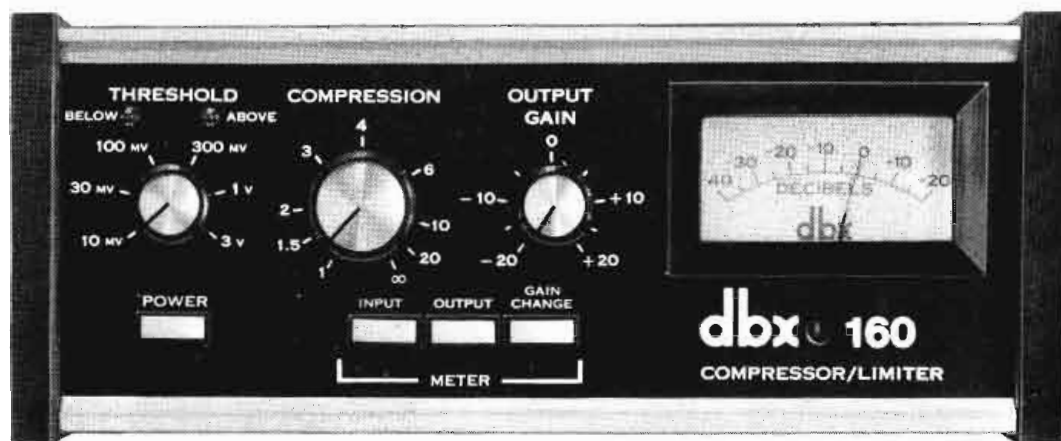
Sony Broadcast

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

For More Details Circle (18) on Reply Card

For Demonstration Only Circle (19) on Reply Card

the little mother



dbx new 160 compressor/limiter

She's got a compression ratio you can set anywhere from 1:1 to infinity. And she's got a very low distortion figure even at high compression ratios. You can set her threshold from -38 to +12 dBm, and her two red LEDs let you know whether she's above or below threshold. Her meter range is from -40 to +20 dB, and you can set her meter zero at any line level between -10 and +10 dBm. Her illuminated meter is switchable to read input, output, or gain change.

She uses true RMS level detection, which you know is more reliable and accurate than other methods. Her dynamic range is enormous and her noise contribution practically negligible. Her output is automatically ground loop compensated and she is protected against turn-on and turn-off transients. She is beautifully packaged and small enough that you can take her with you wherever you go. Or you can bolt her into the rack where she'll give you a lifetime of faithful service.

You're going to love this little mother, especially when you learn her price. She costs only \$300.00, which is a lot less than you pay for those other mothers. She's available now at your dbx professional equipment dealer's. For complete spec information including the little mother's measurements, circle reader service card or contact:

dbx dbx, Incorporated
296 Newton Street
Waltham, Mass. 02154
617/899-8090

For More Details Circle (20) on Reply Card

SBE

(Continued from page 16)

antennas. (Bob Ingalls, Chairman, 5441-187th Avenue, N.E., Redmond, Washington 98052. (206) 543-7774.)

Chapter 17 — Minneapolis / St. Paul

The December meeting of Chapter 17 was held at the University of Minnesota. Mr. Harold Allen, FCC Engineer in Charge of the District Office, led the evening's discussion on the two-tone EBS system and fielded other questions regarding FCC Rules and Regulations. (Lance Raygor, Chairman, Route 1, Box 337, Chisago City, Minnesota 55013, (612) 373-4807.)

Chapter 22 — Central New York

In Syracuse, New York, the December 18 meeting featured electronic news gathering equipment as Bob Powers of Videosound led the discussion/demonstration on the JVC and Magnavox cameras and associated recorders. Mr. Powers pointed out common pitfalls of the equipment and made suggestions for assembling the systems.

In January, Bill Bingham, president of Northeast Broadcast Labs, gave an informative program on AM-FM installation, offered ideas on testing and proof-of-performance techniques for AM and FM systems, reviewed the latest on EBS signaling requirements, and demonstrated some of the new EBS equipment.

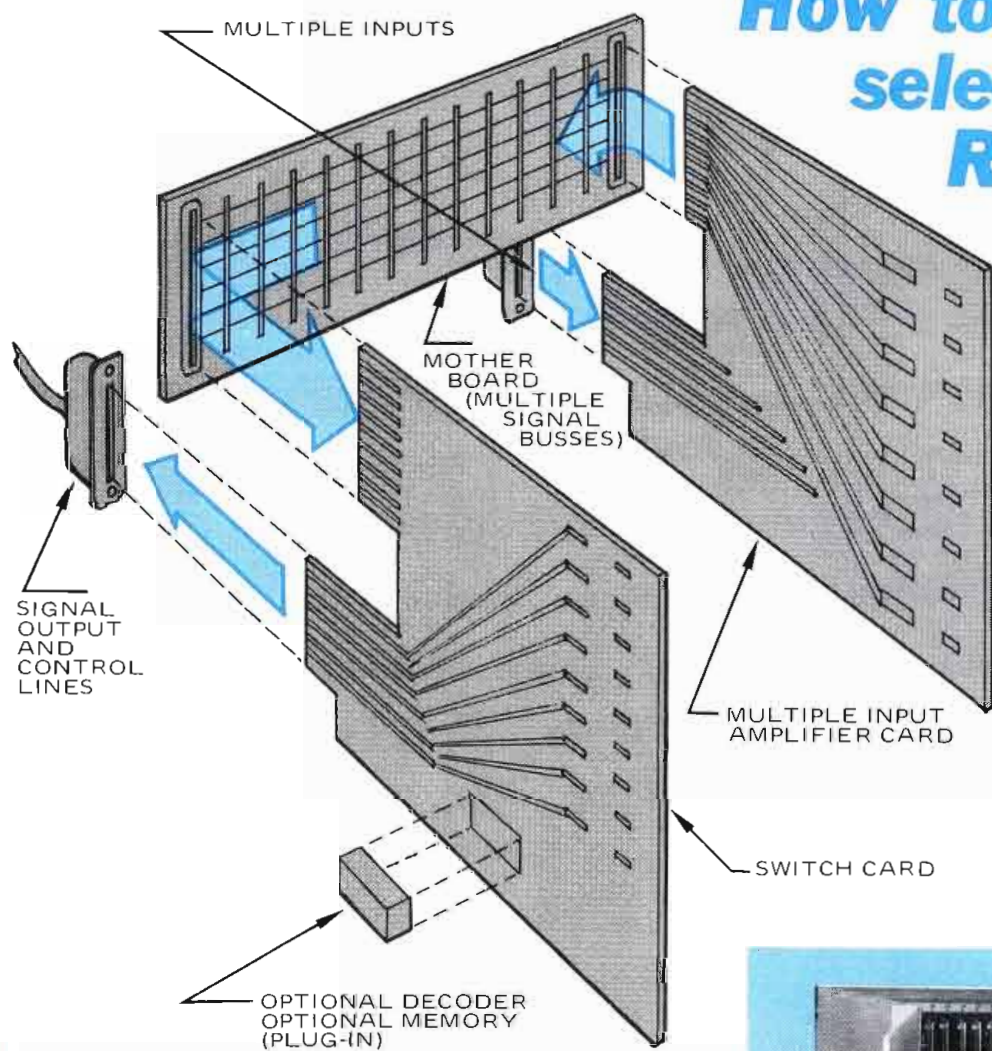
The meeting in February will feature Bob Griffiths from Telemet with a slide presentation and report on the history of television and test gear. (Gary Hartman, Chairman, WSYR, 1030 James Street, Syracuse, New York 13203. (315) 474-3911.)

Chapter 32 — Tucson, Arizona

Mr. Glen Hills, chief engineer of KGUN-TV, hosted the program December 9 as representatives from Broadcast Communications Devices held a program on electronic news gathering. Members had the opportunity at this meeting to see the new system using the "joy stick editor." (H. J. "Bart" Paine, Chair-

(Continued on page 22)

How to select a ROUTING SWITCHER!...



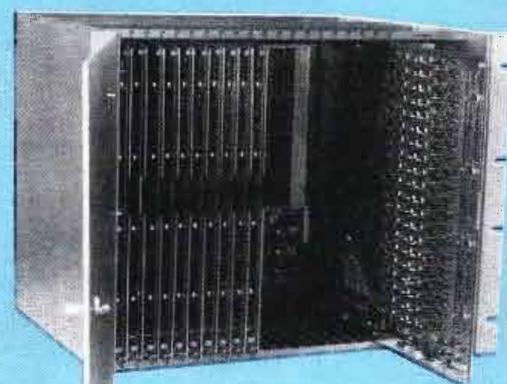
- Select for PERFORMANCE
- Select for COST EFFECTIVENESS
- Select for RELIABILITY
- Select for EXPANDABILITY
- Select for RELIABLE SOURCE

Select DYNAIR



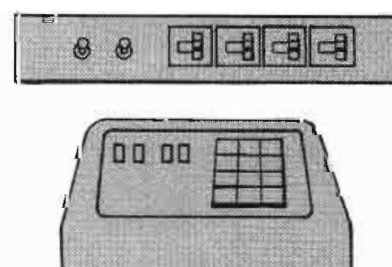
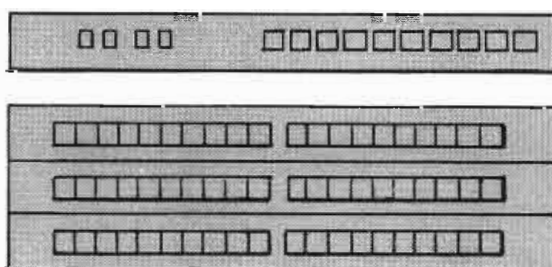
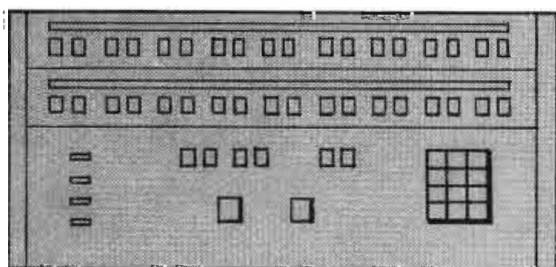
SERIES 8100 AUDIO SWITCHER

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



SERIES 1400 VIDEO SWITCHER

Frequency Response 8 MHz ± 0.1 dB, 12 MHz ± 0.5 dB — Differential Phase 0.1° — Differential Gain 0.1% — Crosstalk better than 60 dB



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

DYNAIR ELECTRONICS, INC.

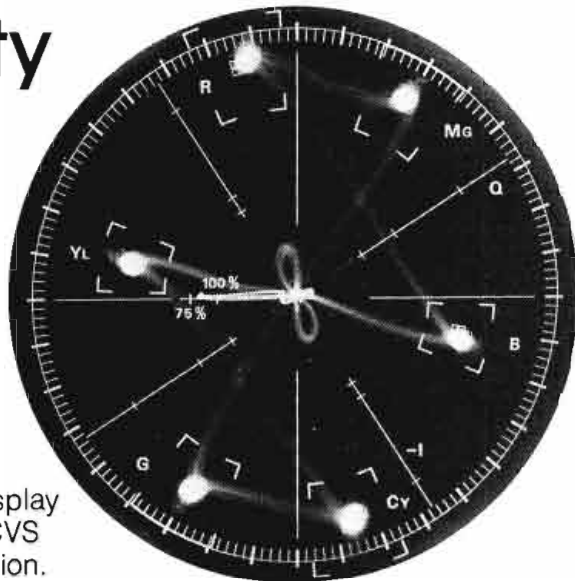
6360 FEDERAL BLVD., SAN DIEGO, CA. 92114
PHONE: (714) 582-9211; TWX: (910) 335-2040

DYNAIR

For More Details Circle (21) on Reply Card

The new CVS 504B Digital Time Base Corrector

Our quality
is easy
to see



Typical Vectorscope display of VTR playback after CVS 504B time base correction.

Gyroscopic effects, when running or turning, with portable ENG systems, poor stability of tape, and chroma level instability are but a few of the real world problems of video. The CVS 504B solves these problems.

And let's look at operation and maintenance. The CVS 504B requires only front panel control in all standard operations. Every PC board requires only seconds to install. These are just two examples of our strict adherence to modular design.

Then consider the fact that CVS has delivered more than 1,200 digital TBC's. That speaks for itself.

Know what to look for when you buy a TBC? CVS can help. Just ask. We will send you a "TBC Buying Guide" to assist you in evaluating the real world of digital time base correction.

Look to the leader.



Consolidated Video Systems

3300 Edward Avenue
Santa Clara, California 95050
(408) 247-2050 Telex: 35-2028

For More Details Circle (22) on Reply Card
For Demonstration Only Circle (98) on Reply Card

SBE

(Continued from page 20)

man, Chief Television Engineer, University of Arizona, College of Medicine, Tucson, Arizona 85724, (602) 882-6644.)

Chapter 37 — Alexandria, Va./ Washington, D.C.

Members of Chapter 37 had an excellent program prepared for them by Floyd Daisey, chief engineer of WFBR, Baltimore, who discussed experimental stereo broadcasts through WFBR-AM, using the Kahn AM stereo system. This evening meeting was held at the University of Maryland in College Park, beginning with dinner at 6:30 and the program following at 8.

Clarence Beverage, Collins Radio representative, who in the meantime had returned from visiting Chapter 2 in Pennsylvania, [see above] spoke to members of his own Chapter on January 28 on intermodulation distortion with a hands-on demonstration of the Collins 310Z-2 FM exciter, the Crown IM distortion analyzer, and the Sequerra monitor receiver.

This Chapter informs us via its newsletter that members are contemplating a Regional Convention, hopefully early in the year. (Charles Riley, Chairman, Tele-Color Productions, 708 N. West Street, Alexandria, Virginia 22314, (703) 683-3203.)

Chapter 39 — Tampa, Florida

On January 13, Tampa people welcomed Ralph Barlow, Engineer in Charge of the District Office, to hear a report on the various functions of the local office. The Chapter is hoping that they may be able to set up a regular feature with Mr. Barlow and have him give a 5-minute report every meeting. (George Shideman, Chairman, 1561 South Jefferson Avenue, Clearwater, Florida 33516, (813) 442-9133.)

Orlando, Florida

In December, Central Florida met at the Channel 24 studio to hear a program conducted by Don Anglin, chief engineer at WNBE/WBJW in Orlando, with assistance

(Continued on page 24)

AKAI RELIEVES BACK PAIN.

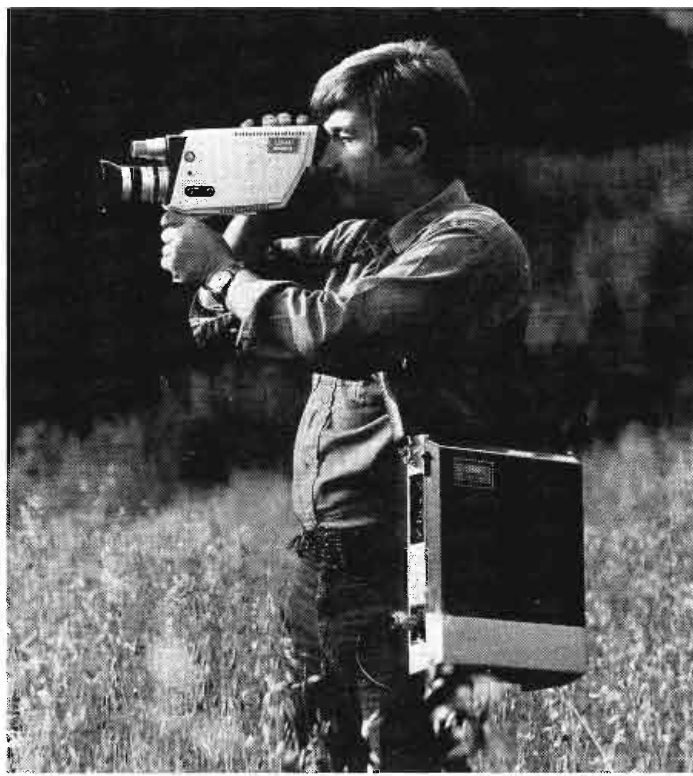
One of the common discomforts due to excessive videotaping is back pain.

Lugging around those 35 and 40 pound VTRs through crowds, down stairways, up stairways, up hills, steep hills.

Well, no more. Akai has a remedy — our new VTS-150B we call the Hustler.

The Hustler doesn't weigh 35 or 40 pounds like other recording units. It doesn't weigh half that.

In fact, it doesn't even



need to go on your back.

The Hustler is a 16 pound color videotape recorder you sling over your shoulder, and a 6 pound color camera you can carry in one hand.

No wonder 63 TV stations are now using our little Hustler.

The lightweight, two-piece, one-man operation that isn't a pain in the back — or anyplace else.

AKAI™

2139 E. Del Amo Blvd., Compton, Ca. 90220

Fast!



Don't Panic! Berkey Colortran Delivers Dimming Systems Fast.

Custom electronic lighting control systems in 90 days or less.

The control console shown above was completed in only 6 weeks—part of a 60 dimmer 5 scene preset system complete with dimmer racks, patch panel, power distribution equipment and lights.

Memory? Takes a few weeks more—Ask about our Memory Center.

Berkey Colortran can deliver the finest custom lighting control system in 90 days or less. Try us.

For more information write:
Berkey Colortran, Dept. BE-276
1015 Chestnut St., Burbank, CA 91502
or Telephone (213) 843-1200.

Berkey Colortran DIVISION OF
Berkey Photo Inc.

(Continued from page 22)

from Ransome Welborne, assistant chief. Their seminar was an introduction to integrated circuits, history, design, construction, and practical application. A handout, passed out that evening, contained the building blocks of the IC application as Mr. Anglin discussed his personally designed IC bench tester equipment, along with current available literature on RTL, DTL, ECL, CTL, CML, HNIL, CMOS and I^2L logic.

Mr. Joseph Lang, vice-chairman of the Orlando Chapter, conducted a seminar in January on loud-speaker design and application. (John Weyrick, Chairman, 5765-F Kingsgate Drive, Orlando, Florida 32809, (305) 857-3729.)

Squeeze Coming On Program Duplication

The FCC has instructed the staff to prepare for later release new rules to further curtail the amount of allowable program duplication carried on both AM and FM radio stations owned by the same licensee and located in the same local area.

The present rule (Section 73.242) limits FM stations in cities of over 100,000 to no more than 50 percent of the average FM broadcast week to programs duplicated from an AM station owned by the same licensee in the same local area.

Effective January 1, 1977, program duplication will be limited to 25 percent for all stations if either the AM or FM facility is licensed to a city with a population of more than 100,000 and duplication will be limited to 50 percent if either AM or FM station is licensed to a city with a population of more than 25,000 but not more than 100,000.

Effective January 1, 1979, the allowable amount of duplication the 25,000-100,000 category will drop to 25 percent.

Duplication is the simultaneous broadcasting of a particular program over both the AM and FM stations or the broadcast of a particular program by one station within 24 hours before or after the identical program is broadcast over the other station.

If your studio operates one or more helical scan recorders, a time base corrector is virtually a necessity. And now, cost is no longer a reason to restrict the versatility of your operation with a TBC that has limited flexibility.

The Edutron TBC-110A is more than a time base corrector. It's a total signal processing system including: -Time Base Corrector -Video Processing Amplifier -Sync Generator with Pulse Driver Outputs -Heterodyne Corrector and Velocity Compensation.

The TBC-110A will improve the time base stability of any helical VTR. It will make H locked VTRs broadcast stable, and timed to either studio sync or the internal crystal reference. Many V locked VTRs can also be corrected to stringent broadcast requirements in the H lock mode by supplying our variable

V Rate Recorder Driver pulse to the video input of the VTR. The less stable V locked, and all line locked recorders, can still be dubbed up to quad or helical broadcast recorders through the TBC-110A with rephased chroma, or distributed on cable systems with processed chroma.

The internal digital sync generator is clocked by a temperature controlled 14.318 MHz oscillator that surpasses

broadcast requirements and provides a full complement of synchronizing outputs. This provides an excellent primary sync generator or backup for either broadcast or production studio.

As you can see, the TBC-110A has all the credentials to make it perfect for small distribution systems or the most demanding studio requirements. The TBC-110A is remarkable! Send for our specs today.



At last.
A time base corrector
perfectly suited for
the most demanding studio situation.
At a price you can afford.



Edutron™

3700-B2 Northeast 53rd Avenue
Gainesville, Florida 32601/(904) 377-1411

For More Details Circle (24) on Reply Card

EBS Countdown Is Nearing Deadline

By Joseph Wu

Mr. Wu is president of Time & Frequency Technology. Along with other manufacturers, he worked closely with the FCC on development of the new EBS equipment. He has a BSEE from Purdue, and a MSEE from Illinois Inst. of Technology.

During 1975 TFT had been actively involved with the FCC's Emergency Broadcast Division and the broadcasters in defining the specifications of the new two-tone EBS equipment required to be operational on April 15, 1976. In the engineering development phase of the EBS equipment many broadcast engineers and consultants were consulted by TFT regarding their daily use and interfacing problems of the EBS equipment in the broadcast facilities.

Because of our familiarity with the new EBS requirements, TFT has been invited by several regional Society of Broadcast Engineers to speak and give slide presentations on the subject at their meetings. A list of most frequently asked questions and answers have been compiled and condensed. These questions and answers might be timely EBS information for the readers in order to give them a better understanding of the EBS operations and also to help them to choose the right type of EBS equipment for meeting the April 15 deadline.

Q. 1—What is the purpose of The Emergency Broadcast System?

A—The EBS is designed to allow instant access to the broadcast media by the President of the United States and responsible officials in the state and local government in case of national, state or local emergency.

Q. 2—How does the EBS work?

A—The Emergency Broadcast System is a voluntary program initiated by the Federal Communications Commission in cooperation with the White House and the office of Telecommunication Policy. All broadcast stations are classified as either a participating station or a non-participating station. It is based on the chain principle. In each state there are key stations. These stations are called Common Program Control Stations (CPCS). These are the main stations that originate national and state level emergency broadcast, although any station in the EBS system may originate such a message, these are the designated key stations. The next station in the chain is called a Primary Relay station. The function of these Primary Relay stations is to

monitor the CPCS stations and when an emergency message for broadcast is received, relay it on to the next station and so on until all stations in the chain have received the message. For that reason it is very important that every station monitor the correct station or one that is assigned by the FCC. That way all stations are assured of receiving emergency messages.

Q. 3—What are the obligations of the broadcast station?

A—Every station must perform the following functions:

(a) Conduct tests once per week between 8:30 a.m. and local sunset.

(b) They must monitor the station specified in the state EBS plan. This requires every station to have an EBS monitor receiver tuned and operating to the station so specified. Note that this applies to non-commercial educational stations as well as commercial stations.

(c) Log the weekly EBS test in the station's operation (transmitter) log.

(d) Keep the EBS Checklist (Big Yellow Folder) in a readily accessible place and known to all employees.

(e) Keep the Operational Map for your area as supplied by the FCC in a readily accessible location.

Q. 4—What are the routine obligations of a PARTICIPATING station?

A—In addition to those items listed in the question above, a participating station must additionally do the following:

(a) Participate in closed circuit tests. These tests are scheduled by the White House and the National Industry Advisory Committee on a random basis not more than once a month nor less than once every three months. It consists of live test messages sent down the AP/UPI/Mutual/NBC/ABC/CBS Audio wire networks. These national level tests will originate from the White House or a point selected by the White House with a program feed connected to the telephone company toll test center. The telephone company will interconnect as required the facilities of all audio networks. Additionally, the AP/UPI radio wire teletype network will be acti-

When the FCC approves
a 750kW power level
for 12 clear channel AM stations
to better serve the people
of the United States,
EIMAC tubes will do the job.



Your choice for Class C, Doherty, Ampliphase or
PDM service. EIMAC makes it work. Varian,
EIMAC Division, 301 Industrial Way, San Carlos
California 94070. Telephone (415) 592-1221.



For More Details Circle (25) on Reply Card

www.americanradiohistory.com

vated for these tests. Upon receipt of this test, continue to monitor the radio network or the teletype line for further information.

(b) Enter the time of receipt of the closed circuit test in your station's operation log. (Remember the FCC may request a report of your station's participation in the closed circuit test.)

It should be noted at this point that non-affiliated stations to any of the above listed networks may order a loop from the local telephone company for use during activation of the EBS only.

Q. 5—Who initiates the EBS?

A—At the NATIONAL level it would be the President of the United States. At the STATE and LOCAL level, local officials, state officials (such as the Governor of the State) the local meteorologist in charge of the weather station, the local or state Civil Defense Director, or such other official as the station licensee deems appropriate. The Commission leaves it to the discretion of the station licensee as to who is a qualified local or state leader within that definition. It might be noted at this point that all 50 Governors have been advised of the existence and use of the EBS.

Q. 6—How does a station initiate the Emergency Broadcast System for its area at the present time?

A—The station begins by transmitting the ATTENTION SIGNAL. This consists of the following procedure:

(a) Cut the transmitter carrier for 5 seconds; (sound carrier only for TV stations).

(b) Return the carrier to the air for 5 seconds.

(c) Cut the transmitter carrier for 5 seconds (sound carrier only for TV stations);

(d) Return carrier to the air;

(e) Broadcast 1,000 cycle steady state tone for 15 seconds.

(f) The announcer then proceeds to announce the emergency condition as relayed to him by the state

or local official.

By this procedure other stations monitoring this station will know of the emergency condition and will repeat it for their area. They would follow essentially the same procedure as above. For example, suppose the local weatherman contacts the General Manager of Station A and advises him that there is a tornado warning for his section of the state. The General Manager would then proceed to initiate the EBS system as above described and then make the appropriate announcement. Other stations monitoring that station would do likewise.

Q. 7—Must the non-participating stations go off the air in the event of an EBS alert?

A—Non-participating stations do not go off the air in LOCAL or STATE emergencies and furthermore they may participate in the EBS during STATE or LOCAL emergency situations. However, in the event of a NATIONAL emergency, all non-participating stations must broadcast an announcement advising listeners to tune to one of the participating EBS stations. These participating stations appear on the State Operational Map which are supplied by the FCC. Upon this advisory to their listening audience in the event of a NATIONAL emergency, they must go off the air until the emergency is over.

Q. 8—May a participating station re-broadcast the message of the station it is monitoring in an emergency?

A—Yes. Stations operating emergency communications shall be deemed to have conferred re-broadcast authority on other participating stations. (FCC Rule 73.1207).

Q. 9—What should every station have in its possession to be within present FCC rules regarding EBS?

A—Every station must have the

following items at its station's studio location:

(a) The EBS Checklist (Big Yellow Folder) and the Authenticator Word List (Red Envelope).

(b) Special instruction card (White poster);

(c) A copy of the EBS Rules dated January 30, 1974;

(d) A copy of the STATE EMERGENCY BROADCAST SYSTEM OPERATIONAL PLAN;

(e) EBS (FCC) authorization posted with transmitter license.

All of the above items have been sent to every broadcast station licensed by the FCC, including non-commercial and 10 watt educational FM stations. If you do not have any or all of the above listed items readily available at your station, you should immediately contact the Emergency Broadcast Office of the FCC at 202-632-7232 and request the missing items. Or you may send a written request for these to Mr. Ray Seddon, Chief, Emergency Communications Division, Federal Communications Commission, Washington, D.C. 20554.

Q. 10—What is the Authenticator Word List?

A—This is a list of words contained in the red colored envelope in the inside front jacket of your EBS CHECKLIST (Big Yellow Folder). This is a list of code words that verify the use of the NATIONAL EBS system. They are contained in the red envelope. Do NOT open the red envelope until you receive an EBS Emergency Action Notification via UPI/AP any of the radio audio networks/or off-the-air monitoring of another station. The authenticator word lists are used to protect the integrity of the system and to prevent unauthorized activation of the system.

Q. 11—Are the Authenticator Word Lists changed periodically?

A—Yes, the lists are changed two times per year. Every station is required to keep this red envelope

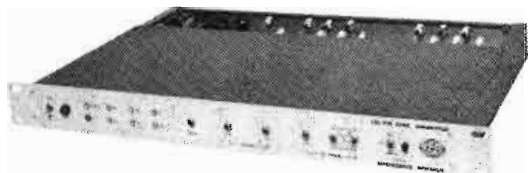
DID YOU KNOW — — — —

That LENCO Has A Complete Line of Quality Video Terminal Equipment on The Shelf For Immediate Delivery?

DIGITAL COLOR SYNC GENERATORS

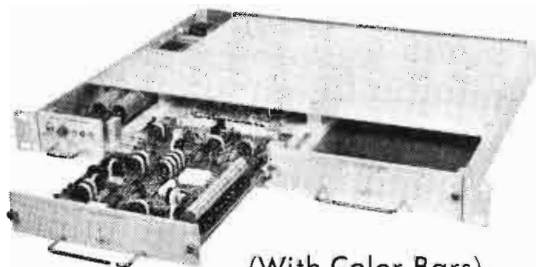


(With Dual Outputs)



(RS-170 or Helical Genlock)

NTSC COLOR ENCODERS



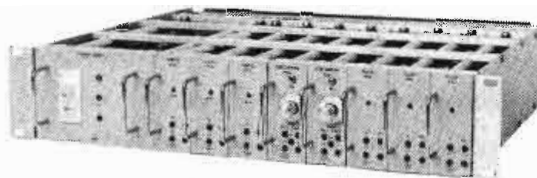
(With Color Bars)

COLOR STABILIZING AMPLIFIERS

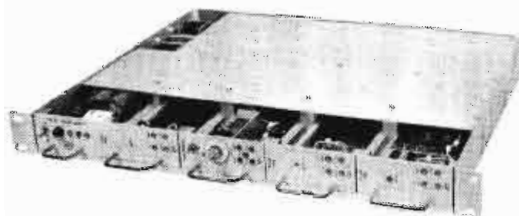


(Video AGC & Chroma Control)

VIDEO, PULSE, SUBCARRIER DISTRIBUTION



8 Unit Frame



4 Unit Frame

VIDEO PRESENCE DETECTOR



(A-B Automatic Video Switch)

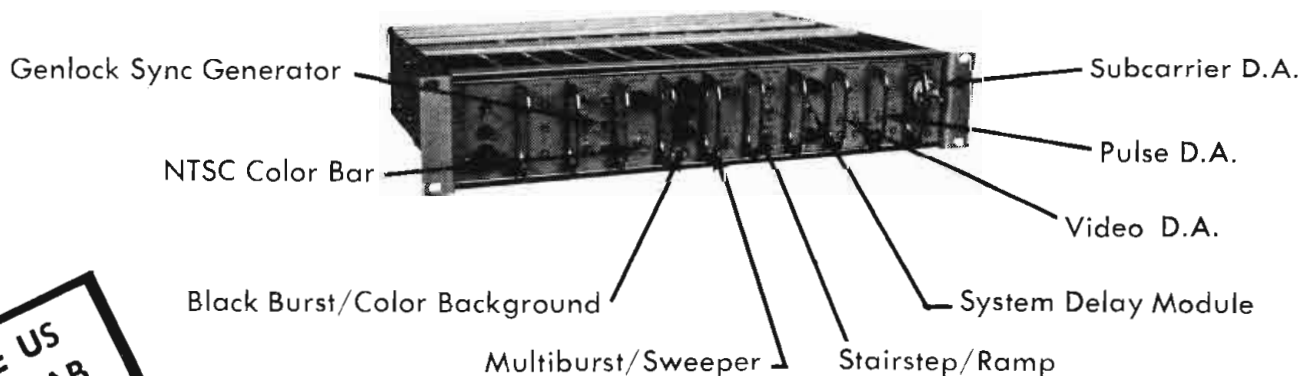
BLACK BURST/BAR DOT GENERATOR



(Valuable Stand Alone Unit)

300 SYSTEM

(9 of 29 Shown)



SEE US
AT NAB
CHICAGO
BOOTH
#707



FOR THE FIRST TIME—YOU HAVE THE CHOICE!

"QUALITY WITH RELIABILITY AT A REASONABLE PRICE"

LENCO INC. ELECTRONICS DIVISION

319 W. MAIN ST., JACKSON, MO. 63755

314-243-3147

with its CHECKLIST whether the station is participating or non-participating station.

Q. 12—When is the ATTENTION Signal transmitted?

A—The ATTENTION signal is used only in (1) off-the-air monitoring tests; or (2) in an emergency situation (either National, State, or Local emergency).

Q. 13—When a station receives a "CLOSED CIRCUIT TEST" message over the news wire, what should the station employee do?

A—The operator should log the receipt of the message in the transmitter (operation) log and NOT THE PROGRAM LOG.

Q. 14—Could I schedule the weekly test so that it falls on the same day of the week?

A—No. The tests are to be RANDOM, that is, not scheduled at any particular time each week. The idea here is to permit all employees to be exposed to the procedures required in an emergency should they be on the air at the time of the emergency. The employees should be reviewed on the procedures periodically and should be reminded of the location of the EBS CHECKLIST.

Q. 15—I understand that the EBS station to monitor is assigned by the FCC. What should I do if I can't receive that station?

A—If you are having problems receiving your primary relay station, you should notify the FCC for another assignment giving them your preferences, if any, of other stations to monitor.

Q. 16—What are the highlights of the FCC Rules released by the Commission in August 1975 regarding the two-tone EBS?

A—a. The attention signal is changed to 853 and 960 Hz two-tones.

b. Each of the two tones shall separately modulate the transmitter at no less than 40%.

c. The Two-Tone Encoder must be typed accepted by the Commission.

d. The Two-Tone Decoder must be certified by the Commission.

e. All AM, FM, and TV stations must have the equipment installed by April 15, 1976.

f. The 10-watt educational stations are exempt from generating the two-tone signal, but are still required to have the receiver and decoder.

g. Stations wishing to build their own encoder and decoder are required to file for Type Acceptance and Certification; however, if the quantity is five or less and not for sale, they are not required to pay the fees.

Q. 17—What are the FCC Technical Requirements of the Two-Tone Encoder?

A—a. Frequencies: 853 and 960 Hz ± 0.5 Hz.

b. Harmonic Distortion: less than 5%.

c. Output Level: +8 dBm (600 ohms).

d. Period of Two-Tone: 20 to 25 seconds.

e. RF Environment: 10 V/m AM Frequencies, 0.5 V/m FM and TV frequencies.

f. Operating Temperature: 0° to +50 C°.

g. Line Voltage: 100 to 135 VAC.

h. Indicator Device: Visual or aural indicator to show system is activated.

i. Switch Guard: COMMAND switch must be protected from accidental activation. Same applies to remote COMMAND switch.

Q. 18—What are the FCC Technical Requirements of the Two-Tone Decoder?

A—a. Time Delay: 8-10 seconds.

b. Operation Bandwidth: ± 5 Hz.

c. Reset Ability: a switch should

be provided to reset receiver to a muted state.

D. Operating Temperature: 0 to 50° C.

The author wishes to thank Mr. Perry, the publisher of the Perry Publications, for the permission of using a portion of the materials published in the June 15, 1975 issue of **Perry's Broadcasting and the Law**.

EBS Equipment Manufacturers with FCC type approval (encoder and decoder)

A. C. Radio Co.
370 South West 13th St.
Pompano Beach, Fla. 33060

Audio Engineering Co.
4112 Oak Lane
Gary, Ind. 46408

Avcom Inc.
P.O. Box 29153
Columbus, Ohio 43229

Bald Mountain Lab
230 Bellevue Rd.
Troy, N.Y. 12180

Branco div., Ledex Inc.
P.O. Box 706
Piqua, Ohio 45356

Elcom Engineering Co.
13161 Barrett Hill Circle
Santa Ana, Ca. 92705

Gorman-Redlich Mfg. Co.
6 Curtis St.
Athens, Ohio 45701

*International Nuclear Corp.
608 Norris Ave.
Nashville, Tenn. 37204

McMartin Industries Inc.
4500 So. 76th St.
Omaha, Nebr. 68127

Neff Electronics Inc.
P.O. Bx 317
Beltsville, Md. 20705

Rivers Associates P.O. Box 58
Leominster, Mass. 01453

Telco American
P.O. Box 10207
Knoxville, Tenn. 37919

Time & Frequency Technology, Inc.
3000 Olcott St.
Santa Clara, Ca. 95051

The Waldon Co.
810 Dyches Dr.
Savannah, Ga. 31406

*Decoder approval not confirmed at press time.

1976

...A year of pioneers and pioneering



For over a decade and a half, Moseley Associates, Inc., has pioneered many advances in aural studio-transmitter links (STL) and transmitter remote control equipment. Listed below are but some of these innovations —

MOSELEY – Pioneers of:

- ✓ Dual STL for FM Stereo
- ✓ Composite STL — A SINGLE Link for FM Stereo
- ✓ All Solid-State STL
- ✓ AM Wireless Remote Control with Subaudible Metering
- ✓ FM Wireless Remote Control with Subaudible Metering
- ✓ Automatic Digital Transmitter Logging
- ✓ Digital Transmitter Remote Control System
- ✓ Patented FM Remote Control SCA Phase Modulation Telemetry Return Technique
- ✓ All Solid-State Remote Pickup Link

AND NOW, for the 1976 NAB Convention, we will introduce the first 950 MHz STL transmitter with an on-frequency All SOLID-STATE RF Amplifier — NO varactors!

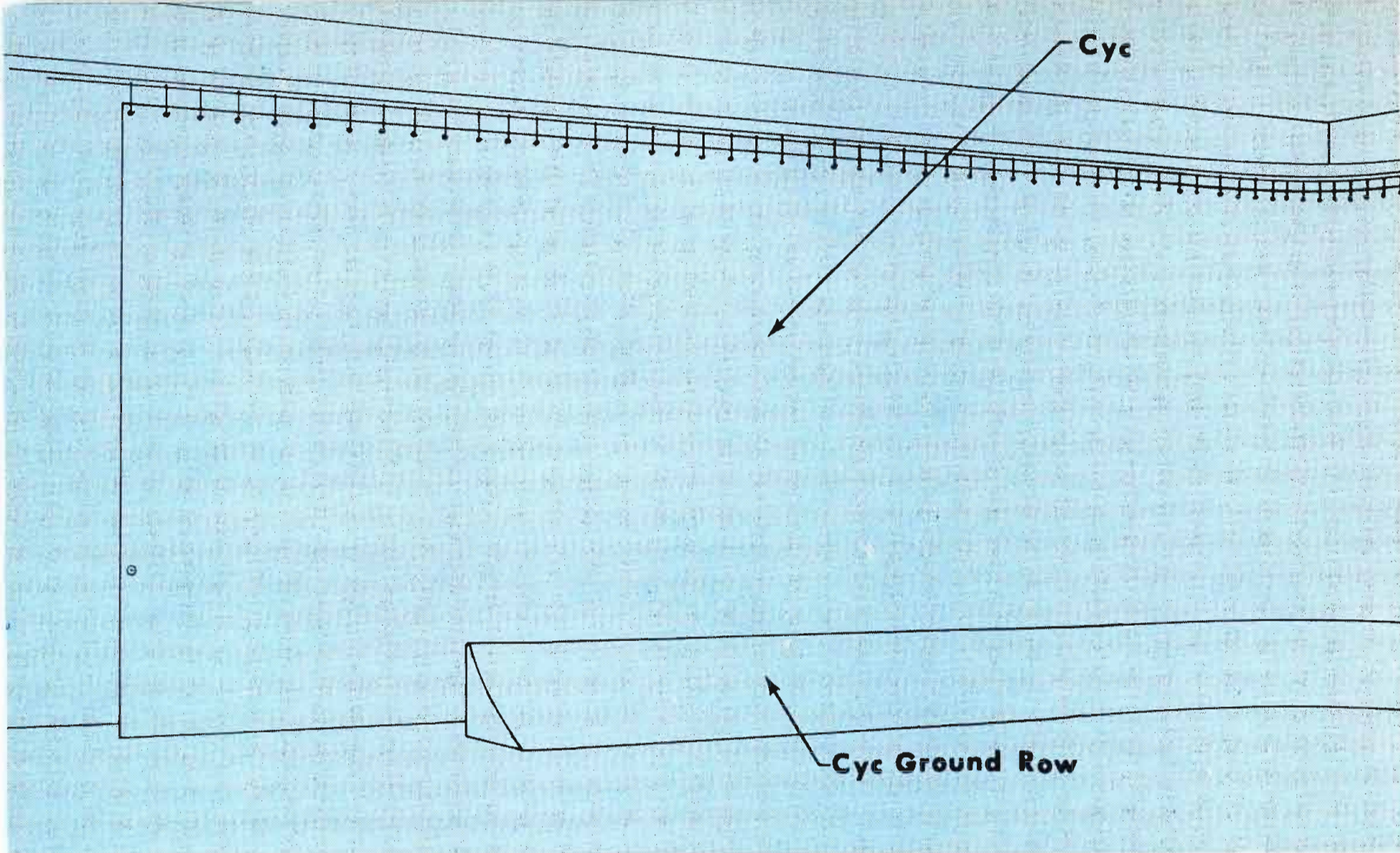
Please visit us in Booth 505 during the NAB Convention and see this new STL transmitter and other Moseley innovations.



MOSELEY ASSOCIATES, INC.
SANTA BARBARA RESEARCH PARK

111 CASTILIAN DRIVE
GOLETA, CALIFORNIA 93017
TELEPHONE (805) 968-9621
TELEX 658448 CABLE: MOSELEY

For More Details Circle (27) on Reply Card



Design and construction notes

Basic Set Types

First of all, some background information. There are four basic categories of studio sets: Neutral, Representational-Supportive, Suggestive, Realistic and Fantasy.

The first two, Neutral and Representative-Supportive, are the most used. Often, "Neutral" would be better called "nothing," since this type of set is usually represented by a blank wall, often painted chroma key blue. Other terms used to describe the completely Neutral set are "limbo" (nothingness) and "cameo" (a completely **black** background, as opposed to limbo, which can be **any** solid tone or color).

The completely neutral set is easy to "construct", since all you need is a smooth, unbroken wall and a bucket of matt-finish paint. This type of set, of course, is pretty unexciting and it is about as far from an original idea as you can get. It definitely has its place, however, when used creatively and

sparingly. Since there is nothing present to divide attention or distract viewers from your center of pictorial interest, this type of set can be reserved for focusing total attention on a picture's subject. The subject matter, therefore, has to be strong enough to hold interest and attention by itself. But, remember, even a diamond looks better in an appropriate setting.

When the neutral set is used for chroma key purposes, the background doesn't have to be one solid, unbroken color or tone. As long as tonal qualities remain within reasonable limits, you can try out patterns of relief in the surface of the background by including, for example, letters, logos, etc. In this way, when the wall isn't keyed out, the viewer will be able to see something more interesting than blue nothingness. When using relief patterns, just remember that the lighting on the background will have to be fairly

flat and consistent from show to show. Otherwise, you may find that a key is correctly adjusted (clipped) in one area of the picture, while another area exhibits a "tearing" effect.

Generally, chroma key makes use of a royal blue colored background, a color which has been found to be the most practical and successful. Often, several shades of blue can be keyed out simultaneously, which makes possible the design of more interesting backgrounds. Although blue is most often used in chroma keys, any color can (theoretically) be keyed out of a scene, depending upon the flexibility of your equipment.

The Cyc

The cyc (short for cyclorama) is another type of Neutral set. Traditionally, cycs have been made of tightly-stretched ceiling to floor canvas, covering at least two walls by gently curving undetected around the 90 degree corners. (See

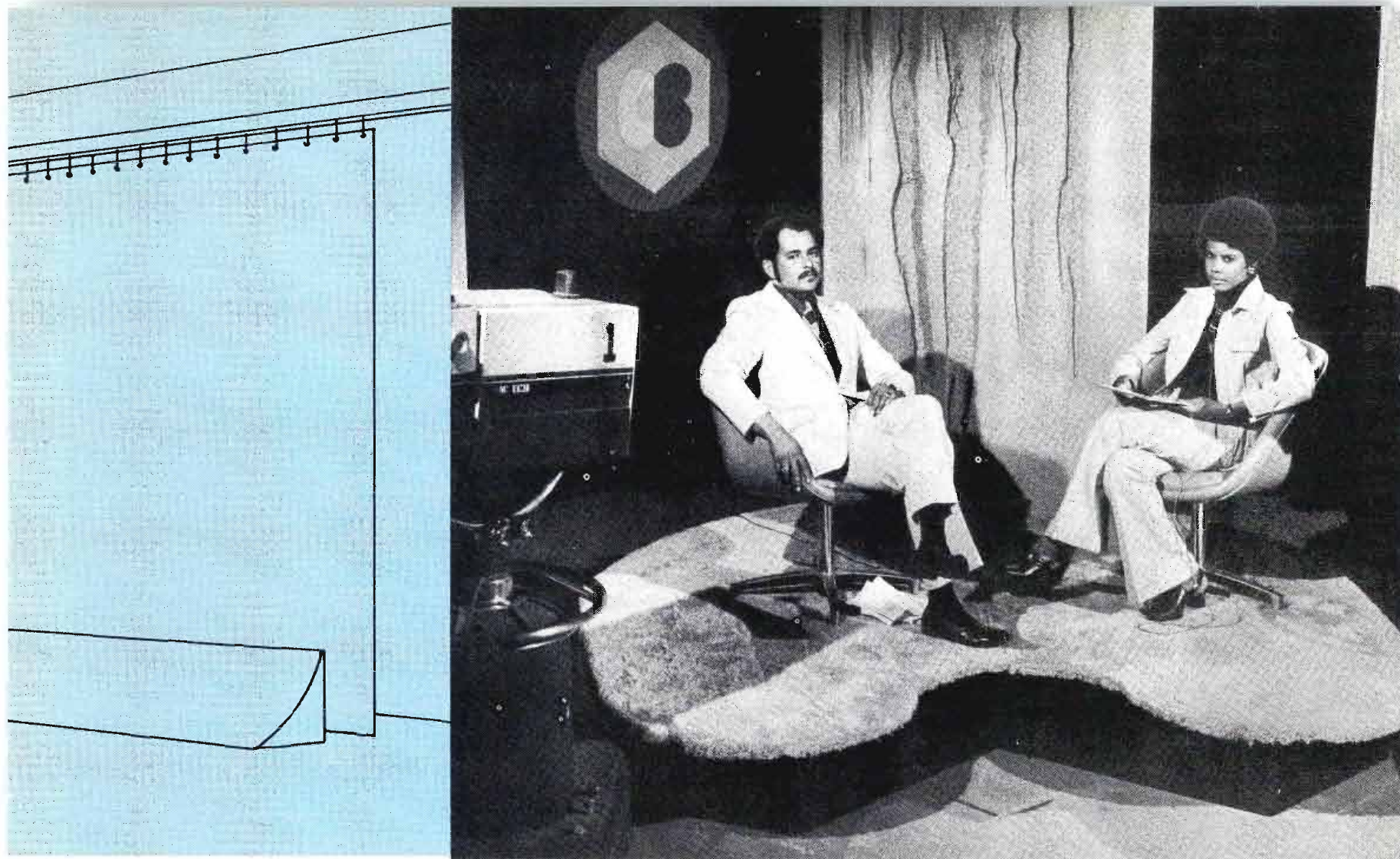


Figure 1

for studio sets

By Ron Whittaker, University of Florida, Gainesville, Florida

Figure 1.) Cys can also be made of plaster, or, in fact, any material which can be finished so that seams and corners will not be visible. Through the use of strong, directional lights covered with colored gels, or through the projection of interesting shadow patterns, cys can be made into simple but interesting backgrounds for subject matter requiring a relatively large space.

There is one other type of "Neutral" background which (fortunately) has all but dropped from the television scene—curtains. At one time, no respectable television studio was without at least two colors of curtains which could be pulled around the walls of the studio to provide an instant background for anything. Television's reliance upon curtains undoubtedly came from its theatre heritage. For the most part, nowadays, curtains or drapes are useful in a TV studio only when they are made to appear

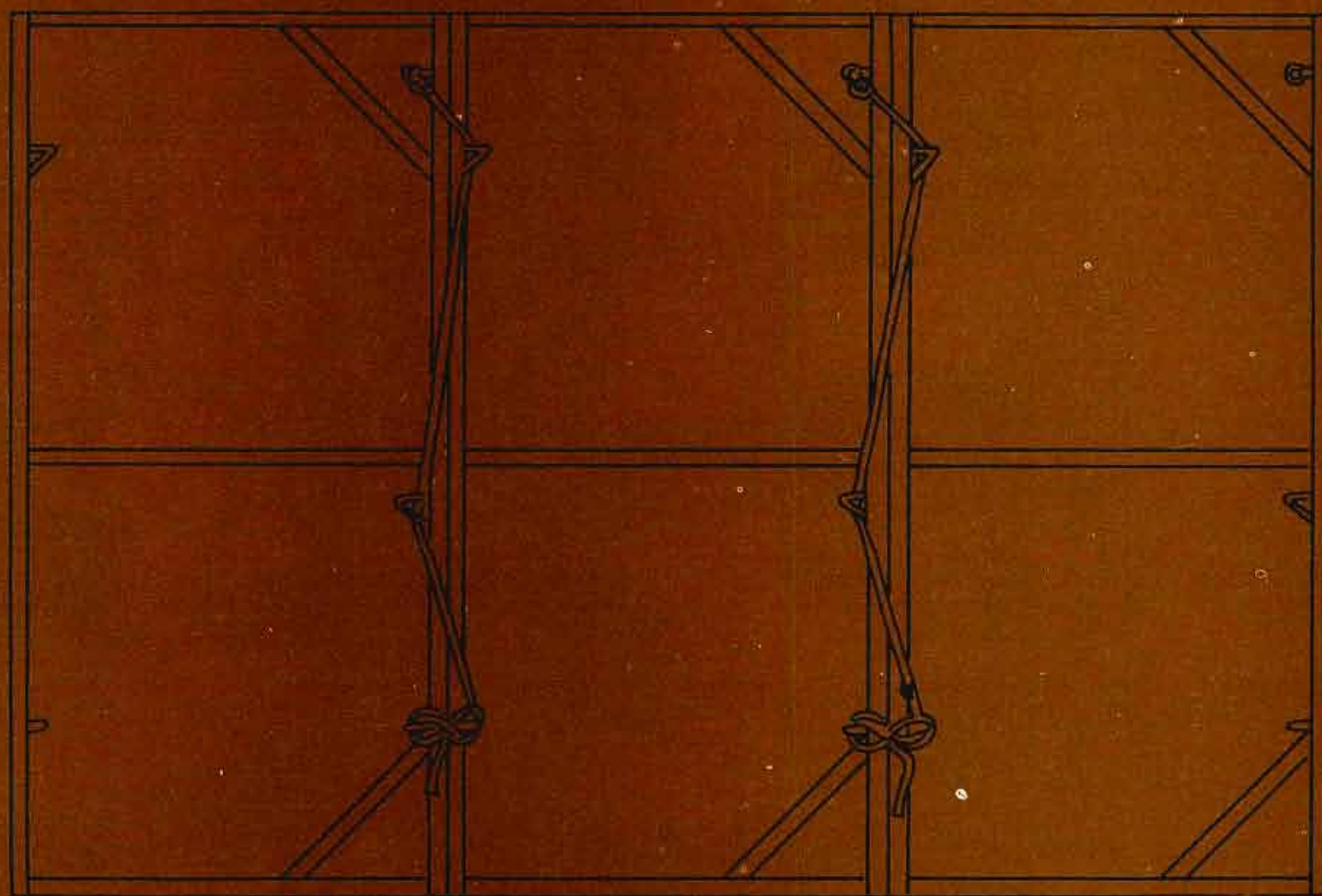
like something other than what they are! Solid, satin-type black curtains can produce an excellent cameo background, which will provide a stark effect (in limited doses). There are also light grey and off-white curtains which can be stretched tightly for a cyc-effect. A curtain fabric which shows wrinkles can be a real curse in the latter situation, however.

Representational-Supportive Sets

News, sports, weather and most studio interview sets fit into the category called "Representational-Supportive". In the case of the weather set, the background is more than just supportive, since it is a vital prop in the show itself. Weather sets need to be simple with highly legible lettering and outlines, and they should be very well lit from the top or sides to hold shadows to an absolute minimum.

If you are set up for chroma key for use in news and sports programs, you will want at least one camera angle on these sets to pick up a background which can be keyed out. If you only have one studio camera available on each announcer, you will probably want to construct a background behind each with an appropriate design done in relief or with different shades of blue. Prior to designing and painting a whole set, it is imperative that you carefully check out background tone and color saturation levels with your particular chroma key equipment by checking the paints and designs on a small test area.

If you have two cameras available for the news and sports sets, you will find it more visually interesting to shoot your announcers from two camera angles; one which leaves open an area of background to one side of the announcer for chroma keys and another, 45 or so degrees



Joining flats by lash lines.

Figure 2 Sets are made up of flats. They usually are from eight to twelve feet high. Here you see the flats joined by lash lines.

to the other side, which picks up a different background area which is not restricted by the chroma key process. Set elements and props containing additional colors and an expanded tonal range can be used in the latter area.

Before discussing the construction and painting of sets, it would be well to cover the other three types of sets, even though they are not used nearly as much as the Neutral or Representative-Supportive types. The "Suggestive" type set (sometimes called the "Atmospheric Realism" type) represents in the most simple and basic way a real setting. A shadow pattern of leaves on a cyc area would suggest the outdoors, or a desk and part of a bookcase could suggest an office. This type of set is useful for simple commercials when you want to suggest a locale without the necessity of completing a full Realistic setting. The "Realistic" or "Replica" set is just what the name implies—an accurate looking reproduction or copy of the scene being depicted. Various types of dramas and situation comedies require this type of set for authen-

ticity. The "Fantasy" setting has little direct relation to any real locale. Often, it is a bizarre and deliberate distortion of reality.

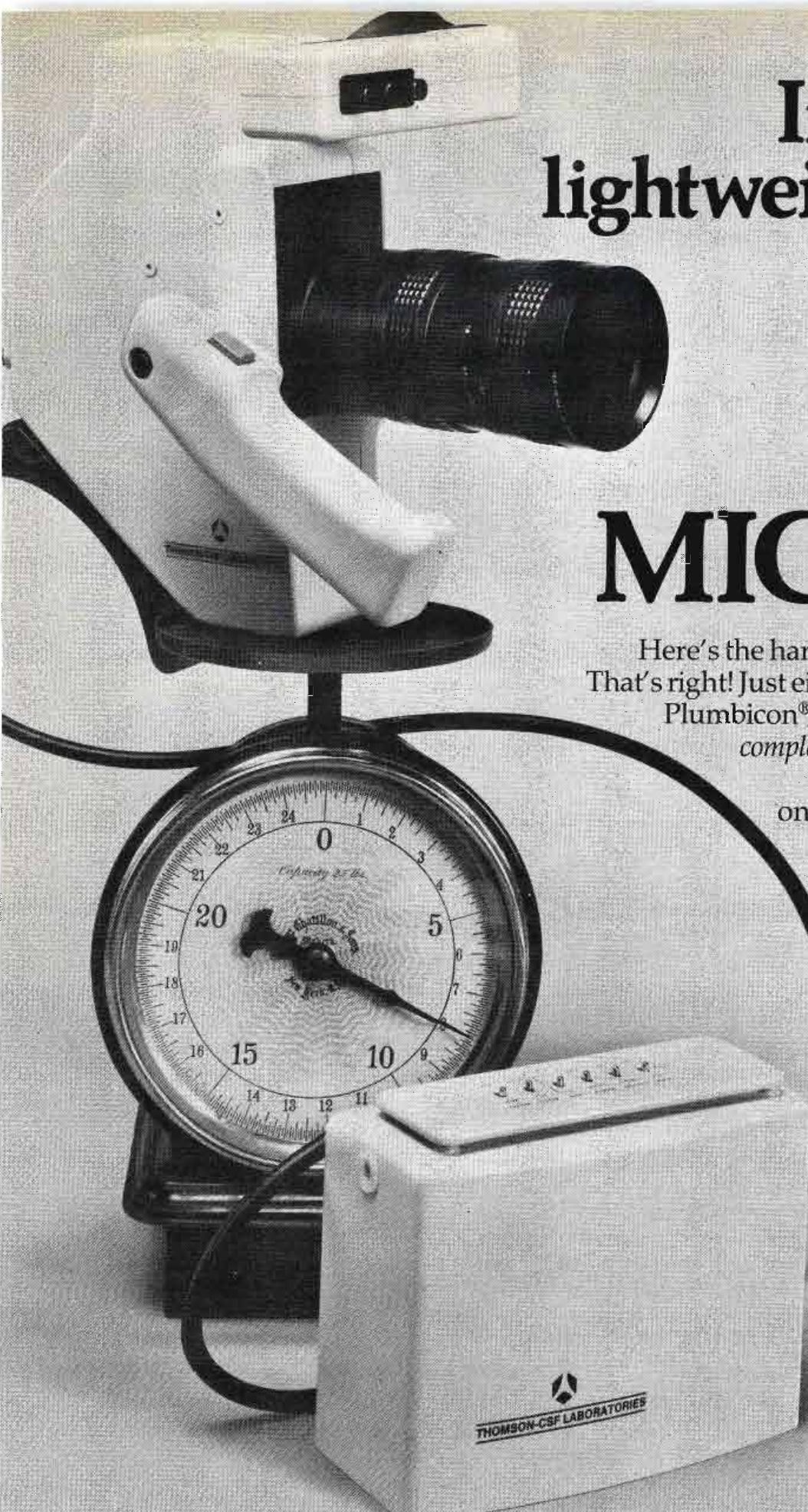
Set Construction and Materials

Sets are made up of unit sections called "flats" which are joined together. Flats are from eight to twelve feet high (depending upon the height of your ceiling) and are four or more feet wide. There are two basic types of construction—hardwall and softwall.

The Softwall Flat—Softwall flats consist of frames made of one-by-three inch wood covered with canvas (bleached muslin). (See Figure 2.) The canvas is stretched over the frames and attached with staples and glue. The surface is then coated with a flame-proof sealer before painting. Softwall flats can be joined together and painted to represent any interior or exterior scene or background. Softwall flats are light, easy to work with and easy to repaint. Their major disadvantages are that they can be easily torn and that they will

quickly show wear with continuous use. Softwall flats are an excellent choice, however, for limited use situations, such as specials, where low cost is a factor and longevity isn't.

The Hardwall Flat—The hardwall flat is the basic setpiece for most stations. This type of setpiece has a frame made from one-by-threes or two-by-fours covered with composition board or paneling. A visit to your local building supply house will reveal the tremendous range of designs and surfaces available. Or, if you can't find a ready-made surface for your needs, cover the frames with unfinished composition board and paint on your own finish. Stippled patterns, for example, make an interesting finish. These are made by applying paint with a coarse brush, sponge, wrinkled paper, or cloth. This technique can be helpful in suggesting stone, cement, or earth. Some sort of texture is desirable for most flats to hide the inevitable smudges, fingerprints, gouges, etc., as well as to make the background more interesting.



Introducing the lightweight champion!

MICROCAM™

Here's the hardest hitting eight pounds in the business. That's right! Just eight pounds for an ultra-miniature, three-Plumbicon®, broadcast-quality color TV camera head, *complete* with lens and viewfinder.

The associated electronics pack weighs only another three pounds and can be worn on the battery belt. Miniaturization has reduced power consumption to 22 watts, which means a full hour of operation is possible from a 2½ pound battery pack. A two line vertical image enhancer and comb filter are included as standard equipment.

MICROCAM™ will go anywhere, capture anything, live or on tape. It will revolutionize studio programming and remote operations for news, sports, commercials, and special events.

MICROCAM™ also costs less than its heavyweight competitors. Meet the new champ — a broadcast-quality color camera at half the size, half the weight, with half the power consumption.

See the new lightweight champ at the NAB Convention.



THOMSON-CSF LABORATORIES, INC.

37 Brownhouse Road, Stamford, Connecticut 06902
(203) 327-7700 / TWX (710) 474-3346

MICROCAM™ is a trademark of Thomson-CSF Laboratories, Inc., PLUMBICON® is a registered trademark of N.Z. Philips' of Holland.

For More Details Circle (28) on Reply Card

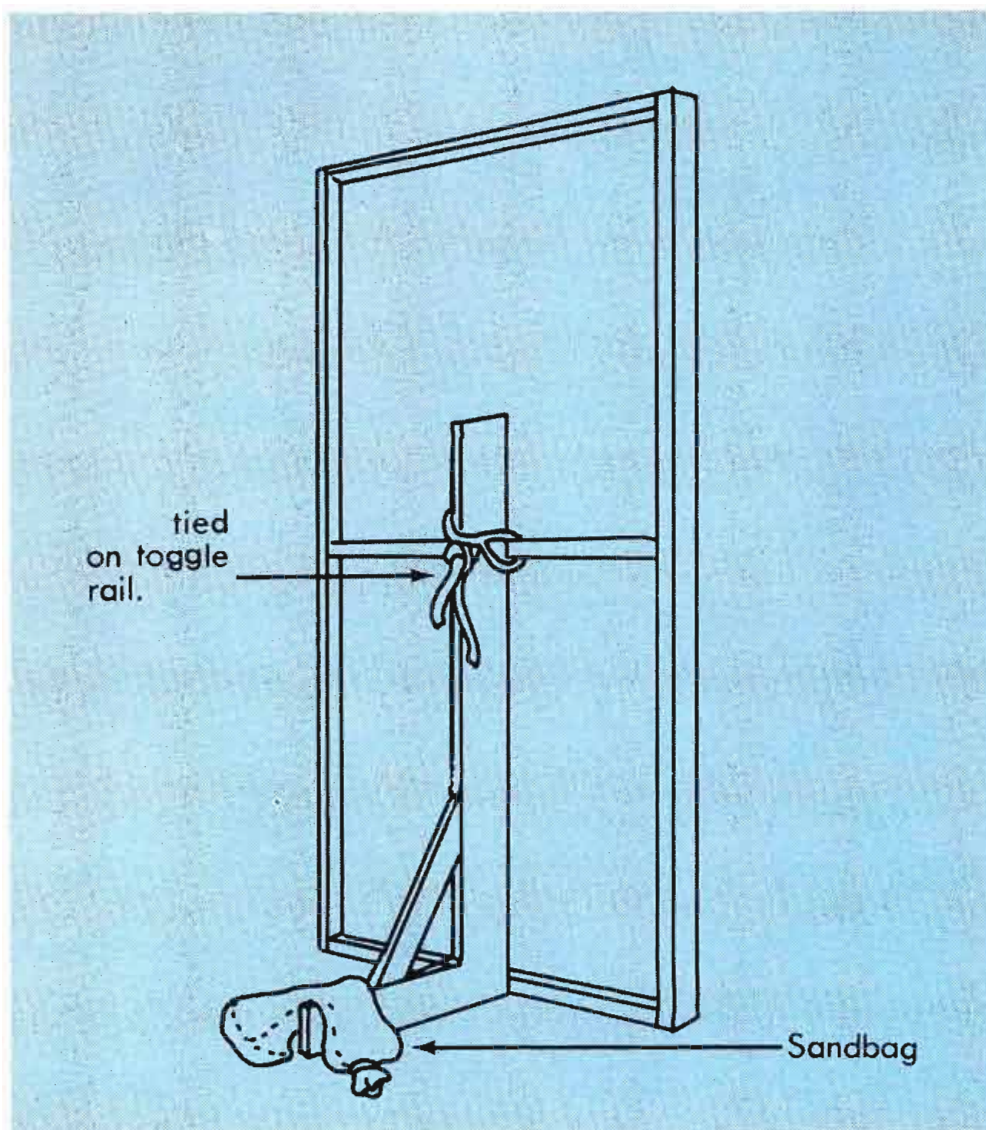


Figure 3 Backside details for supporting a flat.

Wallpaper and contact paper can also be used to cover flats. A myriad of colors, patterns, and textures are available. Contact paper and some types of wall paper have a self-sticking backing which is a vast improvement over the old brush and paste approach. Regardless of the choice of covering, however, remember that a shiny surface can cause some real problems in reflective "hot spots." So, be on the safe side and select a surface with a dull, matt finish.

Supporting Flats

Figure 3 shows how a soft or hardwall flat can be made to stand on its own, away from a studio wall. Here, a one-by-four inch "L" brace is tied to the flat and then sandbagged for stability. The same approach will apply when you want to lash several flats together, as indicated in Figure 3. In the latter case, you can use your discretion about how many "L" braces will be necessary to hold up a section of flats. Just make sure that if you err in your decision, it's on the side of

too many, rather than too few. There is something about the sight of a set coming down upon an announcer's head during a show that chips away at a station's image!

Note how the lashlines are used in Figure 2 to tie multiple flats together. If the flats are well constructed and lashed together tightly, the breaks between the flats can be virtually invisible to a television camera.

Another approach to combining hard or softwall flats is illustrated in Figure 4. Here, bolts and nails replace the lashlines for a more permanent setup. A so-called "pole cat" (a long hollow pipe with a spring loaded extension piece at the top) can be used in place of "L" braces and sand bags (See Figure 5).

Twofolds and Threefolds

Figure 6 shows the twofold and threefold set pieces (illustrated in semi-closed positions). These are just hardwall flats which have been joined with hidden hinges. If you tackle this approach, you will

probably want to make the flat frames out of one-by-fours or even two-by-fours. This type of set is self-supporting, as long as it isn't opened up completely. The twofolds and threefolds can be made large enough to represent a corner, or even three walls of a room, office, kitchen, or whatever. Although twofolds and threefolds are fast and convenient, they have the disadvantage of being hard to move and store.

Seamless Paper

Seamless paper comes in large rolls and can be stapled or taped directly to studio walls to form a quick, inexpensive background. The paper is available from most display houses in 9 x 36 foot rolls. A large variety of matt surface colors are available.

Seamless paper backgrounds are quick and easy to put up but have the obvious disadvantage of easily getting dirty, torn and wrinkled.

Polystyrene Set Pieces

One of the newest and most interesting approaches to the design of set pieces is through the use of expanded polystyrene blocks. These featherweight hardened foam blocks are available at many lumber supply houses at a reasonable cost. They come in four-by-eight feet blocks from one to twelve inches thick.

Patterns and designs can be sculptured and embossed into these blocks through the use of carefully applied applications of paint thinner. The paint thinner causes a chemical reaction with the polystyrene which, in effect, "eats away" designs or patterns, according to how it is applied. (See photo.) The paint thinner can be poured down a sheet to result in a "stalactite" effect; it can be carefully painted on to form designs and crude letters; or, it can be sprayed on to provide still another pattern and effect. The possibilities here are only limited by a person's imagination and creativity.

The polystyrene should be painted only with a latex-based paint. Petroleum-based paints will cause the same chemical reaction as the paint thinner (which, by the way, results in an interesting, but somewhat unpredictable effect).

One of the best approaches with

Old-New Reel Time Recorder

Telex/Magnecord series 1400 broadcast quality recorder/reproducer. An old name that spells reliability. A new design for today's state of the art.

- The Old. Telex/Magnecord products are still made in the USA so parts and service are always available. The series 1400 is still built on a solid die cast aluminum main frame for reliable operation around the clock. It's still available in full, half and

quarter track configurations, has fail safe differential brakes and accepts 8 1/4 inch reels. It also still comes with three motors—but then, that's touching on the new.

- The New. A brushless d.c. servo drive with a crystal oscillator control reference so accurate it virtually eliminates program timing errors. New, three speeds: 3 3/4 - 7 1/2 - 15 ips. New catenary head block for straight tape loading, the convenience of one hand cueing and the bi-level illumination of push button controls. New DTL logic controls eliminate EMI and provide fast, spill

proof tape handling gentle enough for half mil tape. And new electronics, clean to 60 dB S/N at all speeds.

- If you're looking for a real time, reel recorder with old name reliability but designed for today's demands, you'll find it in the Telex/Magnecord series 1400. For complete 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 Légion-d'Honneur, 93200 St. Denis, France

Canada: Telak Electronics, Ltd., Scarborough, Ontario

polystyrene is to paint the blocks with latex paint and then treat them with paint thinner according to the design you have in mind. This will result in a two-color effect.

Risers

Although many small studios place their news, sports and interview sets directly on the studio floor, there are some important advantages to elevating these sets four to twelve inches above the floor with risers. Since most of the announcers and talent in these situations are seated, the risers should elevate them to the point of being approximately level with camera lenses. **The use of risers in this way does three things: it results in better eye contact, it is easier on cameramen and it looks better on the air by giving a more effective pictorial perspective.**

Depending upon the load and stability requirements, you can choose between one-half to three-quarter inch plywood covered frames for your risers. The frames can be constructed of anything from two-by-fours to two-by-twelves, depending on height needs. As long as risers are built for stability, you needn't worry about a smooth, neat finished job, since you will probably want to cover them completely with carpeting, which will cut down on noise while providing an attractive covering.

Risers are generally constructed in four-by-four or four-by-eight foot sections so that a variety of configurations will be possible in different applications. For a choir or band, you may want to stack

some on top of each other to provide different elevations. Attractive designs are possible on the top of risers by fitting together different sizes, shapes and colors of carpeting. Shag carpet seems to work best with risers, since cracks and slight variations in height will generally not show.

It is also possible to use the polystyrene blocks for risers if they are covered with one-eighth inch plywood. The plywood covering is carefully held in place with nails long enough to anchor it to the polystyrene material. In this way the plywood serves the very important function of distributing weight over an area which can be supported by the polystyrene. The whole riser can then be painted, or it can be covered with a rug. Compared to the all-wood risers previously discussed, the polystyrene risers are cheaper and considerably lighter. They are somewhat less durable in comparison, however.

Holding to Brightness Ratios

In designing, painting and decorating sets, it is quite important to hold to the brightness ratio limitations of the broadcast process. Failing to do so can result in severe distortions in the video's tonal range.

For example, a significant amount of picture content with over sixty percent reflectance can severely darken faces and skin tones.

We have all heard that men should wear light grey or colored shirts on camera instead of white.

The television system is limited in its ability to accurately reproduce a total range of grey shades from absolute black to pure white. In order to make the important middle tones appear accurate, the tonal range on sets and TV subject matter must be slightly restricted. It has been found that if the tonal range is limited to between three percent reflectance (reference black) and sixty percent reflectance (reference white) that the most pleasing and accurate tonal rendition will be possible.

Keep this in mind when you choose paints and fabrics for sets, as well as when you brief guests on what to wear for TV appearances. Also, don't forget about scripts and papers which might appear on camera. Stations which have caught on to the problems that pure white paper can cause on camera, use copy paper which is grey or a pastel color.

Summary

Briefly then, these are some of the more important points on selecting, designing and building sets. In general, make sure sets are complimentary to subject matter and that they support it, rather than fight with it for attention, or drag it down into mediocrity or garrishness. Carefully observe and analyze what you like and don't like on network shows, and what sets appear to "work" and **why**. A little bit of time and effort put into planning appropriate sets can go an amazingly long way toward improving the attractiveness of your studio productions.

Management Highlights

Much of the initial effect of the studio set upon the viewer is probably unconscious. But, studio settings which are dull and unimaginative will instill this initial idea about your show in the mind of viewers. Equally as negative is the garrish, hokey set which tips off the viewer to the low level of sophistication which the whole program may represent.

Fortunately, the design and building of television sets is one area in television where a little bit of knowledge will go a long way. It is the intent of this article to provide a little bit of the right kind of knowledge.

A little time, money and ingenuity invested in the design and construction of sets can go a long way in making your local studio originations appear fresh and attention-getting. Or, to put it another way, your local studio originations do not have to take on the stereotyped characteristics of local, low-budget productions.

It is that first "establishing shot" of the show and its setting which serves to tip off the audience to the caliber of the production they are about to see (or, are about **not** to see, if the initial impression is not positive enough to keep them from turning to another channel).

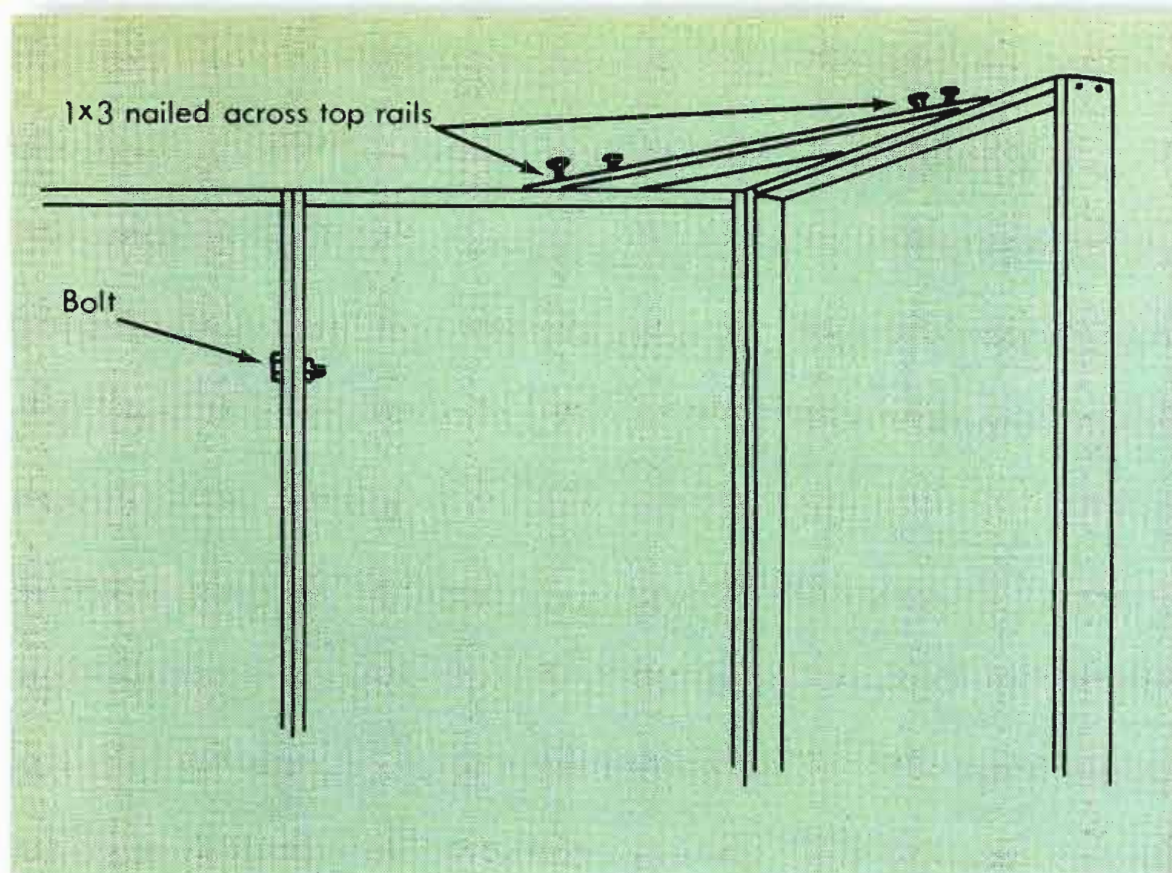


Figure 4 Here you see how to tie flats together with a corner bolted brace.

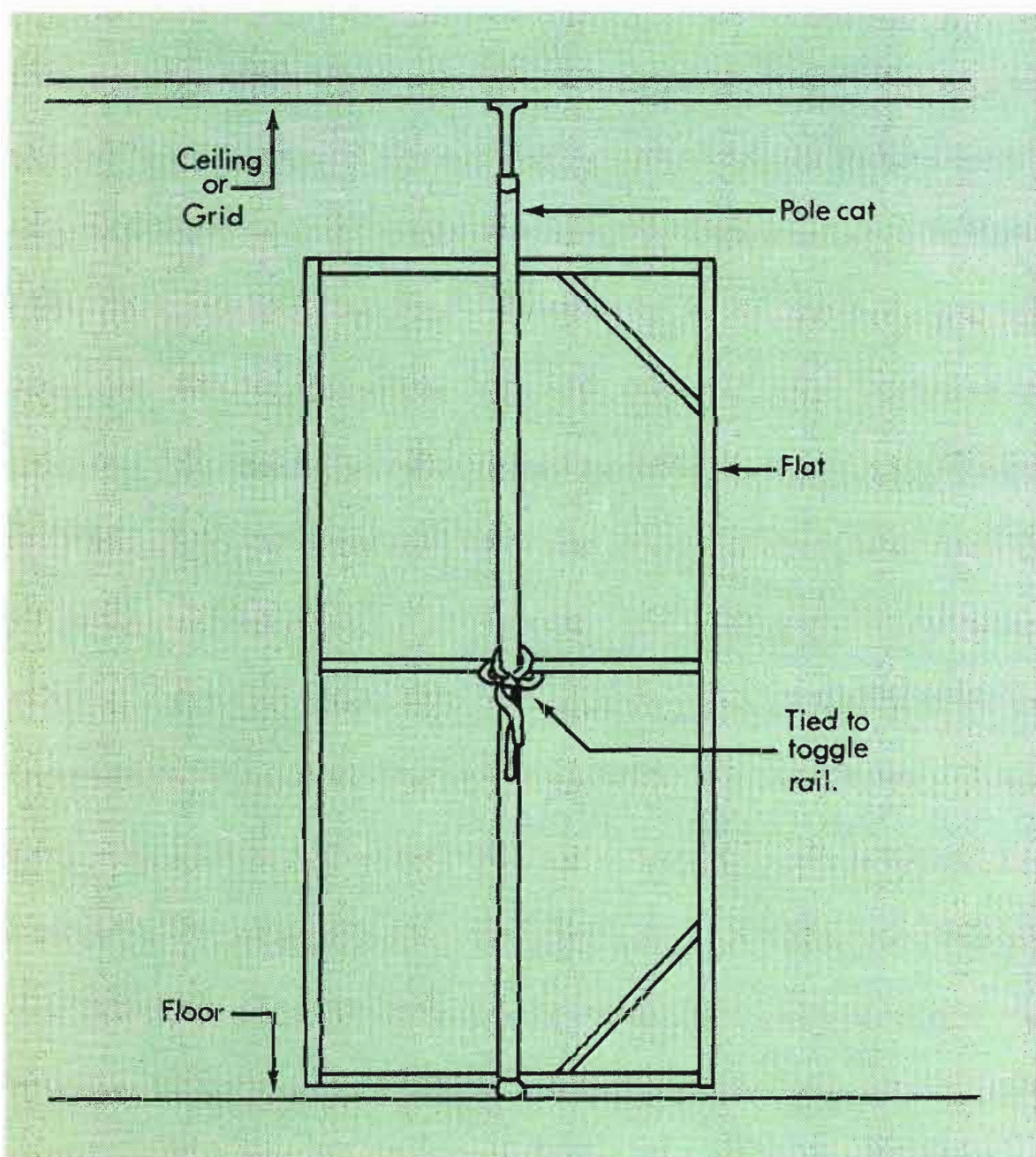
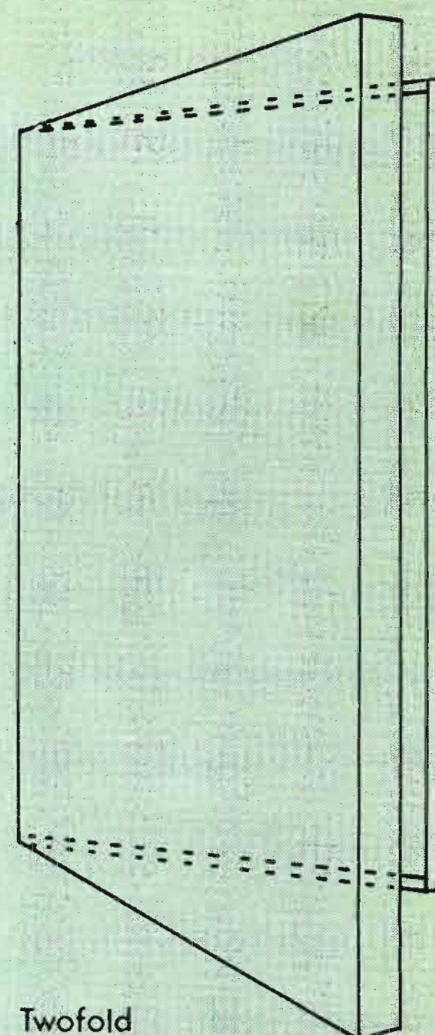
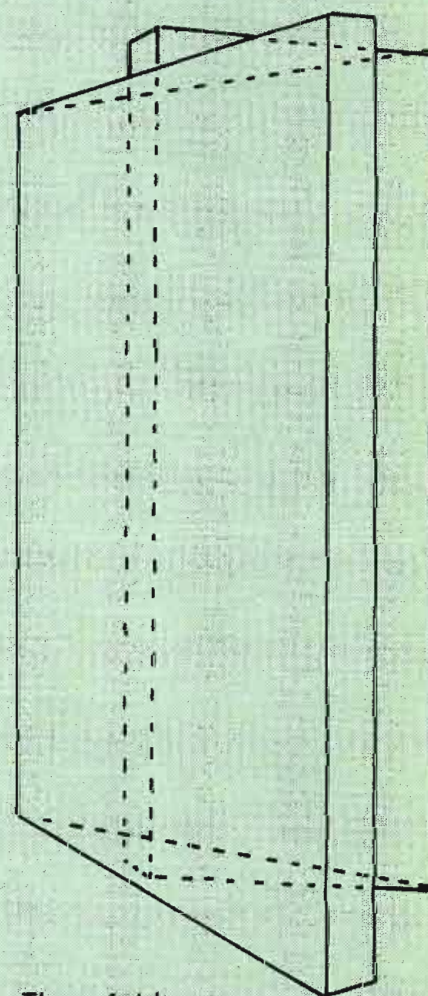


Figure 5 Here you see how to tie flats together with a pole cat.



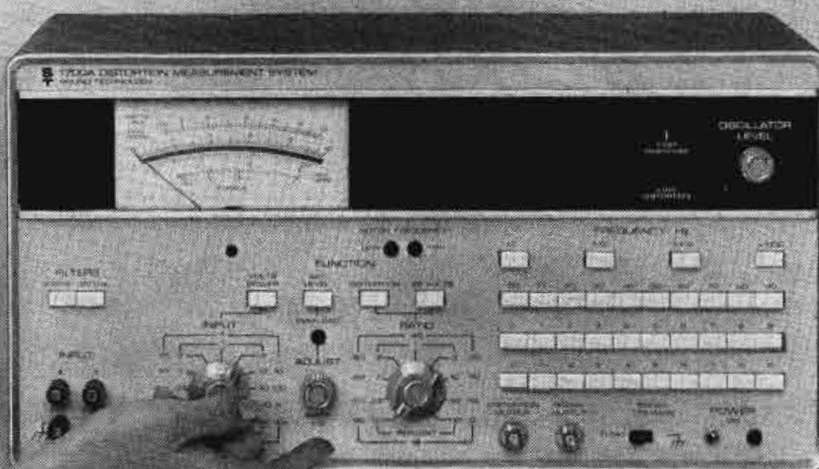
Twofold



Threefold

Figure 6 These are two-fold and three-fold set pieces. These are hardwalls which have been joined by hidden hinges. This type of set is self-supporting.

I can measure lower distortion than you've ever seen. I'll show you at NAB



Hi!

Yes, I can measure distortion down to .002% (−94 dB) with this new Sound Tech system.

And I can measure it in 5 seconds.

That's because Sound Tech's new 1700B is push-button controlled—and it nulls *automatically*.

What's more, the 1700B is both an ultra-low-distortion signal source *and* a total harmonic distortion analyzer—a *complete distortion measuring system*.

You'll like these other 1700B features, too:

- Covers 10 Hz to 110 kHz
- Has differential input
- Measures signal ratios up to 100 dB
- Measures 30 microvolts to 300 volts as a high-sensitivity ac voltmeter
- Reads power into 8 ohms

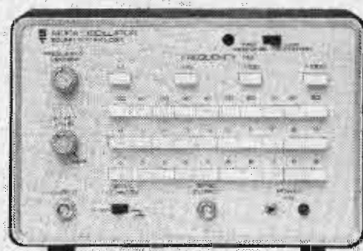
I'll be at NAB to show you how easily the 1700B measures.

Booth 123—it's easy to remember.

See you there.

—Rosemary

Ultra-low-distortion oscillator



See this at NAB, too.

It's an ultra-low-distortion oscillator for use in measuring lowest distortion amplifiers. Has less than .001% distortion. Covers 10 Hz to 110 kHz. Push-button frequency selection. Output variable from less than 1 millivolt to 3 volts.



SOUND TECHNOLOGY

1400 DELL AVENUE
CAMPBELL, CALIFORNIA 95008
(408) 378-6540

Avoid ulcer gulch:

Get ready for the RI

By John H. Mullaney, PE, Consulting radio engineer, Potomac, Maryland.

This Check List is a helpful digest of FCC Rules (Part 73 of those applicable to AM and FM broadcast stations). It includes the primary items that an FCC inspector will check during a station inspection.

It will be noted from a study of the following questions concerning the Commission Rules that many are a so-called catch-all type, and they do not specifically call out what is asked for in the question. It should be understood that the question asked is assumed to come under the Rule cited, or at least the Commission in the past has interpreted the Rule to cover the question.

The Rules should be kept up to date by each station. The simplest way to accomplish this is for a station to subscribe to the FCC Rule service provided by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The technical questions should be checked by the station's chief engineer; whereas, the non-technical items should be checked by the station manager or someone under his direction who is familiar with the subject matter.

The best way to use this Check List is to take the station's copy of the Rules and read each section of the Rules shown to the right of the question asked. This technique will allow you to understand what is being checked, and probably help to give you a better understanding of the Commission Rules.

Although this check list is not complete, if you are able to pass the items listed, you have an excellent chance of passing a **real FCC inspection**.

Frequently Violated Rules

On March 6th, 1975, the FCC released a Public Notice entitled "Rules Frequently Violated by

Broadcast Stations". The following is a copy of this release:

In response to many requests, the Field Operations Bureau has prepared an analysis of violation notices (FCC Form 793-A) issued to Broadcast Stations after station inspection and/or measurements by field personnel of the Bureau during Fiscal Year 1974. The list should not be constructed to be a tabulation of all violations observed or those leading to serious consequences. There is no particular significance to the placement of an item in the list, e.g., Section 73.93 is not necessarily the most frequently observed discrepancy. For further information call 202-632-7090 or write to Enforcement Division, File 1100, Washington D.C. 20554.

PROBLEM AREA & COMMENTS

OPERATOR REQUIREMENTS

Am - 73.93

FM - 73.265

Includes employment of operators with Third Class permits NOT endorsed for broadcast station operation, or operators with expired licenses or permits. Also includes failure to provide the operators with adequate visibility and accessibility to metering and control equipment from their places of duty.

TV - 73.661

Includes failure to provide the operators with adequate visibility and accessibility to metering and control equipment from their places of duty.

EQUIPMENT PERFORMANCE MEASUREMENTS

AM - 73.47

FM - 73.254

Failure to carry out equipment performance measurements each year at intervals not exceeding 14 months.

MODULATION LEVELS (AURAL)

AM - 73.55

FM - 73.268

TV - 73.687 (b) (7)

Levels consistently in excess of 100% on peaks (AM-negative peaks) of frequent recurrence.

MODULATION MONITORS (AURAL)

AM - 73.56

TV - 73.691

Deficiencies include lack of calibration and defective peak indicating device.

REMOTE CONTROL OPERATION

AM - 73.67

FM - 73.275

TV - 73.676

Operation with defective power adjustment control circuits, or uncalibrated indicating instruments. Failure to terminate operation by remote control when malfunctions cause improper control or inaccurate meter readings. Also for TV, failure to generate, insert, or properly utilize the required test signals (VITS).

REMOTE READING ANTENNA AMMETRES

AM - 73.39 (d)

Instruments not calibrated to indicate with 2 of main meter for each power mode of operation.

OPERATING POWER

AM - 73.52

FM - 73.267

Operation for extended periods with power levels greatly in excess of authorized tolerances. Also for certain AM stations, operating pre-sunrise and/or nighttime with full daytime power. In addition for TV, failure to calibrate output power indicators over the tolerance range at six-month intervals.

OTHER GENERAL REQUIREMENTS

AM - Various

Failure to check the antenna lights for proper operation on a daily basis and failure to inspect the lighting system and control circuits at three-month intervals.

Failure to record the results of equipment inspections, adjustments, calibrations, and repairs as well as

operations during experimental periods.

OTHER TECHNICAL REQUIREMENTS

FM - 73.317

Failure to maintain transmitter and associated equipment such that noise and frequency response requirements are met. Failure to

install equipment and associated wiring in accordance with pertinent standards and practices.

FM - 73.322

Failure to maintain the 19KHz pilot subcarrier injection (modulation) level within tolerances.

TV - 73.699 (FIGURE 6)

Pulse durations not maintained within tolerance standards.

TV - 73.682(a) (9), (12), (13), (17)

Includes continuous operation with improper peak video modulation levels and failure to maintain blanking, reference white, and reference black levels within tolerances.

It is no secret that the Commission's R.I.'s also use a check list during their inspections. Your writer's previous article in Broadcast Engineering discussed the old check list. This new list is a good one; study the attached carefully, and if you have questions as to what is meant by any of the questions write directly to:

Mr. Wallace E. Johnson, Chief
Broadcast Bureau
Federal Communications Commission
1919 M St., N.W.
Washington, D.C. 20554

Licenses and Authorization:

All licenses and authorizations should be posted preferably conspicuously at one location. The licenses should be framed, and either hung above a bulletin board, or placed in some type of rack made for the frames. Telegraphic and letter notifications or authorizations should be placed on a bulletin board. In addition, the station's EBS and other instructions should be on this board. It is also suggested that any emergency instructions to operators be posted at the same location.

Licenses and Authorizations	AM	FM
() Posted and Visible Lic/CP/REN/PSA/PGM Test/Modifications/AUX/ALT/SCA/Remote Control	73.92(a)	73.264(a)
() Operator Licenses posted LIC/756/759 (13.6)	73.92(b)	73.264(b)
() Operator Licenses signed/valid (Terms)	73.93	73.265
() P1, full or part time (available promptly). Contract for part time—must be full time if DA or over 10 KW or FM over 25 KW	73.93	73.265
() P3-Endorsed for broadcast operation	73.93	73.265
() Copy of notification of designation of chief posted.	73.93(h)	73.265(d)(1)

Control Point and Studios	AM	FM
() Equipment security	73.67(a)(1)	73.275(a)(1)
() Positive on-off/fail safe, if remote control	73.67(a)(2)	73.275(a)(2)
() Remote operation terminated if remote control system malfunctions	73.67(a)(3)	73.275(a)(3)
() Can all required functions be performed if remote control	73.67(a)(4)	73.275(a)(4)
() Equipment accessible and visible (360° arc)	73.93(a)	73.265(a)

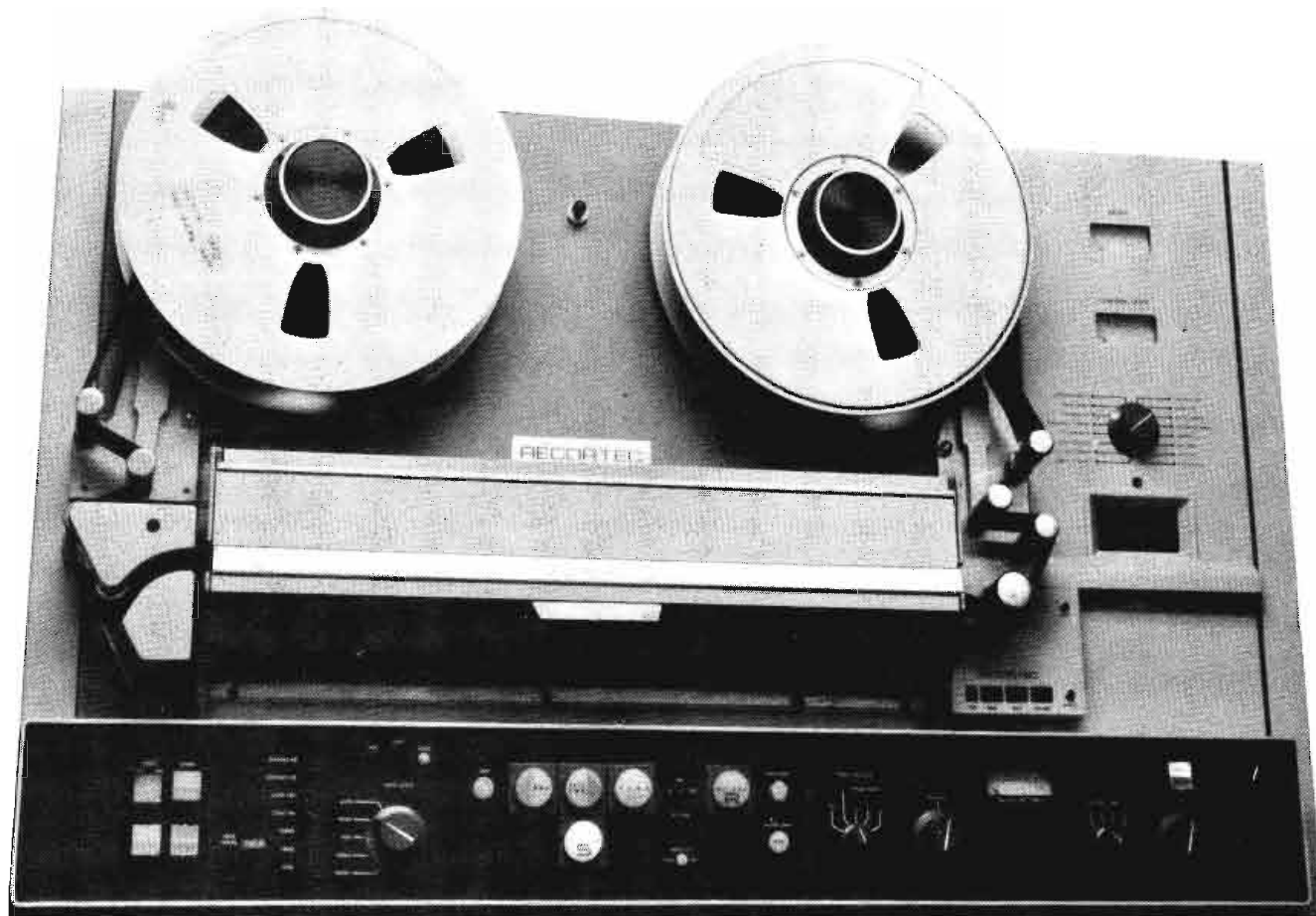
() Curves of factors for meters posted/available	73.67(a)(4)	73.275(a)(4)
() Instructions for lesser grade operator posted.	73.93(g)	73.265(f)
() Limits for parameters posted	73.93(g)	73.265(f)
() Remote meters correct scales	73.93 & 73.67(a)(4)	73.320 & 73.275(a)(4)
() EBS-Receiver/Test Facilities	73.67(b) & 73.932(a) & 73.961 (e)	73.275(b) & 73.932(a) & 73.961(e)
() Studio location as licensed	73.31	73.210
() Equipment/Wiring-Good Engineering Practice	73.46(a) & 73.40(a&b)	73.317
() Automatic Logging Equipment	73.113(b)	73.283(b)
1. Does not affect accuracy of indicating inst.		
2. At least as accurate as indicating instruments being logged		
3. Calibrated weekly		
4. Alarm provided		
5. Reading each 10 min. If alarm does not operate cont.		
6. Located near operator		
7. Is checked by operator		
8. Conforms with 73.39 (scales)		
() Operator's primary duty is operation of transmitter.	73.93(i)	73.265(g)
() Power can be adjusted and changed (day-night)	73.67(a)(4)	73.275(a)(4)
() Modulation within tol.	73.55	73.268
() Modulation monitor install/operating properly peak ind. ok (may be at transmitter but must be monitored at R.C. point at all times).	73.56(a)	73.253(a)
() Frequency within tolerance	73.59	73.269
() Operator welfare Facilities	73.40(d)(2)	73.317(d)(2)
() FM-Stereo-Pilot within 2HZ, Injection 8 to 10%.		73.322(b)

Technical Inspection

This section consists of thirteen parts. Some of the items will not pertain to your operation, so use the symbol # within the brackets () which means, does not apply. Keep in mind that the check list is for either or both AM and FM operation so read the questions carefully.

Maintenance Logs, proof of performance data and other technical records of the station should be kept in file folders (properly fastened in) within a file case or cabinet readily available to the operator on duty. The station that keeps a neat set of files up to date seldom gets citations for failure to have required information available.

AUTOMATE YOUR VTR



NEW PERFORMANCE WITH R-MOD

- FRAME ACCURATE ELECTRONIC TIMER
- SHUTTLE AT CONSTANT TENSION
- RELIABLE REPLAY OF CUE SIGNAL
- HANDLING OF TWO HOUR REELS
- AUTOMATIC STOP AT TAPE ENDS
- RELIABLE FOR REMOTE OPERATION
- CONSISTENT FASTER LOCKUP TIME
- INCREASED HEAD AND TAPE LIFE

R-MOD is a reel servo modification kit which consists of new DC reel motors, servo tension arm assemblies and electronic tape timer. It is easily installed in the field to provide your quadruplex VTR with superior tape handling. R-MOD rapidly pays for itself in less head wear, longer tape life and significantly more effective use of your VTR time and operating personnel.

Unless you want to buy the vacuum chamber buffered VTR, R-MOD at only \$8500 is the next best transport on the market. Before buying a new VTR, investigate the improvement R-MOD will make on your present VTR.

Want more details? Recortec is as close as the telephone on your desk. Call us toll free on (800) 586-1586. (Outside California only)

RECORTEC, INC.

777 PALOMAR AVE., SUNNYVALE, CA 94086

TEL: (408) 735-8821

TWX: 910 339 9367

Inasmuch as the Commission requires that certain measurements be made within a definite period of time, the chief engineer should take a calendar and mark off the dates when certain measurements must be made. If one of the stenos in the station also kept a card or tickler file on the same items, it would act as a double check for the station that they do not fail to make required measurements within the proper time limits.

It should be noted that the Commission inspector will cite a station that took its measurements as little as two days late, so it pays to have a way to keep track of **due dates**.

Many station engineers check their antenna system for full efficiency by checking the ground system and the base current and operating efficiency of the transmitter for changes. Although this indicates if any changes have taken place, it really does not tell too much about the antenna's efficiency.

Go through the following paragraphs carefully and you will find how your station would look to an FCC inspector:

Transmitter	AM	FM
() Transmitter acceptable/as shown on license (if not, was notification made).	73.48	73.250
() All required meters installed/operating	73.58	73.258
() Meters correct scale/range (all powers)	73.39	73.320
() Meters accurate/seal intact/calibration certificate if repaired	73.39(f)	73.320(d)
() Meters labeled	73.39(i)	73.320(f)
() Transmitter safety provisions	73.40(b&c) & 73.46(b)	73.317(f)
() Transmitter Efficiency (in transmitter manual for FM).	73.46(a)	76.267(a)(3)
() Spurious emissions or harmonics	73.40(a) & 73.46(c)	73.317(a&f)(2)
() Transmitter and associated equip. operated in accordance with G.E.P.	73.46(a)	
() Operating Power Correct	73.52(a)	73.267(b)
() Power can be adjusted and changed (day-night)	73.40(a)(8)	73.317(a)(8)
() Modulation within tolerance	73.55	73.268
() Modulation monitor installed/operating properly-Peak ind. o.k. (may be at R.C. Point)	73.56(a)	73.253(a)
() Frequency within tolerance	73.59	73.269

Antenna Tower and Base	AM	FM
() Painting and Lighting/photo cell/number bands/number lights correct.	Terms and Part 17	Terms and Part 17
() Base fence for series FED AM	73.40(b)(3)(iv)	
() Ground system o.k.	73.189(b)(4)(5)	
() Transmitter line o.k.	73.40(b)(3)(v)	
() Tuning house security	73.40(b)(3)(iv)	
() Base meter(s) proper scale/range all powers	73.39(b)	

() Remote meters connect in proper manner	73.39(d)(2)
() Remote meter(s) within 2% of base meter	73.39(d)(2)
() Remote common point meter within 2% of common point meter	73.39(d)(2)
() Installation in accordance with G.E.P.	73.46
() Impedance o.k./Meas. available	73.116(d) & Terms
() Field intensity/adequate	

Maintenance Log	AM	FM
() Logs available/2 years	73.115 & 73.116(a)	73.285 & 73.286(a)
() Entries of:		
1. Base and remote current reading/cal	73.114(a)(1)	
2. Aux transmitter tests made		73.284(a)(1)
3. Frequency checks made (main carrier, SCA, Stereo)		73.284(a)(2)
4. Calibration of automatic logging		73.284(a)(3)
5. Claibration check of antenna monitor		
6. Calibration of remote meters (all)		
() Meters/monitors removed from service	73.114(a)(2)	73.284(a)(4)
() Quarterly tower light checks/tower Maintenance.	73.114(a)(3)	73.284(a)(5)
() Experimental Operation	73.114(a)(4)	73.284(a)(6)
() Other entries required by authorization	73.114(a)(5)	73.284(a)(7)
() Weekly equipment inspections/time spent/condition/data/signature/repairs made	73.114(b)(c)	73.284(b)(c)
() Corrections made properly	73.111(c) & 73.114(d)	73.281(c) & 73.284(d)
() For DA Operation-entries of:	73.114(a)(8)	
1. Common point current		
2. Base currents/ratios/% deviation		
3. Remote base or sample currents/ratios/% deviations		
4. Phase indications (check Section 73.114(a)(9) for schedule)		
() Field strength measurements for DA	73.114(a)(6)	

Proof of Performance	AM	FM
() Proof available/2 years	73.47(b)	73.254(c)
() Proof made each calendar year (not more than 14 months), proof made 4 months prior to renewal.	73.47(a)	73.254(d)
() All circuits included in making proof	73.47(a)	73.254(b)
() Description of Equipment used/procedure/signed/dated.	73.47(b)	73.254(c)

AM Proof	
() Data and curves-AF response from 50 to 7500 HZ for 25, 50, 85 & 100 mod.	73.47(a)(1)

Our best ad is our price list.

 SETCHELL CARLSON Designed, Engineered, and Manufactured by Audioelectronics			User Price List EFFECTIVE NOVEMBER 1975	
MONITOR	MODEL NUMBER	DESCRIPTION	USER NET	
5"	5M916C	FIVE-INCH MONITOR and picture tube without cabinet	\$250.00	
5" 5" 5"	5M916RM3	TRIPLE-FIVE MONITOR; three 5-inch monitors in a row with rack/desktop metal cabinet		
6"	6M917	SIX-INCH MONITOR with metal cabinet and adjustable underscan	735.00	
6" 6" 6"	6M917T	TRIPLE-SIX MONITOR; three 6-inch monitors in a row with rack/desktop metal cabinet and adjustable underscan	235.00	
10"	10M915	TEN-INCH MONITOR with metal cabinet	660.00	
10" 10"	10M915C	TEN-INCH MONITOR chassis and adjustable underscan (left panel blank)	225.00	
	10M915RL	TEN-INCH MONITOR with rack/desktop metal cabinet (right panel blank)	215.00	
12"	12M918	DUAL-TEN MONITOR; two ten-inch monitors in a row with rack/desktop metal cabinet	250.00	
17"	17M922	TWELVE-INCH MONITOR with metal cabinet	465.00	
19"	9M912	SEVENTEEN-INCH MONITOR with metal cabinet	275.00	
23"	9M912R	NINETEEN-INCH MONITOR with metal cabinet	330.00	
25" COLOR	9M912S	NINETEEN-INCH MONITOR rackmount version	300.00	
		Optional control compartment door	400.00	
	SEC920M	TWENTY-FIVE-INCH IC-100 COLOR MONITOR	21.00	
	SEC920R	TWENTY-FIVE-INCH IC-100 COLOR RECEIVER	825.00	
	SEC920MR	TWENTY-FIVE-INCH IC-100 COLOR MONITOR/RECEIVER	925.00	
	SEC920VTR	TWENTY-FIVE-INCH IC-100 COLOR MONITOR/RECEIVER with VTR video/audio drive outputs	950.00	
	DEM919	External Sync Provisions (all monochrome monitors)	15.00	
	MD-1	Underscan, nonswitchable (all monochrome monitors)	15.00	
		Simulated walnut vinyl finish (all monitors)	15.00	
		RF DEMODULATOR with rack/desktop metal cabinet	349.00	
		MOTION DETECTOR with metal cabinet	329.00	

We invite you to compare Setchell Carlson with any other monitor, receiver, demodulator or motion detector.

When you do, we think you'll agree...

Our Best Ad is our Price List!

Feel more secure with Setchell Carlson—Made in America.

Write us for further information and specifications.

SEC ELECTRONICS, INC.
A SUBSIDIARY OF AUDIOTRONICS CORPORATION

530 5th AVE. N.W. NEW BRIGHTON, MN. 55112 (612) 633-3131

For More Details Circle (32) on Reply Card

www.americanradiohistory.com

*9 Monitors 3150
17 Demod 31900
Ext Sync 100
Underscan 100
320
349
329*

*Any
We can't beat
this anywhere.
Give them a call.
Ron*

() Data and curves-AF harmonic content for 25, 50, 85 & 100% mod. for 50, 100, 400, 1,000, 5,000, and 7,500 HZ.	73.47(a)(2)
() Percentage carrier shift for 25, 50, 85 & 100% mod. with 400 HZ tone.	73.47(a)(3)
() Carrier hum and extraneous noise.	73.47(a)(4)
() Spurious and harmonic check.	73.47(a)(5)
() Equipment meets standards?	73.40

FM Proof

() AF response from 50 to 15,000 HZ on 50, 100, 400, 5,000, 10,000 & 15,000 HZ for 25, 50, & 100% mod.	73.254(b)(1)
() AF harmonic distortion for 25, 50 & 100% mod. for 50, 100, 400, 1,000 & 5,000 HZ (also 10,000 and 15,000 HZ for 100% mod.)	73.254(b)(2)
() Output noise level-FM	73.254(b)(3)
() Output noise level-AM	73.254(b)(4)
() Equipment meets standards.	73.317

Program Logs

	AM	FM
() Logs available/2 years	73.115 & 73.116(a)	73.285 & 73.286(a)
() Operators signing log at beginning/end of duty.	73.111(a)	73.281(a)
() Logs orderly and legible/key letters or abbreviations explained	73.111(b)	73.281(b)
() Pages numbered/dated	73.111(b)	73.281(b)
() Time entries in local time/adv. or non-advanced time.	73.111(b)	73.281(b)
() Corrections made properly	73.111(c) & 73.112(d)	73.281(c) & 73.282(d)
() Program name/beginning and ending times/type source.	73.112(a)(1)	73.282(a)(1)
() For political candidates give name/party	73.112(a)(1)	73.282(a)(1)(v)
() Entries indicating announcements for political candidates/local notice (renewal/hearing)/mechanical reproduction.	73.112(a)(4)	73.282(a)(4)
() Commercial matter/sponsor/ Paid by	73.112(a)(2)(i)	73.282(a)(2)(i)
() Duration of commercial matter (may be hourly segments).	73.112a2 & (ii)	73.282(a)(2) & (ii)
() Announced as sponsored indicated.	73.112(a)(2)(iii)	73.282(a)(2)(2)(iii)
() PSA Logged/organization name	73.112(a)(3)	73.282(a)(3)
() Station ID/Times	73.112(a)(4)	73.282(a)(4)
() For auto logging-operator certification/log material can be written out if requested.	73.112(c)	73.282(c)
() SCA Programming		73.295(e)

Operating Logs

	AM	FM
() For DA remote control entries at commencement and every three hours		

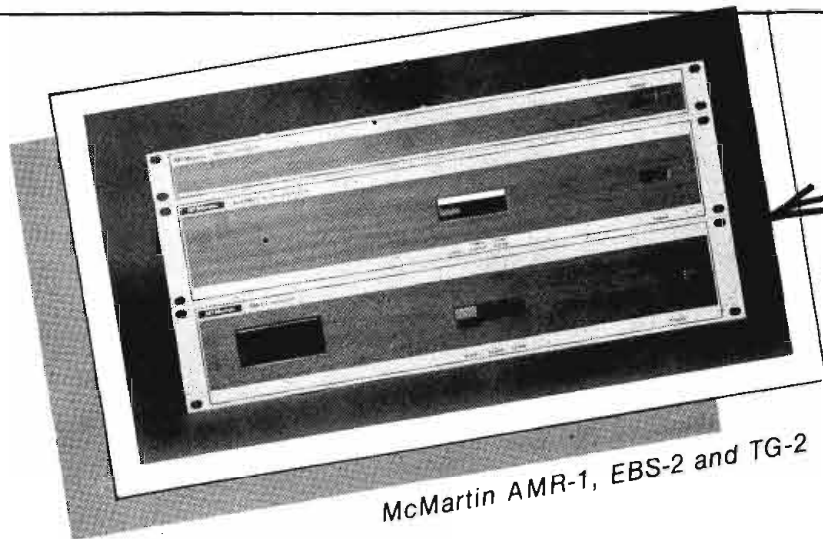
of: remote base I, or currents from antenna monitor sampling lines or their ratios provided by a type approved monitor and phase indications, if provided by a type approved monitor.	73.113(a)(3)(i) & (ii)	
() EBS tests made/unscheduled	73.961(e)	73.961(e)
() No variations in readings for long periods	790	790
() Readings on log within limits and reasonable with present limits	Various Sections	Various Sections
() SCA operating time		73.295(f)

Logs Available/2 Years

	AM	FM
() Operators signing logs at start and end of duty.	73.115 & 73.116(a) 73.111(a)	73.285 & 73.286 73.281(a)
() Logs orderly and legible/key letters or abbreviations explained.	73.111(b)	73.281(b)
() Pages numbered/dated/AM&PM	73.111(b)	73.281(b)
() Time entries in local time/adv. or non-adv. time.	73.111(b)	73.281(b)
() Corrections made properly	73.111(c) & 73.113(d)	73.281(c) & 73.283
() Time carrier on and off	73.113(a)(1)(i)	73.283(a)(1)
() Daily lower light observations	73.113(a)(1)(ii)	73.283(a)(5)
() Entries required by authorization	73.113(a)(1)(iii)	73.283(a)(4)
() Entries at commencement and every 3 hours of PV, PI, Base or C.P.I., and any corrections of above, also FM transmission line if power determined direct.	73.113(a)(1)(iv)	73.283(a)(3)
() For DA not remote control-at commencement and every 3 hours phase indications and remote base current or antenna monitor sample current or current ration indications.	73.113(a)(2)(i)(ii)	

Other Items or Records to Check

	AM	FM
() Field meter available at DA station/working (if required)	73.93(e)(4)	
() Operating parameters within specifications including field measurements.	Various Sections	Various Sections
() Field monitoring points location/description correspond	Terms	
() Station ID made/o.k.	73.1201	73.1201
() Sponsors identified on air	73.119	73.289
() Lottery information?	73.122	73.292
() Antenna/common point impedance data available.	73.116(c)	
() DA proof available/partial proof/skeleton proof available for 2 years.	73.93(e)(3) & 73.116(d)	
() Political file available/required data o.k.	73.120(d)	73.290(d)
() Public inspections file available/contains required info.	1.526	1.526
() RF transmission line meter calibration every six months (when required).		73.267(b)(2)



McMartin AMR-1, EBS-2 and TG-2

BUT TFT HAS IT ALL TOGETHER



Compare!

See the pluses that only \$46 more will buy:

	TFT Model 760 System IA at \$470*	McMartin AM System at \$424*
AM Receiver	Frequency synthesized digitally-tuned to receive any of the EBS stations.	Non-crystal controlled, can receive one station only. (additional receiver at \$99.50 each)
Dependability	Can be tuned to best operating station in EBS network.	Won't work if primary EBS station is off the air.
Installation	No additional wiring or calibration between modules. Easy to install.	Requires external wiring between units. Takes at least 3 times longer to install.
Rack Space	Requires 3½ vertical inches of rack space.	Requires 8¾ vertical inches of rack space.
Built-in System Test	Yes	No

Specify the computer tested EBS system that's ready when it's delivered and ready when it counts...TFT Model 760.

* Based on manufacturer's list price as of Nov. 12, 1975.

Call Toll Free 800-538-6884 (Call Collect in California)

TFT **TIME AND FREQUENCY TECHNOLOGY, INC.**
3000 Olcott St., Santa Clara, California 95051, 408/246-6365

For More Details Circle (33) on Reply Card

IKEGAMI

ENG SYSTEMS

300 CAMERAS IN SERVICE

... more broadcast-quality Ikegami Systems in the field than all other manufacturers combined.

Rugged. Reliable.

The ultimate proof of reliability is actual field service. In two years, Ikegami ENG Systems have dominated the industry... because one user tells another they're the "dependables." Call one of the user stations listed and prove it!

12½ pounds light.

Because the backpack is a separate unit, you can set it down and work really light with the camera alone. And the backpack is only 22 lbs., including batteries.

Studio-quality color.

Three ¾" Plumbicon® tubes, full two-line image enhancer, prism optics and other advanced features deliver superb colorimetry and resolution.

Remarkable sensitivity.

Fine picture quality even at 30 foot-candles.

In-depth service nationwide.

Nine convenient distributors offer full stocks of parts and quick service. There's one near you:

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

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

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

BENNETT ASSOCIATES, INC.
P.O. Box 29
Mercer Island, Washington 98040
206-232-3550

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

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

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

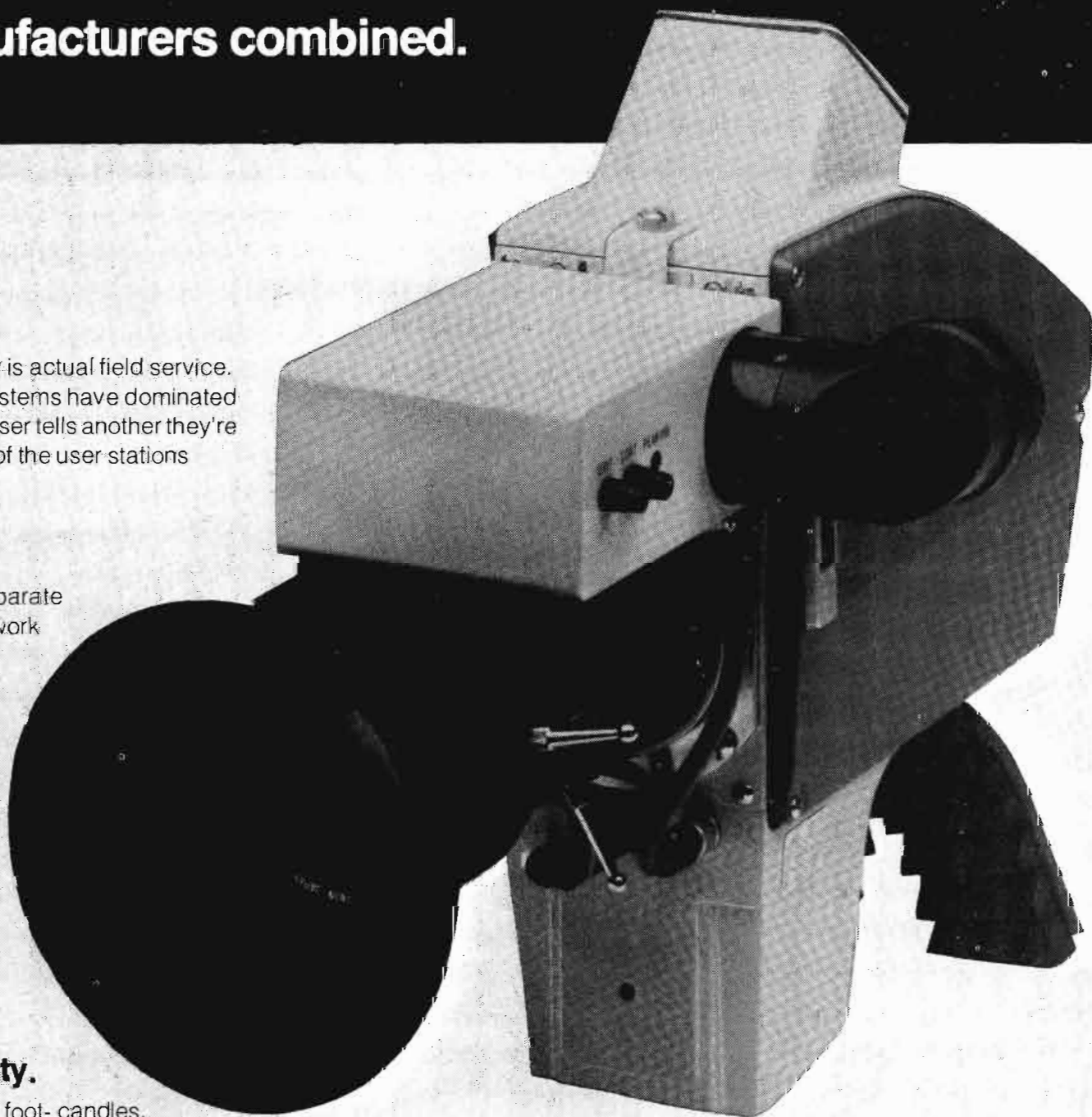
GRAY COMMUNICATIONS
1709 Stuart Avenue
Albany, Georgia 31707
912-439-7610

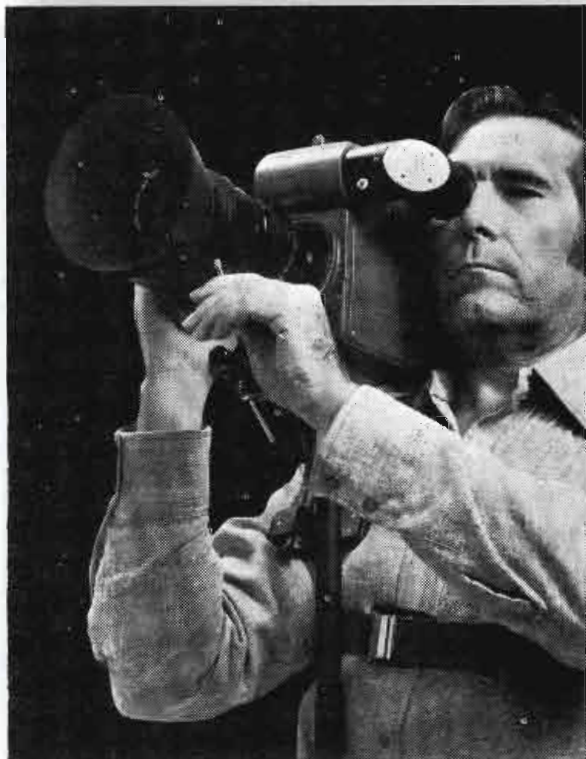
MARTIN, ZIENKOSKY & EIROVNE
13731 Omega Road
Dallas, Texas 75240
214-233-5535

Call or write for a demonstration.

IKEGAMI
Depend on it

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





Ask the man behind the **IKEGAMI** camera at these stations...

WNBC-TV
New York, N.Y.
212 247-8300

KAKM-TV
Anchorage, Ala.
907 276-7070

WDSU-TV
New Orleans, La.
504 588-9378

WWJ-TV
Detroit, Mich.
312 222-2000

KSD-TV
St. Louis, Mo.
314 421-5055

WRGB-TV
Schenectady, N.Y.
518 377-2261

WIS-TV
Columbia, S.C.
803 799-1010

WESH-TV
Winter Park, Fla.
904 253-7616

WSB-TV
Atlanta, Georgia
404 892-3456

WBZ-TV
Boston, Mass.
617 254-5670

WSOC-TV
Charlotte, No. Carolina
704 372-0930

WIIQ-TV
Pittsburgh, Pa.
412 321-8700

WATE-TV
Knoxville, Tenn.
615 637-9666

WISM-TV
Nashville, Tenn.
615 749-2244

KPRC-TV
Houston, Texas
713 771-4631

KING-TV
Seattle, Wash.
206 682-3555

KWTU-TV
Oklahoma City, Okla.
405 843-6641

KFMB-TV
San Diego, Calif.
714 232-2114

WMHT-TV
Schenectady, N.Y.
518 356-1700

KOOL-TV
Phoenix, Arizona
602 257-1234

WBNS-TV
Columbus, Ohio
614 224-7121

WTVJ-TV
Miami, Fla.
305 377-8241

WJBK-TV
Southfield, Mich.
313 557-9000

KIRO-TV
Seattle, Wash.
206 624-7077

WJZ-TV
Baltimore, Md.
301 466-0013

KTUV-TV
Oakland, Calif.
415 834-2000

KOMO-TV
Seattle, Wash.
206 624-6000

WHIO-TV
Dayton, Ohio
513 254-5311

KYW-TV
Philadelphia, Pa.
215 238-4700

WGN-TV
Chicago, Ill.
312 528-2311

WCBS-TV
New York, N.Y.
212 785-4321

WAIB-TV
New York, N.Y.
212 581-7777

WTNH-TV
New Haven, Conn.
203 777-3611

**Additional Stations
on Request.**

Switching To Solid State Relays

By Pat Finnegan

Technology continues its advance as many areas succumb to solid state inroads. History has shown that advancing technology does not always replace original methods or components, but instead, often complements and expands the usefulness of the original. The EM (electromechanical) relay, for example, expanded the use of the manual switch but did not replace it. So too have Logic gates in solid state form opened up new horizons for both the switch and the EM relay. Solid state techniques and elements are in the process of doing the same for the EM relay.

Benefits:

New processes often provide additional utility and benefits that are not attainable in the components they are modifying. The SS (solid state) relays have their

share of these benefits. Transients, arcing and RFI from the coil and contacts have been a serious problem in many applications and require suppression techniques. Since many SS relays have no coils or contacts and with ZVS (zero voltage switching) available, these problems do not exist. Acoustical noise from the relay mechanical pull in or drop out action, low frequency buzzing or humming during operation are non-existent.

There are many operational techniques in these relays that were not possible or feasible in EM relays, such as: switching-timing-latching in the same relay, or delays up to 9 hours with built in memories—these are but a few of the many areas opening up.

Two Classes:

SS relays fall into two general

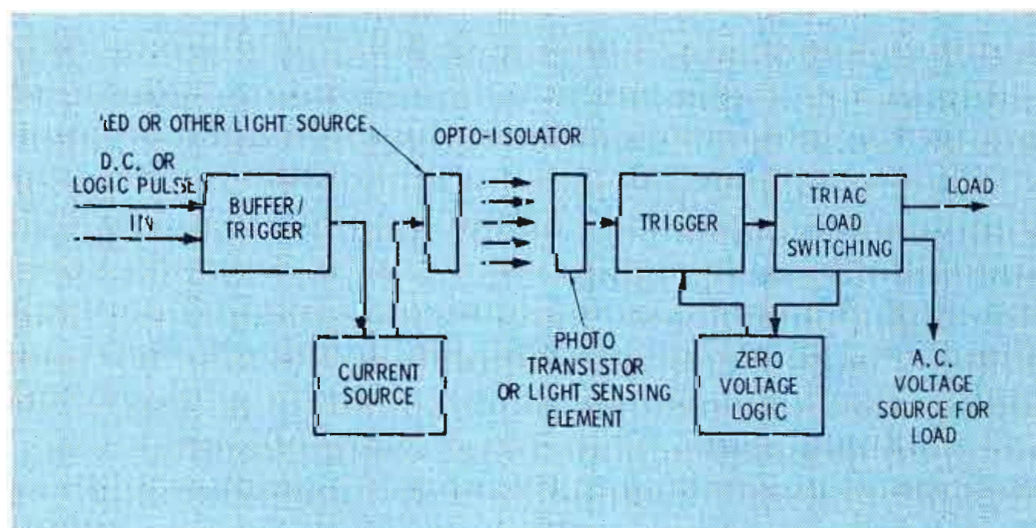


Fig. 1 This is a block diagram of an all solid state relay using optical isolation and triac output switching, and with a zero voltage switching feature.

← For More Details Circle (34) on Reply Card

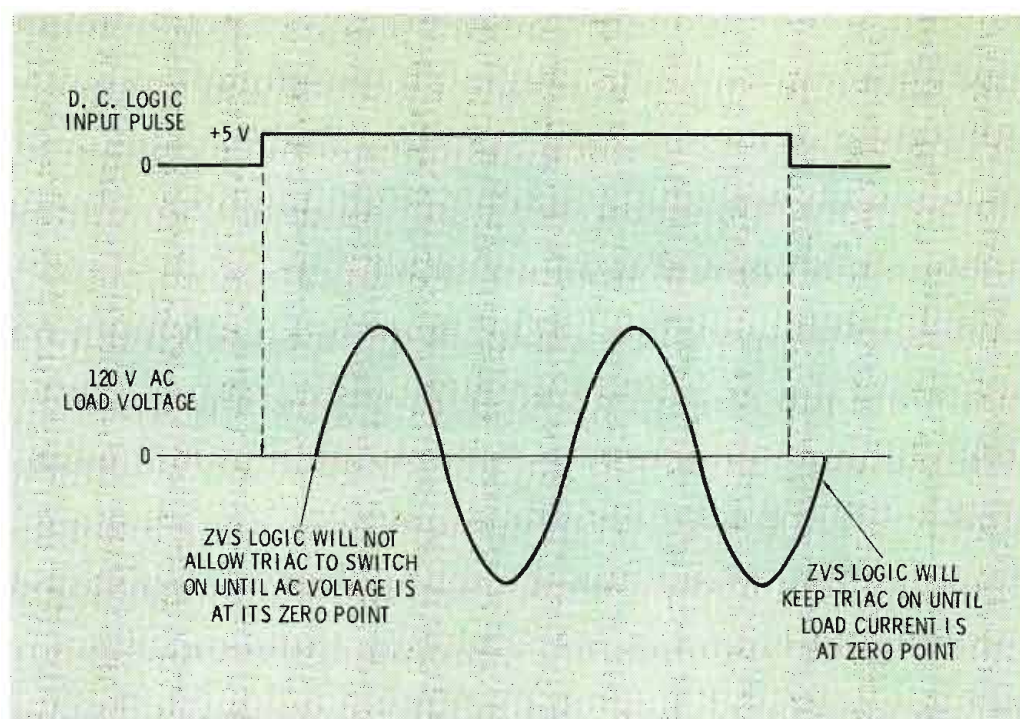


Fig. 2 Zero voltage switching of the load voltage, showing the input DC control pulse and the AC load voltage against time.

classes: the hybrid and the all solid state. The hybrid, as the name implies, is a combination of mechanical features and solid state features. The all solid state relay, on the other hand, is made up entirely of solid state features with nothing mechanical.

The Hybrid:

This relay type is a combination of solid state and mechanical components and the arrangement of its components are proliferating into numerous configurations. General switching relays fall basically into two arrangements. In the first style, the control section (equivalent of the coil in the EM relay) is solid state and in many cases compatible with DTL or TTL Logic, so they can be driven directly from Logic circuitry. The load switching is then mechanical—often in the form of reed relay contacts sealed in a chamber. The second arrangement is a reverse of this in that the input control circuitry is a reed relay whose contacts activate a triac. The triac switches the load voltage and zero voltage switching feature may be included. Although reed relay input, many of these are Logic compatible if the Logic is a current source or the relay may have built-in Logic amplification.

All Solid State:

Both the input control and the load switching are solid state in these relays. Types are available that can accept input control

signals as low as 3V DC Logic and DC signals to 32 volts, and others, AC control signals from 3 volts and on up to 240 VRMS.

One of the basic features of any relay is its isolation of control voltage from the load voltage. The solid state relay accomplishes this function either through a transformer or through Photo-Optic techniques. The Opto-Isolation method can provide isolation up to 1500V RMS AC and resistance values to 10^{10} ohms.

The control input Logic signal, in the transformer isolation type, will trigger a pulser or oscillator which generates an AC signal that can pass through the transformer. The AC signal appearing on the secondary of the transformer will activate a triac which does the load switching.

In the Opto-Isolation type, the Logic input pulse will trigger off a pulse or internal current source that will turn on an LED or other light source. The light output of the optic device is focused onto a photo sensitive transistor or other photo sensitive device or element which turns on the triac for load switching.

Zero Voltage Switching:

This technique is also known as synchronous voltage switching and may be included in SS relays that have solid state switching. It requires additional Logic circuitry within the relay to accomplish this action.

Basically, the ZVS Logic will allow the triac to switch on only when the load voltage is at its next nearest zero crossing point, and will not allow the triac to turn off until the load current is at its next zero point. The relay works in this manner: the control pulse calls the relay on, activating the input circuitry. The optic device lights up and its beam is coupled to the light detector, turning on a trigger to gate the triac into a "ready" condition when ZVS Logic is incorporated, or it will conduct immediately in the absence of ZVS Logic, allowing the AC voltage to reach the load. But when additional ZVS Logic is incorporated, the logic does not allow the triac to conduct until the AC load voltage is at its next zero crossing point—which can be up to one half cycle away. At that time, the triac turns on and allows the AC voltage to pass, and will continue to conduct as long as the input control pulse is present. When the control pulse goes off, the ZVS Logic will hold the triac in a conducting condition until the load current reaches its next zero crossing point.

The greatest benefits of ZVS switching is the lack of transient, RFI and the problem of arcing and pitted contacts in EM relays. This is due to the load voltage and current being switched at or very near the zero crossing point, so there is never more than 5 volts across the triac at the moment of switch.

Others:

As mentioned earlier, the types and applications for SS relays are proliferating. There has been rapid movement into the area of Time Delays. Most of these are hybrid units, but many all solid state relays are also into the area. In one of the Potter-Brumfield relays, the input circuit is an R/C timing circuit that will delay the turn-on of the relay until the voltage across the capacitor reaches a value that will turn-on a solid state trigger. This trigger then operates the coil of an EM relay and closes its mechanical contacts. Another version of this relay with a different arrangement of components in its input circuit, will cause the relay to delay dropping out.

Some timing devices are somewhat sophisticated, for example, the

(Continued on page 78)

BE Tests The dbx System

By Dennis Ciapura, BE Audio Editor

By now, most recording studio technicians are familiar with the dbx noise reduction system and many of these gizmos have found their way into recording studios around the world. So, it is only natural that the company should now work at penetrating the broadcast equipment market and has introduced the dbx 142, which is tailored to the needs of the broadcaster.

We were interested in seeing if the unit could really be used to advantage around the station, so, we decided to put a sample of the unit through it's paces on the test bench and then use it in actual day-to-day operation for a few weeks to test it's actual operational feasibility in a broadcast environment.

The unit is attractively packaged in black and silver and is of sturdy enough construction to withstand



This is an example of the unit BE used for testing the broadcast uses of the dbx system.

the rigors of the busiest production studio. All connections to the unit are made through a large Jones type plug (provided) and socket on the rear apron. The line cord is the detachable type and also plugs into the rear of the unit. The 142 has a

20k balanced differential input, which is transformerless for better fidelity, but sockets are provided for plug-in matching transformers, if they are required for R.F.I. suppression, etc. The sockets have built-in switches which automatic-

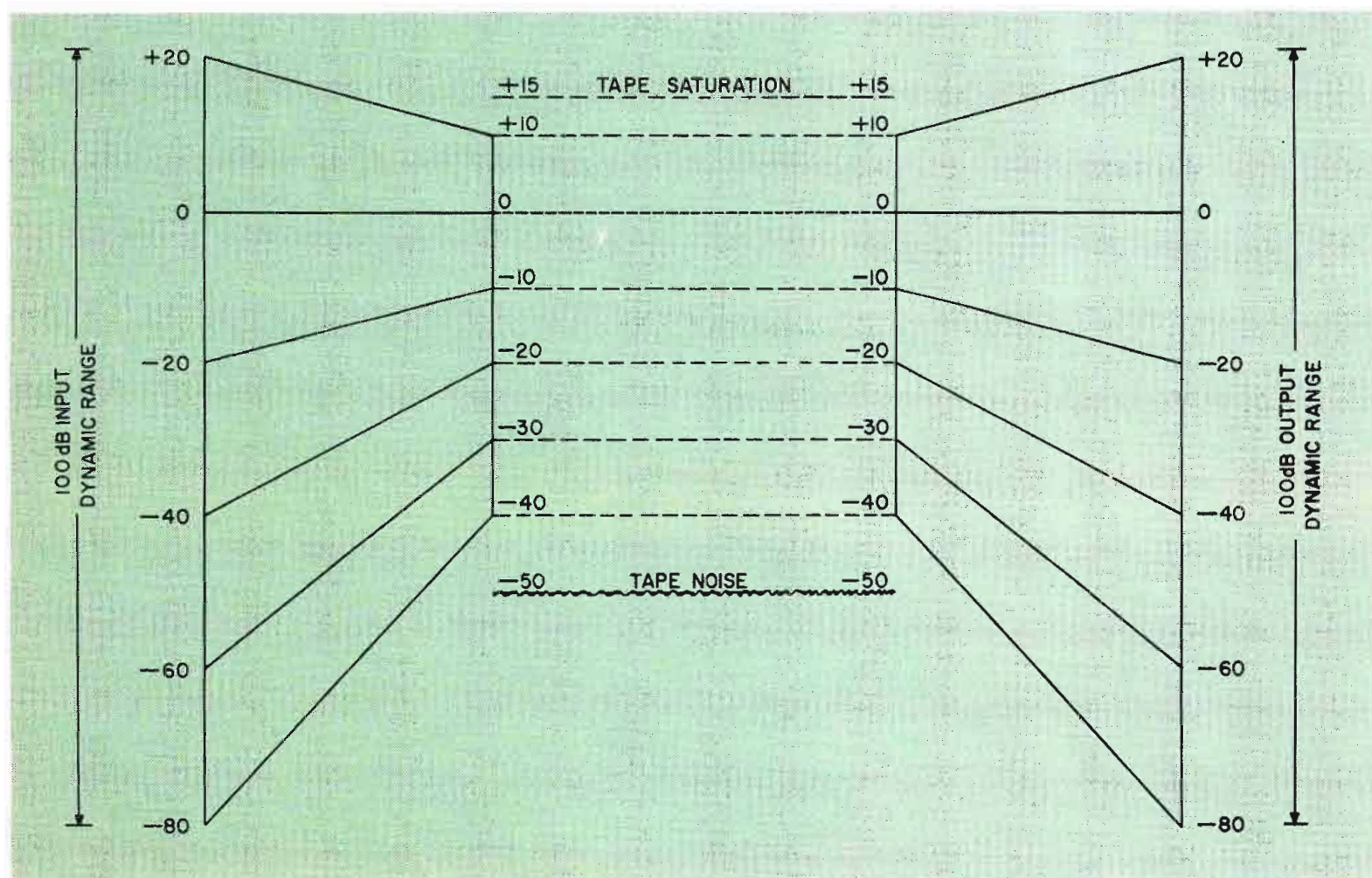


Figure 1 Encode and decode gain characteristics of the dbx II.

ally cut the transformers into the input circuit when they are plugged in, so that no re-wiring is necessary. There is also a 600 ohm input termination switch that provides the proper load for 600 ohm signal sources, so the user has a wide range of input configurations available to cope with the usual interface requirements.

As can be seen from the photograph of the unit, the front panel contains the power and audio switching push-buttons, with LED function indicators. The internal layout of the circuitry is neat and orderly and quite acceptable by broadcast standards. Mechanically, the unit is more rigid than it's 8 pounds of weight would suggest.

Before reviewing the test results, let's take a look at how the unit operates and what the mysterious modules inside of it do as they labor quietly in the dark.

Something Old Something New

The dbx noise reduction system

is based on the complimentary compression/expansion (compander) scheme that has been around in various forms for years. Basically, this method of noise reduction employs a compressor to bring the low level audio passages up to a higher level that is farther above the noise level of the recording or transmission medium. Upon playback or reception, an expander restores the dynamics to approximately what they were to begin with. This approximation aspect of the compander approach to noise reduction has the primary factor in limiting its use for broadcast work. After all, any engineer meticulous enough to consider a noise reduction system is likely to insist on accurate level matching. The dbx system takes the approximation out of the compander game and also eliminates another of its inherent problems—noise modulation. The old companders could often be heard operating because the background noise was constantly rising and falling. This phenomena was

most irritating when the recording or transmission had a very bad s/n ratio.

The dbx system also employs complimentary preemphasis and deemphasis, which reduces the noise pumping by about 12 dB. This is sufficient to drop the entire noise floor after decoding to well below the audible level, since the system is capable of 30 dB of noise reduction. This means that a tape deck with a -40 dB noise level would decode at about -70 dB so that any noise fluctuation would be at quite a low level and deemphasized as well.

Input-Output Characteristics

Figure 1. shows the input/output characteristics of the dBxII system. Notice that the dbx system incorporates a linear decibel transfer. In other words, a -20 dB input signal will be increased to -10 dB, double the decibel value, in the encode mode and then reduced from -10 back to the original -20 dB level

(Continued on page 74)

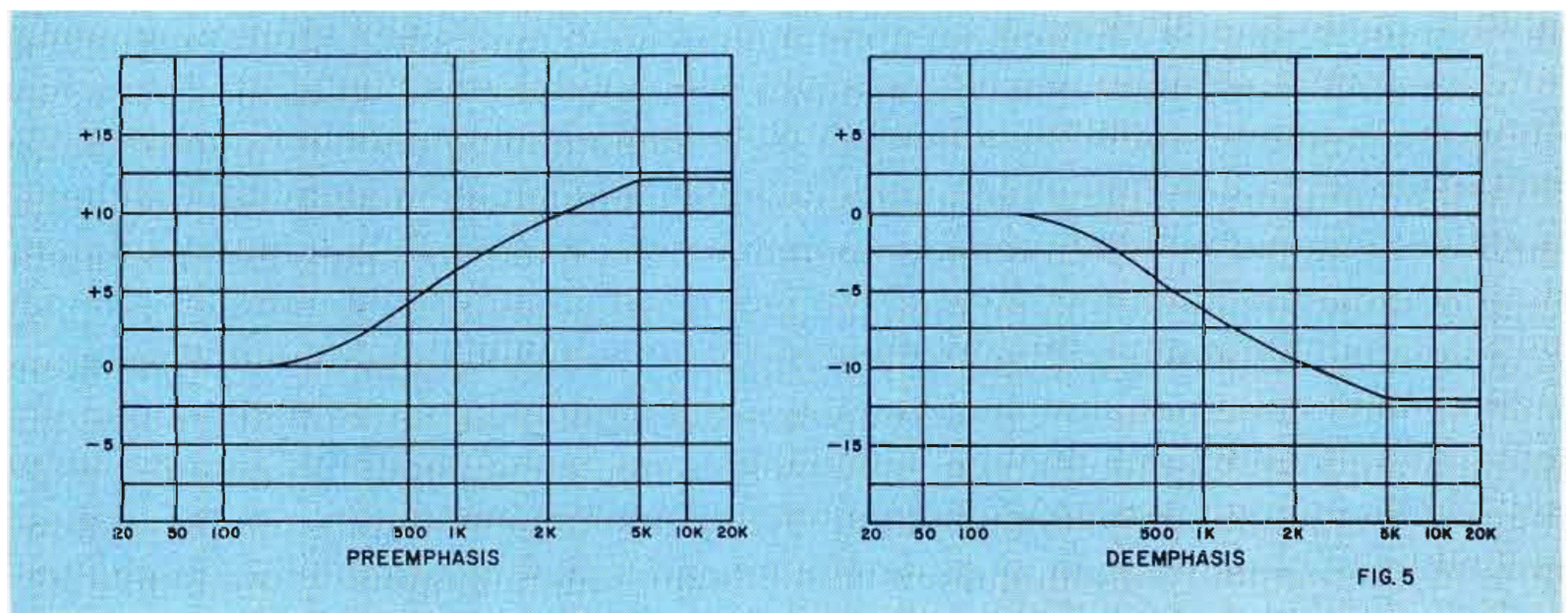


Figure 2 Encode preemphasis and decode complimentary deemphasis.

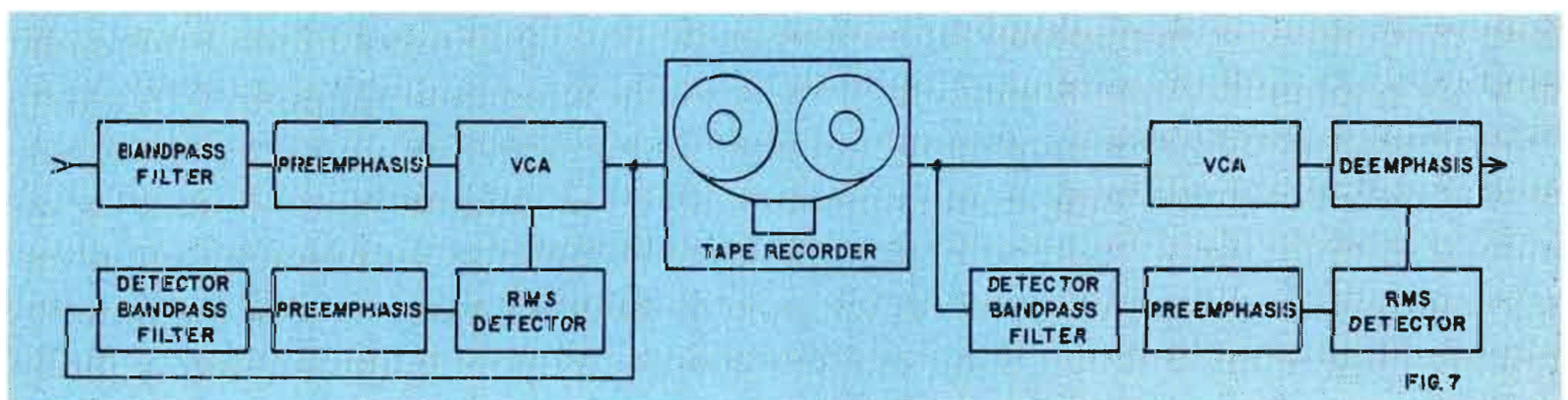


Figure 3 Functional diagram of the dbx II noise reduction method.

Most people in the industry know the Blue Bananas story. Stories like that are a part of broadcasting, and so they will continue. Somewhere in the heat of the day it pays to realize that despite all our industry advancements, we still have humans at the controls and at the mikes.

We invite your tales of horror or humor for a column we will—in the future—call Blue Bananas. Simply address all correspondence to: The Editor, Broadcast Engineering, 1014 Wyandotte, Kansas City, Mo. 64105.

Somebody goofed on the air. Now what do you do?

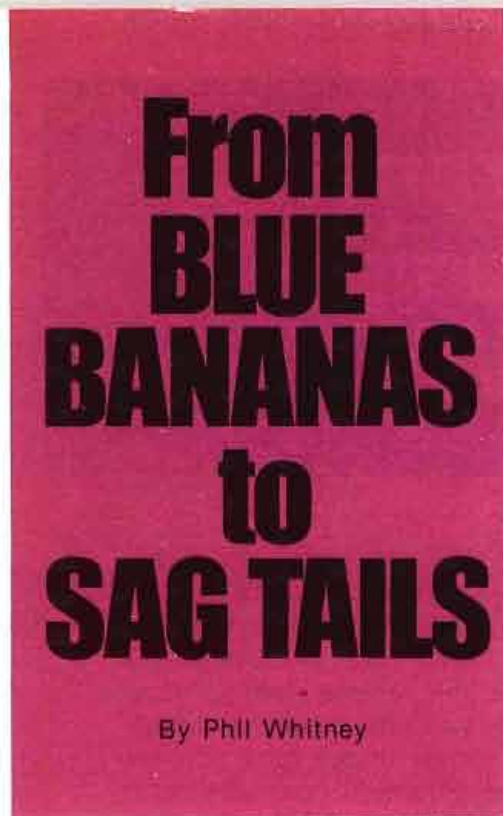
Do you stop and correct the mistake, or read on as though nothing ever happened? Better take the latter route. Just maybe your audience wasn't all that attentive. Read on...and hope.

One of the remaining areas in which it is possible to put one's foot into the open mouth is in sports broadcasting. Many station managers won't hire a sports man for on-air work who, in private life, is addicted to using colorful language. The excitement of a sports situation could trigger the less-commonly-heard words. On some occasions it has, like the announcer describing the football game. When the runner broke loose and streaked in for a touchdown, one announcer screamed..."Look at that go!"

A paper cup of hot coffee always seems to be present at the scene of a football broadcast. It's there waiting for the appropriate moment to cause unlimited havoc.

One night the engineer on a network football broadcast elbowed a nearly-full cup into the lap of the announcer. There was little time lag before the full flow of short and descriptive words appeared. The engineer, somewhat embarrassed because he had started the incident, faded the announcer while he ran down a little.

When he thought enough time had expired, the engineer brought the gain back up only to find that as the hot coffee soaked deeper, the words came faster. Again he faded...and again and again.



A listener later commented that the broadcast sounded as though it had been coming across the ocean. Well, finally the color man, the third member of the broadcast team, took over the microphone, and worked it very closely to fill in while things cooled down. After the broadcast he commented that the air was blue, the engineer's face was red and all the time he thought that **he** was supposed to be the "color" man.

Murphy's Law?

Smaller stations often send a crew of only two men to air a game. The color man reads the commercials and runs the remote amplifier. Under these circumstances unforeseen incidents can run through the crew quickly.

One night early in the football season, the lights in the broadcast booth were attracting powdery white moths of fairly large size. They became distracting to the degree that the sports announcer was having trouble concentrating on the game. He started a rapid-fire sentence about the quarterback "stepping out for a quick pitch-out". He got to the middle of "pitch" and decided to change the word to "pass". The result was disastrous.

There was a long pause and the engineer-color man decided it was time to fill. He took a deep breath and in flew one of the moths! The listeners heard a loud "PTOO". The sight of the ejected moth being

catapulted out into the stands was too much for the play-by-play announcer who immediately broke into loud guffaws of laughter. Luckily that night the control man back at the station was in the booth. He began playing the nearest thing he could lay his hands on, which unfortunately was a hymn.

Smokey Stover

When the regular play-by-play announcer became ill, the station quickly hired a part-timer to cover. He had great qualifications; college graduate, sports fan, experience. We later wondered about some of those.

It was a windy afternoon when the game was broadcast and there were problems as a result. The first we noticed wrong was when out of the loudspeaker came the words... "He threw the ball up and the wind blew it right back at him." Suspicions were confirmed when the ball ended up on the "seventy yard" line. The eager young man was transferred to news and special events after that game. He had some good points, such as dedication to his job and the desire to excell. Somewhere he had heard an announcer describing a "pall of smoke". When a large department store burned down, he began his news feed dramatically with..."tonight a pail of smoke hangs over our city!"

Since announcers have the advantages of tape today, there are fewer commercial misreadings. The problem often appears in the tag requested by many agencies, such as the Ford Motors White Tag Sale. The announcer, reading the tag quickly to join the net, called it a "White Sag Tail", much to the amusement of the listeners. Then there was the horror of all announcers, the alliteration..."See the short sleeve sport shirts at H. C. Sheets and Son!" That one nearly killed three announcers before the store went out of business.

Call Betty Crocker

The business of broadcasting is

Increase sharpness... improve camera sensitivity



For the sharpest image, the finest resolution, the best picture quality in your station's ADI, EEV's new 30mm Coaxial Leddicon® Camera Tube is the answer.

Features the fastest leading edge signal level rise and quickest trailing edge fall of any image tube now on the market. Patented coaxial design assures consistently accurate geometry and optimum registration no matter the tube orientation. **RESULT . . .** a noticeably superior picture quality even under the most difficult lighting conditions.

Direct replacement for most separate or integral mesh Plumbicon®, Vistacon or older Leddicon camera tubes.

Available with exclusive internal fixed or variable light bias in extended red, extended green, luminance, blue, green, red or monochrome types. Call or write today for details.

Leddicon is a registered trademark of English Electric Valve Company Ltd.

Plumbicon is a registered trademark of N. V. Philips of Holland

EEV NORTH AMERICA ENGLISH ELECTRIC VALVE NORTH AMERICA LTD.



1 American Drive • Cheektowaga, NY 14225
(716) 632-5871 • TWX: (710) 523-1862

67 Westmore Drive • Rexdale, Ontario M9V 3Y6
(416) 745-9494 • Telex: 06 965864

A member of the GEC-English Electric Group of Companies

filled with surprises. One would hardly expect too many of these while broadcasting a symphony concert from the stage of a civic auditorium, but they appear wherever there is a microphone.

Covering a two-hour concert as announcer can bestow a great dignity upon the staff member assigned to the job. Two little old ladies in the front row had been carrying on animated conversations during the louder parts of the concert. They could be seen but not heard. As the music slowly built up to a crescendo, they had more and more difficulty hearing one another. Then came a tremendous cymbal crash, followed by dead silence, when one little old lady screamed at the other... "but I fry mine in lard!"

The engineer thought that he was picking up another radio program in his earphones and began a systematic check of his gear. The announcer stood in front of the microphone with his mouth open but nothing came out. Finally a twitter could be heard in the audience, followed by a roar. The announcer never forgot the incident and his sense of aloofness disappeared.

Such occurrences are all a part of experience. How the broadcaster copes with the unexpected when he is before the public's eyes and ears often determines his future in the industry.

Since the presswires are great offenders at times, it serves a newsman well to read his newscast through before airing it. One letter missing from a word changes it from a five-letter to a four-letter word and unfortunately it is not a rare occurrence. Then there is the imaginative wire trouble which changes a weather forecast to... "hot today with afternoon thunder-doolers." And there was the case of the "child was celebrating his 67th birthday". It is possible for one of these typos in the news to change the entire impact of the story.

Most newsmen who have been around for awhile have a collection of these gems so often responsible for the egg on the face of the beginner. It's best to avoid the possibility of embarrassment by reading the news through before airing it. But if the unexpected happens, **DON'T STOP.** Keep it moving!

See us at Marconi Booth #301, NAB

For More Details Circle (35) on Reply Card

BROADCAST ENGINEERING

BE covers the **PAN AM GAMES**

By Joe Roizen

The 33 countries of the Western Hemisphere sent over 4,000 of their best athletes to compete in the 7th Pan American Games in Mexico City. The high public interest in athletic events of this nature virtually guarantees a Herculean TV coverage to relay the efforts of the competitors with color images and sound from every venue. Television facilities in the host country are extensive, but for an event of this magnitude some external equipment had to be brought in to provide the added camera coverage and VTR program origination or editing that would be needed for a round-the-clock operation.

Mexico's largest TV network, Televisa, which operates over 100 stations throughout the country, and Channels 2, 4, 5 and 8 in Mexico City, provided several mobile vans with cameras and VTR's for their share of the burden. Channel 13, the other major station in Mexico City, also supplied vans with cameras and VTR's. CBS, the official U.S. Pan Am Games network, leased a local van with two portable cameras and brought in another from New Jersey with five field cameras, one portable camera, three VTR's, and a slow-motion disc.

The Organizing Committee for the games also arranged to lease eight VTR's for the official recording center at the Telecommunications Tower, and three color cameras for the Volleyball Hall, together with a slow-motion disc unit



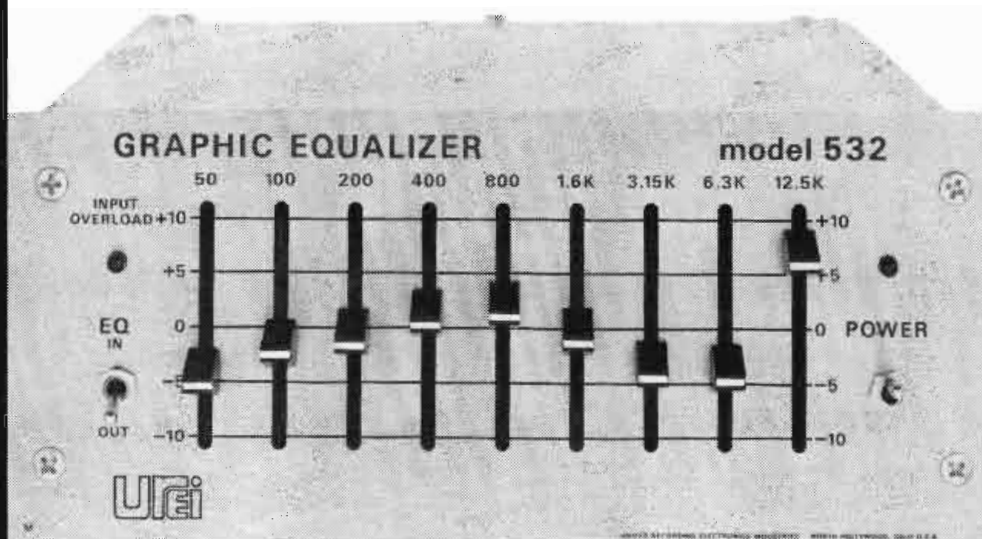
Volleyball is covered at close range by one of three cameras. The other two were setup in the balcony. The floor camera also was used for post game interviews. (Photos by Donna Foster Roizen)

Our New Math:

$$\frac{530}{2} = 532$$

The new Model 532 is a single channel version of UREI's popular 530 Dual Graphic Equalizer, offering real economy for recording, sound reinforcement, radio and TV, and monaural music systems. The nine equalizers are centered at each octave from 50 Hz to 12.5 kHz. The 532's input may be operated balanced or unbalanced and the transformer-coupled output amplifier is capable of delivering +20 dBm into a 600 ohm load. Signal-to-noise ratio at maximum output is 110 dB, distortion is below 0.5%. Half rack size, uncompromising performance. Available from your UREI dealer.

UREI
QUALITY
OF COURSE



11922 Valerio Street No. Hollywood, California 91605 (213) 764-1500

Exclusive export agent: Gotham Export Corporation, New York

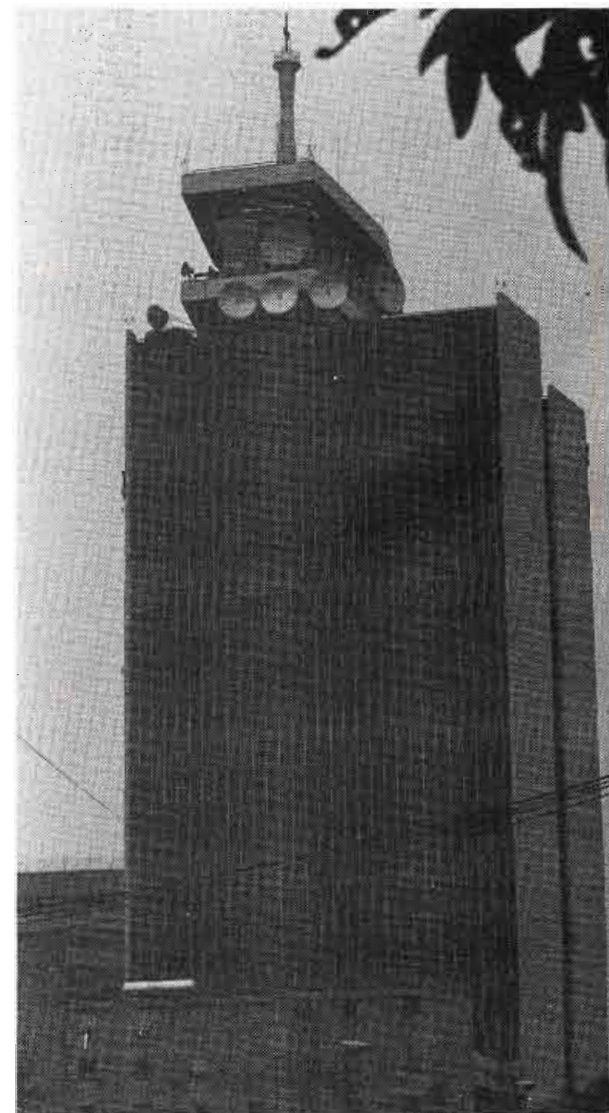
For More Details Circle (36) on Reply Card

to provide instant replay in variable speed or fixed images.

Many of the venues were the same as those used for the '68 Olympics, with the major change in television coverage being that everything was now color. The color cameras coming from different sources covered the gamut of well-known brands: Fernseh, IVC, Marconi, Philips, Toshiba, and Thomson-CSF. VTR's at various locations also ranged from IVC 9000 and 800 series to Ampex 2000's, 1200's and VR3000's. HS100 and DMI slow-motion disc recorders were also at a few venues.

Local coverage was the most extensive, with over 12 hours of daily on-air programming. North of the border, American viewers saw highlights of the Pan Am opening ceremony during NFL half-time and before the Sunday night movie. With an editorial and production

This 15-story Telecommunications tower was built for the '68 Summer Olympic Games and was once again used as the central video recording, switching and distribution point.



staff of 19 CBS employees and leased facilities that included 25 technical personnel, CBS put out about 9 hours of programming, concentrating on sports of interest to U.S. viewers and on the athletic confrontation with Cuba.

The Canadian Broadcasting Corporation, with an eye toward the '76 World Olympics to be held in Montreal, sent a number of observers to assess the problems of high-density coverage of huge sporting events. Canada had a large participating team and scheduled at least one hour per day for their English network, as well as a similar amount for the French network. Using their own satellite, they could relay pictures and sound from the Pan Am Games on a 24-hour basis, record and edit locally, and go on the air with great immediacy.

Technical Arrangements

A 15-story Telecommunications Tower built in 1968 to house the TV equipment for the XIX Olympiad was again used as the central switching and distribution center for the TV feeds from the different venues.

Microwave circuits from the top of the Tower fed a bank of eight monitoring and distribution panels on the 13th floor, where eight VTR's were installed to make the official recordings of all of the events at the Pan Am Games. For the first time in an international Olympic contest, segmented-scan helical recorders operating on the super hi-band standard and using two-inch tape were employed for master recording.

Six IVC 9000 VTR's were used for this purpose, with two Ampex VR1200 quadruplex machines providing the interface for dubbed tapes in the quad format that would be needed for studios so equipped. Recorded tapes made on the 9000's were then edited and put on the air, either for local consumption or for satellite feeds to other countries and continents.

Most of the original coverage came from color camera equipped mobile vans that were located at the major venues and in some cases moved to other ones as the sporting scene shifted.

The first day of competition included a controversial volleyball

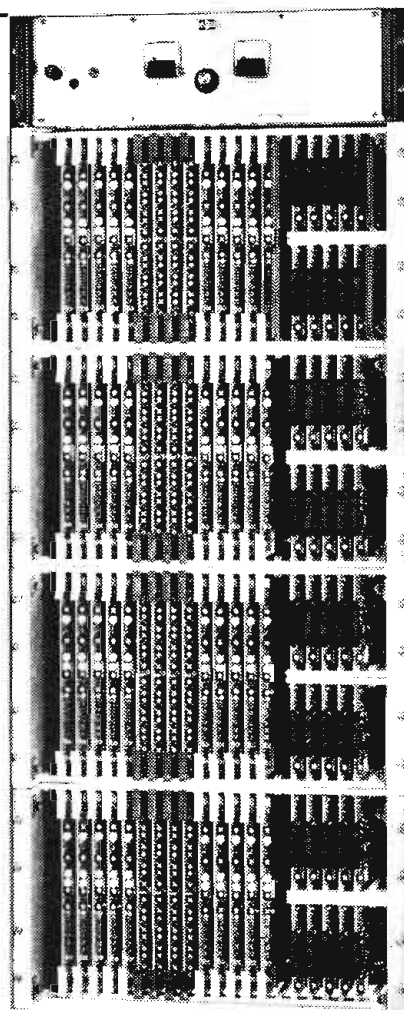
THE COMPLETE VIDEO-AUDIO ROUTING SYSTEM

**...only Datatek
has all these features:**

- Choice of matrix building blocks—12 x 10 (breakaway audio), 20 x 10, 20 x 15, 30 x 10 or 30 x 15
- Independent, simple and flexible control facility for each bus
- Front access operational adjustments (input and output gain, frequency response, cable equalizing) with modules in normal operating position (not on an extender)
- All connections are plug-in
- Front access video, audio and power test points
- Four section continuously adjustable cable equalizers on *both* inputs and outputs
- Plug-in matrix PC boards are all front mounting and vertically oriented for unrestricted air flow
- Crosspoint latch feedback tallies (BCD) and source (camera) tallies brought out as standard
- Simple expansion facilities (video, audio, control, tally and power connectors) provided as standard
- Soft clamp provided for video inputs
- Differential (hum bucking) bridging video inputs with high return loss
- Two video outputs and two + 24dBm (150 or 600 ohms) balanced audio outputs per bus
- Multi-reference vertical interval or random switching facilities for each bus
- Rear access audio level systemizing pad facilities
- Highest quality non-proprietary multi-source components used throughout



1166 W. Chestnut St.
Union, N.J. 07083 (201) 964-3656



For More Details Circle (37) on Reply Card

CLE/FM SOUND BRITENER

Another Innovation from *Spotmaster*®

- Improves your coverage and recaptures some of the 30 million FM motorists as they move through your area — both city and suburbs.
- Unique signal processing adds new luster to mono or stereo with automatic level control and maximum transmitter modulation — and full protection against over modulation.
- Custom tailors audio to *your* programming — only two controls to set dynamic range and signal expansion rate.
- Ideal for mono or stereo — operates with DOLBY B to provide compression, peak limiting or straight amplification.
- No compromises in design or packaging — both stereo channels in one package.

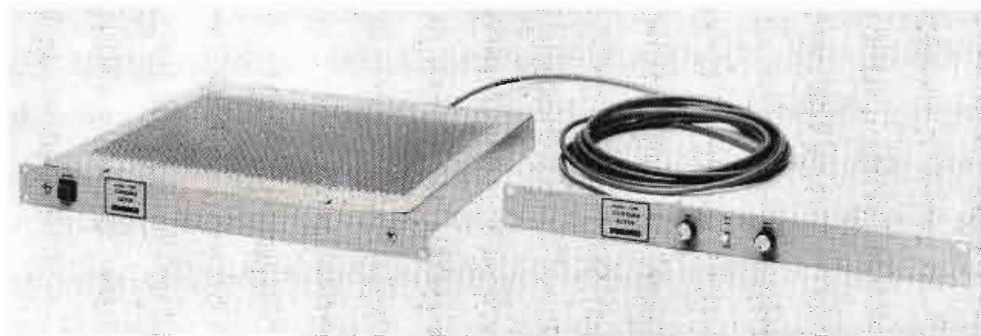
CALL ABOUT OUR 30 DAY FREE TRIAL



**BROADCAST
ELECTRONICS, INC.**
— A FILMWAYS COMPANY —
8810 BROOKVILLE ROAD
SILVER SPRING, MD. 20910
PHONE 301-588-4983
TWX 710-825-0432
CABLE "SPOTMASTER"

For More Details Circle (40) on Reply Card

MODEL 7200 chroma keyer



- Produces chroma-keyed output from two encoded video inputs
- Comb Filter
- Zero chroma delay
- Sync adding capability for non-composite inputs
- Remote control panel includes vertical-interval key on/off switch

DYNASCIENCES

video products

Township Line Road, Blue Bell, PA. 19422
Tel.: (215) 643-0250 / Telex: 84-6358

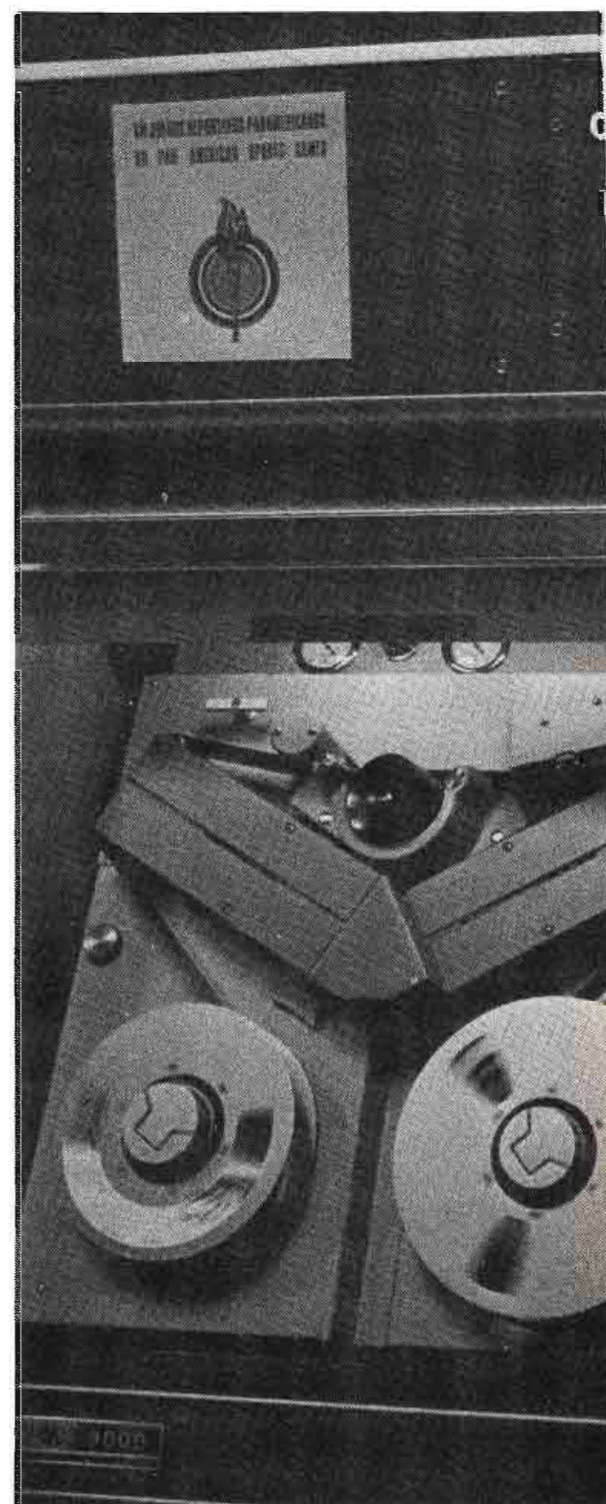
A SUBSIDIARY OF **Whittaker**

For More Details Circle (41) on Reply Card

game between the USA and Cuba. This match was covered by another newcomer to the Olympic TV circuit, the IVC 7000 color camera. Two cameras were located on the balcony of the volleyball court and provided wide to medium views of the action with zoom lenses. The third camera was on the volleyball court floor and had to be equipped with rubber doll wheels to avoid marring the highly polished hardwood surface. This camera could move in to follow the focal point of action or to pick up team huddles during time-outs, as well as post-game interviews.

The competition area of the

This is one of seven IVC 9000 recorders used in the Telecommunications tower.



BROADCAST ENGINEERING

volleyball court was painted a bright orange and provided a very colorful backdrop for the athletes and the TV camera images coming from the 7000's. The temporary camera control room was set up in a closed area adjacent to the volleyball court and contained all the elements of a small studio operation. Since the director's camera monitors and the CCU monitors were small monochrome units, a Conrac 19-inch RHA was used as a color program line monitor. Connected into the system was a portable DMI video disc that gave instant replay for slow or stop motion purposes at peaks of action.

On-site interviews in the Flag Square of the Olympic Village and elsewhere were done with a pair of

PCP-90 cameras, usually on tripods and connected to a self-powered mobile van supplied by Notimex, a TV production company in Mexico City. To provide some unilateral coverage of items interesting to Canadian viewers, the CBC brought in an ENG camera and a backpack quad recorder.

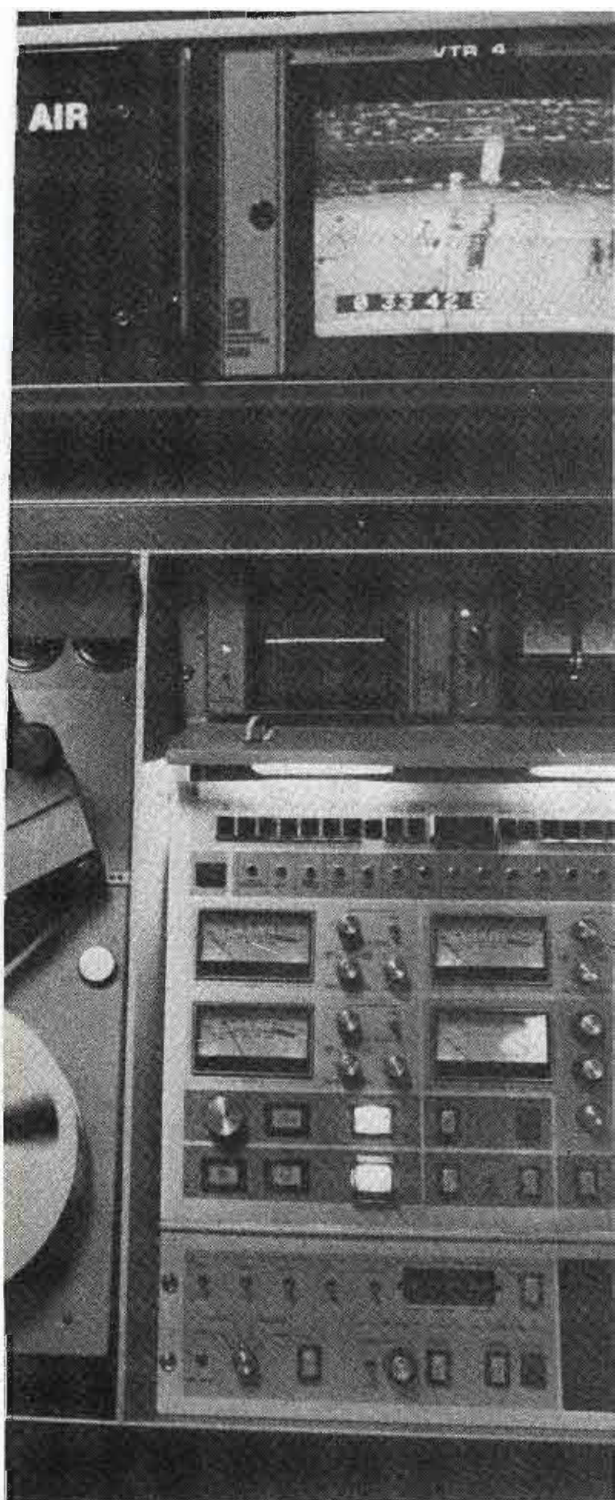
Behind The Scenes

With such a great variety of input signals to the Telecommunications Tower, there were bound to

be some initial problems, but these were quickly ironed out as the games got under way.

One unique difficulty occurred because signals coming in to the Tower from some of the venues had little or no front porch, thereby affecting VTR stability. A round robin of horizontal phase adjustments on sync generators at all of the venues quickly cured that one.

Still another problem came up on opening day for the CBC transmission of the inauguration ceremony.



Three reliable ITC decks in a space-saving common housing.

- **Compact** — three decks convenient to the operator in the space of two single deck machines.
- **Individual** — decks operate independently with separate audio output and remote control.
- **Versatile** — multi-tone machines may be readily adapted so each deck automatically starts the next.
- **Economical** — three premium line reproducers for little more than the price of two single deck units.
- **Rugged** — decks are 1/2 inch thick hardened aluminum to insure stability.
- **Quiet** — guaranteed by ITC's air-damped solenoids.
- **Serviceable** — simple, reliable mechanics easily accessible through a hinged front panel and slide-out decks.
- **Record** — add a WRA Recording Amplifier and convert the bottom deck to a Master Recorder / Reproducer.

Put the 3D to work in your station. Pick up the phone and call ITC collect (309-828-1381). Ask about our 30 Day Guarantee of Satisfaction.



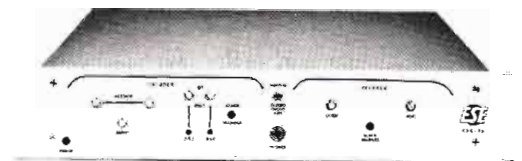
INTERNATIONAL TAPETRONICS CORPORATION

Marketed exclusively in Canada by McCurdy Radio Industries, Toronto, Ontario, Canada

©1975 by ITC

EBS

Encoder/Decoder SYSTEM



\$250



THE ESE EBS-76 WITH AUTOMATIC GAIN CONTROL, efficiency, economy and specifications that meet or exceed all basic FCC requirements.

ENCODER FEATURES

- Output level to +18dBm balanced into 600 ohms.
- Automatic 22.5 second timing. (Adjustable)
- Switching of both sides of program line.
- Crystal controlled tones.
- Remote control capability.
- Reliable C-Mos circuitry.
- Stereo line switching available.
- Valid closed circuit testing with single switch.

DECODER FEATURES

- Automatic Gain Control makes tone levels equal from all sources — accepts any input from 100mv to 5v without adjustment.
- Built to work with existing EBS radio.
- Derives tones from speaker or tuner output.
- Adjustable delay.
- LED's on PCB indicate each tone received for easy adjustment.
- PLL-linear and C-Mos IC's for reliability.

FCC type-approval pending. Kit version may require certification of performance by station engineer. **WRITE, WIRE OR CALL TODAY.**

505½ CENTINELA AVENUE • INGLEWOOD, CALIFORNIA 90302 • (213) 674-3021

For More Details Circle (42) on Reply Card

NEED EQUIPMENT?

ABE is your best source

FOR NEW OR USED BROADCAST EQUIPMENT

MOST MAJOR BRANDS • FAST SERVICE
LARGE INVENTORY • SATISFACTION GUARANTEED
FINANCING AVAILABLE ON \$500 OR MORE

contact ALLIED before you buy or trade

317- 962-8596

IF YOU ARE NOT RECEIVING OUR MONTHLY CATALOG CALL OR WRITE

ALLIED BROADCAST EQUIPMENT

124 South 6th Street

Richmond, Indiana 47374

For More Details Circle (43) on Reply Card

The French sound came through but the English audio went dead, even though the picture was great. A separate sound track was quickly recorded and sent via satellite in a way that succeeded in keeping any Canadian viewer from detecting the problem.

International Electronic News

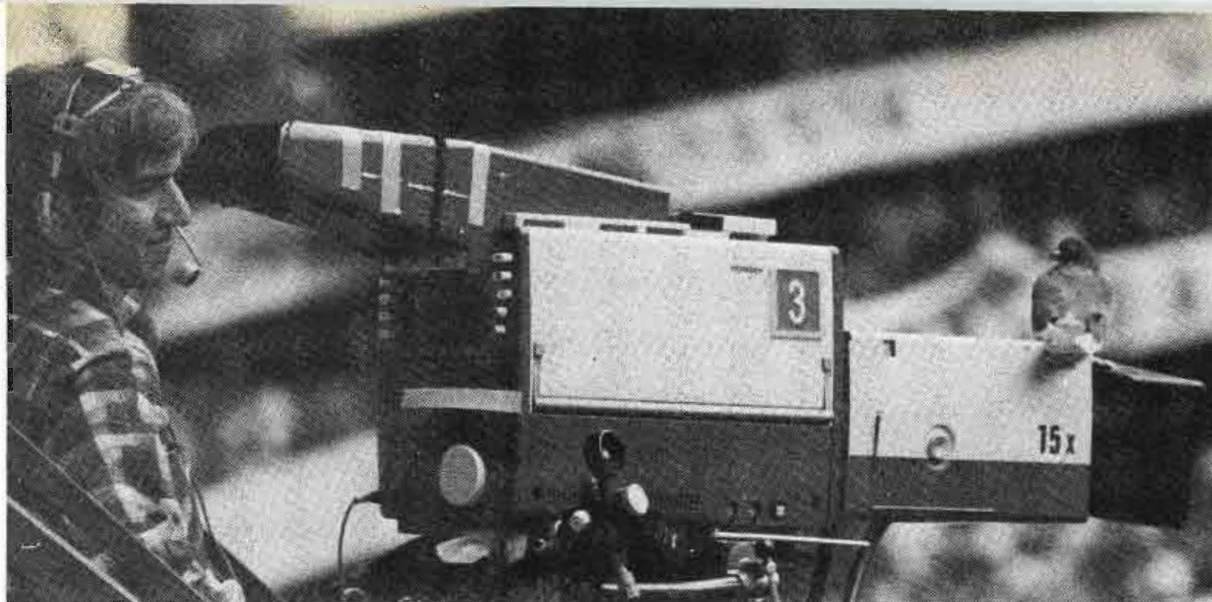
Perhaps the most interesting aspect of the Pan American Games was the use of widespread satellite communications in sending the sound and images to the recipient countries in North and South America. The Telecom Tower in Mexico City is connected by microwave to both ground-based repeaters that go to New York via Laredo and Dallas, and to the Mexican earth satellite station at Tulancingo.

The CBS coverage used the single video and dual audio links through Dallas to feed their network. To reach Cuba with the games, a separate microwave system through Juarez and Miami finally made use of a troposcatter system to cover the last link into Havana. Short, local microwave hops fed Channels 2, 5 and 13 in Mexico City, where they could redistribute the programs to their own internal networks.

The Tulancingo earth satellite station beamed a video and multiple audio signals to the Intelstat IV F3 relay which fed signals to earth receiving station in its window of operation. These included receiving parabolas in Longovilo, Chile; Choconta, Columbia; Camatagua, Venezuela; Tangua, Brazil; and the ETAM station in the USA. To overcome a satellite position problem, the ETAM signals were microwaved to Andover, Maine, and sent up to Intelstat IV F7 which could now relay to Cambita in Santo Domingo and Cayey in Puerto Rico. The Andover terminal also fed the CBC in Montreal, Canada. French and English sound, as well as radio and coordination signals went over a satellite link and land lines which were called SPADE.

In addition to the satellite links, there were daily video-tape reels sent off by jet to various countries

BROADCAST ENGINEERING



A bemused cameraman keeps an eye on an unexpected visitor during coverage of the opening ceremonies. The camera was connected to a CBS van outside Azteca Stadium.

to complete the extensive TV coverage.

Interviews with key members of the various TV teams in Mexico City revealed some ongoing problems with the hastily assembled system that was put together for the Pan Am Games. However, everyone agreed that under the circumstances the results were as good or better than expected. Mexico was not scheduled for the Pan Am in '75; Chile first had the honor and declined due to internal political problems and Brazil was next in line, but an epidemic of meningitis in Sao Paulo took them out of the running. Mexico then accepted the saviour role. By any measure, there was a critically short work period for an undertaking of this magnitude.

Some of the leased equipment arrived on site a few weeks before the opening ceremony and needed a round-the-clock effort to get installed and checked out by game time. The operating crew was recruited from engineering students (who got college credit for their work) and trained for two weeks to run some of the most sophisticated equipment in the television field.

The TV crews from both near and far north of the border suffered from the effects of Mexico City's 7,000 foot plus altitude and the consequences brought on by "Montezuma's revenge," or as it is now referred to in the modern vernacular "Gringo a Go-Go." Nevertheless, a look at the CBS coverage reaching the USA shows a fast paced visual review of the athletic contests and a series of colorful video pageants encompassing the pomp and ceremony of the inauguration and close of the VII Juegos Deportivos Panamericanos.

■ BOOTH #409 • NAB SHOW • CHICAGO • MAR. 21,22,23 & 24TH ■

When the NAB Show is over— the exhibit they'll all be talking about will be the one you can see at booth #409

That's where Datatron will unveil a remarkable new editing system.

Datatron's TEMPO '76

You are cordially invited to see for yourself the introduction of a new generation of editing equipment.

TIME SYNC.

Don't miss seeing the editing equipment that makes tomorrow's technology available today.
The Datatron TEMPO '76.

datatron, Inc.

EDITING SYSTEMS DIVISION

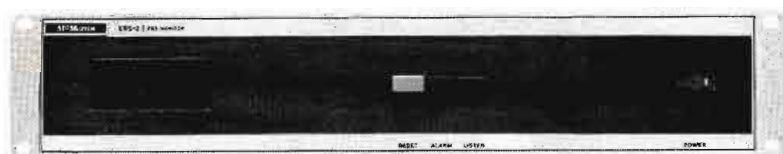
■ BOOTH #409 • NAB SHOW • CHICAGO • MAR. 21,22,23 & 24TH ■

For More Details Circle (45) on Reply Card

McMARTIN

EBS "TWO"

READY FOR APRIL 15TH DEADLINE!



EBS-2 Decoder-Two Tone Monitor **\$ 99.50**
FCC CERTIFIED



TG-2/EBS Encoder-Two Tone Generator **\$225.00**
FCC TYPE ACCEPTED

with



AMR-1 Fixed Single Frequency AM Receiver **\$ 99.50**
or the NEW

AMR-3 Three Frequency AM Receiver **\$125.00**
or



FMR-1 Fixed Single Frequency FM Receiver **\$ 99.50**
FCC CERTIFIED

McMartin, a leader in the development of broadcast equipment has available for **IMMEDIATE DELIVERY** the NEW Two Tone Emergency Broadcast System. This system complies with all FCC Regulations. A complete AM or FM system (EBS-2, TG-2/EBS and AMR-1 or FMR-1) will cost you **only \$424.00.**
or with the **NEW AMR-3** **\$449.50**

see us at Booth 609, NAB/76

McMartin Industries, Inc. • 4500 South 76th Street
Omaha, Nebraska 68127 • (402) 331-2000 • Telex 048-485

Globecasting

Electronics is invading The BBC radio network

Electronic aids for newspapers and wire services have evolved over a period of years to practicality. Now, for the first time, electronics is invading the newsroom of a large radio network, the British Broadcasting Corporation.

A new system, using TV-like screens and a big computer, will be placed in operation in 1977 by a British subsidiary of International Telephone and Telegraph Corporation for BBC's international shortwave "External Services." It will greatly aid its 250 people with the logistics of broadcasting 700 program hours per week in 40 languages, the world's most diverse such service.

Previously, incoming news was stenciled, duplicated, and distributed by hand to locations on 17 floors of three different buildings. Some 20 million sheets of paper were used per year. A large part of the workload was the translation of incoming English-language material into the 39 other languages. Each language is handled by an autonomous department.

The new \$2.4 million system is basically a communications-oriented computer which will store and make available material to some 240 terminals that enter and display information.

Extreme flexibility was required in the terminals to give the editing capabilities required by journalists. The usual editorial implements will no longer be pencil, paper, typewriter, and copy, but will be the terminals with their displays.

Incoming copy will no longer be sifted for news value, duplicated, and distributed to the various language desks. Instead it will be centrally evaluated at the incoming desk and entered by a terminal into the computer.

At this time, editing is performed. Letters, words, and sentences can be deleted, inserted or changed, with the lines automatically being adjusted to conform to the changes. While this is going on, the copy editor will be able to see his changes occurring on a TV-like screen before him.

Each line will contain only complete words, none being hyphenated at the end of a line. Each terminal will have its own storage for 40 lines of text, with 25 lines being displayed at a time. When the copy editor has completed his changes in the 40 lines, they will be "dumped" into the central computer's memory and editing can start on the next part of the story. In the computer, stories will be captioned with a code that will enable them to be recalled instantly on any of the 240 terminals.

At this point, the stories can be summoned to appear on the terminals at the translators' locations, where translations can be prepared, edited and also

stored in the computer.

The broadcasters can selectively call out the material for putting it on the air in the form either of a terminal display or as hard copy on a teleprinter-like device.

The storage in the computer will be so large that material can be retained from three to 30 days, or even up to 150 days, a great help when an important story requires periodic updating.

To provide reliability in the system, the computer will actually be duplicated, with two systems working simultaneously, processing all the news, and cross-checking each other.

The system designers estimate that the delays in broadcasting news stories will be reduced from up to two hours with the present manual system to about one to three minutes, depending on the length of the story.

Satellite links open up New communications

Industrial conferences, that would normally have required air travel, soon will be conducted by using a satellite communications link between two divisions of Westinghouse Electric Corporation. The experiment will be conducted on the Communications Technology Satellite (CTS) which is to be launched shortly by the National Aeronautics & Space Administration (NASA).

Teleconferencing between the Westinghouse Defense & Electronic Systems Center, Baltimore, Md., and the Westinghouse aerospace electrical division, Lima, Ohio, will begin after the CTS launch and post-launch satellite checkout. Each Westinghouse location uses a small ground terminal to both send and receive television signals which are relayed by satellite to and from the other plant location. The two plants are about 400 miles (640 kilometers) apart.

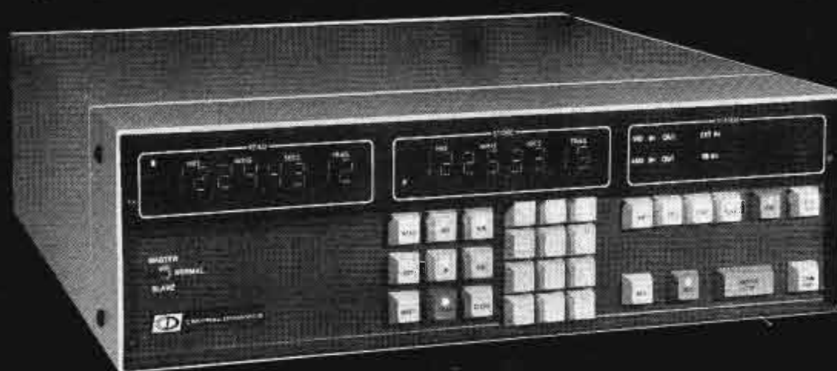
"Experimental conference rooms with television cameras have been set up at each Westinghouse location," explained Herb Nunnally, program manager for Westinghouse satellite communications. "To reduce cost and to increase confidentiality of the conferences, there will be no camera operators. Instead, cameras will be switched by the voice of the speaker."

The conference rooms in Baltimore and Lima will receive color video which will be projected on a large screen permitting participants at one location to view facial expressions and gestures of participants at the other location. The impact of video taping, transmitting graphics, and time/cost constraints will be evaluated during the experiment. A scrambling device will make the communications link secure from potential eavesdroppers.

According to Herb Nunnally, the principal investigator, the experiment will attempt to determine how effectively business information can be

(Continued on page 64)

cut your editing down to size with Central Dynamics' EDS-200



The microcomputer Audio/Video Tape Editor for Commercial, Industrial and Educational Applications

The EDS-200 Automatic Editor and Synchronizer provides professional and economical assembly of master tapes. Utilizing its built-in SMPTE Time Code Reader, Micro-computer and program, the EDS-200 automatically locates, previews and records audio and video edits accurately . . . all to a single frame!

Single button scene location, entry and storage, audio and video synchronizing and switching (in all modes), automatic cueing, and simultaneous machine control cuts the tedium and time of manual editing. The EDS-200's modular design, multi-machine control and available options allow for easy and economical expansion to meet more demanding post-production requirements.

Other features include:

- Can control several Quad, Helical and Multi-Track Audio machines.
- Built-in, sensitive and accurate SMPTE Time Code Reader compensates for poorly recorded time code and can read in all modes.
- Performs Time Code duration calculations.
- Keyboard controls permit simple entry of new data, corrections or changes.
- Automatically stores scene locations from a single control.
- Audio & Video operations are selectively independent or combined.
- Fully compatible for all on-line and off-line editing operations . . . NTSC or PAL.

For the complete story on the EDS-200, Video Tape Editing and associated equipment, call or write today!



CENTRAL DYNAMICS LTD

Canada: 147 Hymus Blvd., Montreal, Que., H9R-1G1 514-697-0811

U.S.A. 230 Livingston Street, Northvale, N.J. 07647 201-767-1300

Studio Lighting. We supply everything but the electricity.



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

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



STRAND CENTURY INC

A COMPANY WITHIN THE RANK ORGANISATION

For More Details Circle (48) on Reply Card

News

(Continued from page 63)

discussed without the normal personal contact and interaction.

"In addition to the human factors, we will be evaluating the costs of limited satellite time compared to the normal travel costs for engineering, marketing and general management personnel," said Mr. Nunnally. "If this experiment proves practical, high-power communications satellites with low-cost ground stations at industrial facilities may eventually become commonly used for business conferences."

Slow motion replays Celebrate first decade

Today's televiewer is so accustomed to slow and stop motion replays of the key incidents in sports programs that it seems hard to imagine what television would be like without this sophisticated gadget. Surprisingly, this technique is only celebrating its first decade of existence this year.

The first commercial application of a magnetic disc capable of instant replay and stop action was through the use of an MVR Videodisc* in 1965 at the July 8 Baltimore Colts game covered by CBS. It was strictly monochrome and had no variable slo-mo capability.

Notwithstanding its early limitations, the TV Academy quickly recognized the program production merit of this new device and on May 22, 1966 awarded its developer, Kurt Machein, president of MVR their Emmy for technical achievement. By the end of that year, and in time for the World Series, variable slow motion was added and NBC could use this feature at the opening game between the Dodgers and the Orioles on October 4.

Within two years color was added and Ampex entered the market with their own version, the HS-100 disc recorder, based on similar principles but with extended time and capabilities.

Few major studios today do not use some form of video disc recorder for sports coverage or post-production special effects. The viewer gets the benefit of television imagery time expanded to show every detail of Hank Aaron's homers or Chris Evert's double-handed smash. For the TV commercial producer, programmed discs allow every kind of forward and reverse animation from full stop to a Keystone Kops speed up. Broadcast television depends more and more upon this magic magnetic disc to perform the daily miracles that capture and hold the viewers' attention on that color screen at home.

**Get Results
With Classified Ads
In
Broadcast Engineering**

BROADCAST ENGINEERING

It's NAB election time

The National Association of Broadcasters announced recently the nomination of 36 prominent broadcasters from throughout the nation for election to membership on its Board of Directors.

Of those nominated, 25 were designated as nominees for 12 seats on the 30-member Radio Board and 11 for six seats on the 15-member Television Board.

The 18 to be selected in mail balloting will serve two-year terms beginning on Wednesday, March 24, the concluding day of NAB's 54th annual convention in Chicago.

Ballots will be mailed to all NAB members later this month and are to be returned to NAB for tabulation by Feb. 17. Results will be announced the following day.

Nominees to the Radio Board are: District 2—(New Jersey and New York)—**William O'Shaughnessy**, president, WVOX AM-FM, New Rochelle, N.Y.; **Oscar Wein**, president and general manager, WDLC AM-FM, Port Jervis, N.Y.

District 4—(North Carolina, South Carolina and Virginia)—**William L. Eure, Jr.**, president and general manager, WSSV/WPLZ, Petersburg, Va.; **Carl V. Venters, Jr.**, president and general manager, WPTF/WQDR, Raleigh, N.C.

District 6—(Arkansas, Louisiana, Mississippi and Tennessee)—**Len Hensel**, vice president and general manager, WSM AM-FM, Nashville, Tenn.; **James M. Ward**, general manager WLAC AM-FM, Nashville.

District 8—(Indiana and Michigan)—**John R. Anderson**, president and general manager, WCCW AM-FM, Traverse City, Mich.; **Bazil O'Hagan**, vice president, WNDU AM-FM, South Bend, Ind.

District 10—(Iowa, Missouri and Nebraska)—**E. G. "Red" Faust**, president, KJAN AM-FM, Atlantic, Ia.; **R. M. McKune**, president and general manager, KTTR/KZNN, Rolla, Mo.

District 12—(Kansas and Oklahoma)—**Pat Murphy**, vice president and general manager, KCRC AM-FM, Enid, Okla.; **Robert L. Pratt**, vice president and general manager, KGGF, Coffeyville, Kan.

District 14—(Colorado, Idaho, Montana, New Mexico, Utah and Wyoming)—**Wayne Cornils**, president and general manager, KFXD AM-FM, Nampa, Ida.; **Frank Scott**, general manager, KTLK, Denver, Colo.

District 16—(Arizona and Southern California)—**Dan B. Speare**, general manager, KGEE/KGFM, Bakersfield, Cal.; **Jack Willis**, vice president and general manager, KHEP AM-FM, Phoenix, Ariz.

(Continued on page 66)

yes it's TRUE... the PRICE of Cross-Pulse & Color monitors HAS DROPPED

Now you can convert any monitor to a cross-pulse monitor with VACC's new \$345* model CPG-1 Cross Pulse Generator. Your monitor requires no modification. Fill out the coupon below for more information. At the same time, ask for a free copy of VACC's Troubleshooting Chart. This handy wall chart has actual photos showing typical video conditions such as normal sync with and without burst, time-base errors, overshoot, clipped sync, and many more. VACC's chart is a valuable aid when adjusting and troubleshooting video problems using a cross-pulse monitor.

If a video monitor is needed, install a VACC Electro-optical Isolator in a Sony receiver. A engineer or electronic technician can install a model A-1 in a 12", 15" and 17" Sony receiver in less than an hour. Model A1-A should be installed in a KV1711, KV1722 and all 19 inch Sony receivers. You add only one-half pound to your receiver and your Sony can be used as a high quality monitor or retained as a receiver by merely flipping a switch. Isolation is far superior to heavy transformer isolated monitors and you can connect up to 20 monitors without troublesome ground loops if all monitors have VACC isolators.

by popular request

NEW DEMODULATOR KIT

NEED AUDIO/VIDEO-OUT TO RECORD OFF-THE-AIR? Order VACC's new model D1 or D1A Optical Demodulator. Similar to, but smaller in size than the widely used VACC A1 or A1-A Optical Isolator, VACC's new optical demodulator kit is easy to install and has the same outstanding isolation and weight advantages. Use model D1 for Sony's KV1201, 1203, 1212, 1214, 1500, 1511, 1710 and CKV 171 and the D1-A for KV1711, 1722, 1910, 1922 receivers. Yes, you can install the A1 and D1 or A1-A and D1-A in the same Sony receiver to have a receiver monitor demodulator. Add VACC's Cross Pulse Generator and you can have all four functions using one CRT.



VIDEO AIDS corporation of colorado
112 West 4th Street, Loveland, Colorado 80537
phone (303) 667-3301

WORLD'S BEST 2.5 KW FM TRANSMITTER USING ONLY ONE TUBE

- USES (1) 5CX1500
- SOLID STATE EXCITER
- SOLID STATE IPA
- SOLID STATE SUPPLIES
- SOLID STATE CONTROL
- FM NOISE, -65 db
- 1/4 db, 30 H -35 KHz
- VAC.CAP. TUNING
- VAC CAP. LOADING
- NO SLIDING CONTACTS
- NO NEUTRALIZATION
- 2750 WATTS AVAILABLE
- NEEDS ONLY 5 1/4 sq. ft.
- COMPLETELY ACCESSIBLE
- FCC TYPE-ACCEPTED



ONLY THE WILKINSON FM-2500E HAS ALL THESE FEATURES YET IS PRICED LESS THAN \$11,600.00.

WILKINSON ELECTRONICS, INC.

701 CHESTNUT ST.
TRAINER, PA. 19013
TELEPHONE (215) 497-5100

For More Details Circle (50) on Reply Card

(Continued from page 66)

Class "A" (markets of 500,000 population or more)—**William W. Hansen**, general manager, WJOL/WLLI-FM, Joliet, Ill.; **David G. Scribner**, president, Doubleday Broadcasting, KHOW AM-FM, Denver, Colo.; **Lester M. Smith**, executive director, KJR/KISW, Seattle, Wash.

Class "B" (markets with populations between 100,000 and 500,000)—**Herbert W. Hobler**, president, WHWH/WPST, Princeton-Trenton, N.J.; **Ted L. Snider**, president, KARN/KKYK, Little Rock, Ark.

Class "C" (markets with populations between 15,000 and 100,000)—**J. R. Livesay**, president and general manager, WLBH AM-FM, Mattoon, Ill.; **Dick Painter**, general manager, KYSM AM-FM, Mankato, Minn.

Class "D" (markets with populations below 15,000)—**Bayard H. Walters**, president and general manager, WKCM, Hawesville, Ky.; **Jack S. Younts**, president and general manager, WEEB, Southern Pines, N.C.

(Thirteen Radio Board directors—nine from even-numbered districts and four at-large—have another year to serve. The remaining five directors are appointed to represent national radio networks.)

The Television Board nominees are: **Forest W. Amsden**, vice president and general manager, KGW-TV, Portland, Ore.; **David Baltimore**, president, WBRE-TV, Wilkes-Barre, Pa.; **Charles A. Batson**, president, Cosmos Broadcasting Corp., Columbia, S.C.; **Kathryn F. Broman**, president, Springfield Television, WWLP, Springfield, Mass.; **A. James Ebel**, president and general manager, KOLN-TV, Lincoln, Neb.; **Earl W. Hickerson**, vice president and general manager, WCEE-TV, Rockford, Ill.; **Douglas L. Manship**, president, WBRZ, Baton Rouge, La.; **Daniel T. Pecaro**, president, WGN Continental Broadcasting, Chicago, Ill.; **Mark Smith**, general manager, KLAS-TV, Las Vegas, Nev.; **Leonard A. Swanson**, vice president and general manager, WIIC-TV, Pittsburgh, Pa.; **Walter M. Windsor**, general manager, WFTV, Orlando, Fla.

Changes in the industry

Russ Johnson, Vice President and General Manager of the Panasonic Communications Division, Secaucus, N.J., announced the appointment of **Henry Suto** as Advertising Manager, Communications Division....Appointed Manager of Advertising, Sales Promotion and Publications, for RCA Electro-Optics and Devices in Lancaster, Pa., was **John F. Chattin**.

McMartin Industries, Inc., Omaha, Nebraska, has named **Charles F. "Chuck" Rockhill** as Western Sales Manager....**Edward King** has become Marketing Manager of the Hicksville, N.Y. Division of Amperex Electronic Corporation, a subsidiary of North American Philips Corporation....Elected as President and Chief Executive Officer of International Video Corporation, Sunnyvale, California, was **Ronald H. Fried**.

Zoom in!

ASTVC Welcomes Walter Cronkite and Tom Snyder

As Honorary Members

Walter Cronkite and Tom Snyder join Harry Reasoner as Honorary Members in the Society.

"I am greatly honored and I accept with pleasure my nomination as Honorary member in the American Society of TV Cameramen" wrote Mr. Cronkite as he accepted our nomination.

NBC's Tom Snyder wrote his letter of acceptance to say: "...I am highly honored by the consideration of the (ASTVC) as a nominee for Honorary Membership....I don't have to tell you...how pleased I would be to be a part of a group of men and women whose work I have always held in high regard. And without whom I could not do what I do..."

The ASTVC is equally honored to have these two gentlemen join our ranks. Plans for the future call for a dinner meeting where members of the Society and their guests can join in greeting our Honorary members and officially welcoming them into the ASTVC.

By the way, all members of the Society are encouraged to forward the names of those they believe, by virtue of their contributions to the industry, are worthy of nomination for Honorary membership.

EJ Cameras At La Guardia Tragedy!

EJ journalism demonstrated its newsworthiness, once again, when it covered the tragic explosion at New York's La Guardia Airport on the evening of December 29th. Crews from all the nets and many of the local stations were on hand to transmit and record the stark reality of this horror as it unfolded.

ASTVC's Art Weider was Taping NBC's Nightly News in New York and riding with the tape, preparing to have an uneventful "wrap", when the word came to prepare for

a break-in....Within minutes, a radio link with our crew at La-Guardia was setup and Art coordinated the very LIVE insert. To the average viewer, it would have seemed well-planned...well-re-

hearsed. Unsurpassed for timeliness ...Unbeatable for realism...EJ has come into its own.

PS: A word of praise must be given to the crews on the scene who
(Continued on page 68)



TOPS!

That's LPB's stereo S-13B console, our top-line audio control center. Features include:

- 18 stereo and 6 mono inputs.
- Step attenuator mixers.
- Telephone-type switches.
- Plug-in fiberglass circuits.
- Stereo 12 watt/channel monitor.
- Internal cue amp and speaker.
- All transformer input and output.

The features and quality of LPB's S-13B just can't be found in other consoles at comparable prices. Take a hard look at the S-13B before you make a mistake!

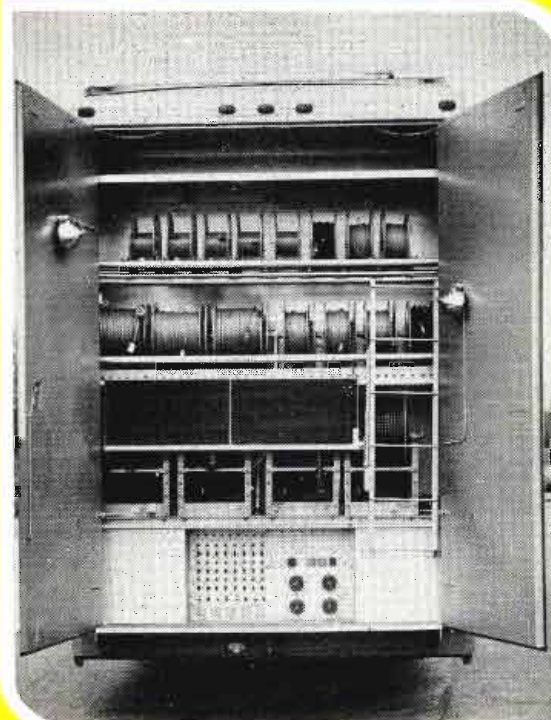
LPB has a complete line of mono consoles, too, and everything that goes with them. Call or write today for complete information.

LPB®

LPB Inc.
520 Lincoln Highway, Frazer, PA 19355
(215) 644-1123

See us at Booth #813, NAB

For More Details Circle (54) on Reply Card



WRAP IT TO GO

Microphone cable, coaxial cable, power cable. Wrap 'em on Hannay reels to go wherever your mobile equipment must go. Hannay reels make cable handling faster, easier and safer to help you set up sooner and stow the cable quickly when the show is over. Choose the reels you need from a wide range of standard and custom models. Send for complete information on Hannay Reels for broadcast cable.



HANNAY REELS

CLIFFORD B. HANNAY & SON, INC., WESTERLO, NEW YORK 12193

For More Details Circle (55) on Reply Card

(Continued from page 67)

operated professionally (if not calmly) with the threat of another bomb going off about their heads....

Hawaii Next?

With Alaska in and most of the major TV centers around the country boasting ASTVC membership, we were wondering when our most western state would get around to asking about membership.

Well, someone down at the Hawaii Production center has set the ball rolling....If all goes well, we may have our annual meeting under the palms, alongside the roaring surf....How about those (pine)apples?

**For Latest News
See
Direct Current page 4**

There are **2** great **CHYRON** systems

providing titling...graphics
for television production

CHYRON II **Electronic Graphics System,**

unquestionably the most advanced and versatile system available today...the one system that offers the highest character resolution and do-it-yourself capability for unlimited type font and logo preparation, plus more features than any other TV graphics equipment.

CHYRON III **Electronic Titling System,**

At a moderate price CHYRON III provides more flexibility and quality than higher priced units, including unlimited font and logo interchangeability, large message storage capability, and character resolution exceeded only by CHYRON II.

For complete information write:

VISIT US AT
NAB BOOTH
#501 B.

CHYRON

TELESYSTEMS DIVISION OF CHYRON CORPORATION

223 Newtown Road, Plainview, New York 11803 • 516 249-3296
851 Burlway Road, Burlingame, California 94010 • 415 348-1144

International Broadcasting School Planned

A minister who started a television network ten years ago with a three-dollar contribution has announced plans to build a \$23-million dollar international headquarters and communications school to teach broadcasting to students from around the world.

Dr. M. G. "Pat" Robertson, President of the Christian Broadcasting Network, has announced plans for the construction of a new headquarters site in Virginia Beach, Virginia. It will include two large television studios, a satellite-transmitting facility, an office complex, a 2,400-seat conference center, an International Institute of Broadcasting to train students from around the world, and a School of Theology.

The complex will be built over several years on a 142-acre tract of land acquired New Year's Eve.

"What we intend to do," said Rev. Robertson, "is to train Christians from around the world in all phases of the broadcasting industry. When they return to their home countries, they will have both the technical know-how and the Christian commitment to use broadcast for the betterment of mankind, and their home nations."

Robertson is host of the internationally-syndicated "700 Club" television and radio program broadcast on approximately 50 television and 70 radio stations in the United States and overseas.

His network won the coveted "Best Stations Award" from the National Religious Broadcasters Association in 1974, and has won the 1975-76 Distinguished Merit Citation from the National Conference of Christians and Jews.

He pioneered the television-telephone counseling concept in the early 1960's with his "700 Club" television program. As an outgrowth of that ministry, the Network now operates more than 40 counseling centers which answered more than three-quarters of a million phone calls for help nationwide last year.

For More Details Circle (85) on Reply Card

FEBRUARY, 1976

CABLE engineering



NCTA Seeking Nominations

Technical Awards

The National Cable Television Association is seeking nominations for its annual technical achievement awards, one in technical operation and one in engineering or manufacturing.

The awards, made for the past three years, honor individuals who have made a lasting contribution to the cable television industry. The selection of award winners will be made by a special selection board of the Society of Cable Television Engineers. Award winners will be honored at a reception during the NCTA Annual Convention, April 4-7 in Dallas, Texas.

Previous winners have been: I. Switzer, Switzer Engineering, Ltd.; Henry Diambra, Westinghouse Research; Hubert Schlafly, Trans-Communication Corp.; Donald Levenson, Wheeling Antenna Co. and Keneth Simons, Simons and Wydro Associates.

Nominations, accompanied by a brief biography and comments on the nominee's contributions, should be sent to Delmer Ports, NCTA Vice President for Engineering, not later than February 1.

Leapfrogging Action

Removal of cable television "leapfrogging" restrictions is "a major positive development for the cable TV industry and its subscribers," according to Robert L. Schmidt, president of the National Cable Television Association.

Schmidt also said that the Federal Communications Commission decision on December 19 to lift its signal importation limitations is "an endorsement of the Commission's stated goal to de-regulate cable TV."

"The FCC action makes development of cable TV in some larger markets viable," Schmidt said.

Friday's FCC decision permits CATV systems to use independent

broadcast television signals from anywhere in the country to make up a complement of allowed signals. Previously, the FCC restricted CATV systems located in the nation's 100 largest markets to carrying signals only from one of the two nearest top-25 markets. The FCC action does not change the limitations on number of independent channels which may be carried (maximum of three in the top-50 markets; two in the next 50 markets), nor does it change the rule that the third imported independent signal in the top-50 metro areas is only allowable if there is no local independent station. The FCC action also continues the requirement that if a third independent station is carried, it must be a UHF

station if one is available within 200 miles.

Schmidt predicted that the leapfrogging relaxation will be the stimulus needed to encourage construction of CATV systems in markets which had until now been unattractive because of the limited choices of independent signals available to them.

Schmidt also noted that in some markets it will become economically feasible to carry signals from distant cities because microwave facilities are already in place carrying signals to intermediate locations. This will allow more choice of stations and more economical microwave routing to bring in the signals.

More speakers available Through new NCTA bureau

Cable television speakers will be available to more audiences through the ambitious new Cable Television Speakers Bureau established by the National Cable Television Association.

The "Speaking of CATV" project will make speakers available to non-cable industry meetings, including those of trade associations, civic and fraternal organizations, schools and similar groups.

"One of NCTA's major goals is to make the public aware of the cable TV industry," NCTA President Robert L. Schmidt explained. "The Speakers Bureau will enable us to schedule industry leaders on a variety of programs around the country."

CATV industry spokesmen — including members of the NCTA Board and Committees, cable TV company executives and NCTA staff members — will be available to discuss the status of the cable TV industry and specific issues

about CATV development, Schmidt said. A basic package of materials has been assembled at NCTA, but all speeches will be tailored to specific audiences.

Schmidt called the public information goal one of his top priorities in developing CATV's image throughout the country. He said it is part of NCTA's on-going program to acquaint the public with the issues involved in the growth of cable TV.

NCTA is informing trade groups, educators and business organizations of the availability of Speakers Bureau representatives, Schmidt said. The NCTA Public Affairs Department will schedule speeches and assist in the production of support material for speakers.

Information about the Speakers Bureau is available from the Public Affairs Department, NCTA, 918 16th St. NW, Washington, D.C. 20006.

NOW! LOW-COST CHARACTER GENERATORS



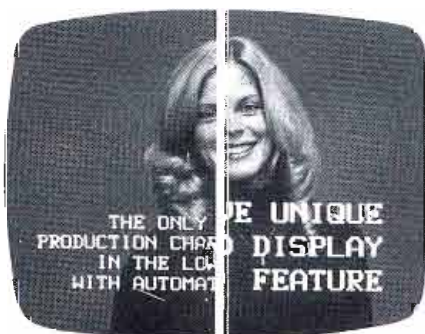
**developed for cable
operators by a cable operator.**

Some years ago, KSN found it difficult to justify the conventional \$12,000 character generator for its own cable systems. So, ignoring the conventional engineering approach and using an entirely new concept, based on the most modern electronic logic, KSN developed a series of new, unique character generators

at a much lower cost.

They're clean and attractive-looking on the outside; and inside, there's a simple, long-lasting, dependable, low-cost workhorse that will set competitive standards for years to come. Custom modifications can be made at extra cost.

THE NEW MESSAGE MASTER!



The new Message Master has eight 12-line pages of storage, optionally expandable to 40 pages built into the keyboard. Masking allows display of only 1, 2, or 4 lines at a time, with unique display advance that

limits the advance to the number of lines displayed, allowing line-by-line use of the memory.

Other functions include: word flash, word or line underline, automatic centering, and two-speed roll or crawl through all or part of memory. Switch to a choice of two display sizes: 12 lines of 32 characters or 6 lines of 16 characters. Preview monitor fed with white letters on blue background. Horizontal edging gives distinct white lettering even on light background. This unit is ideal for HOME BOX OFFICE marquees.

Information about the KSN Weather Master — designed for use with wire from U.S. Weather Bureau — and the News Master — use with UPI or AP cable news services — is available in our brochure.



CHARACTER GENERATORS

Kansas State Network
Write KSN, Box 333, Wichita, Kansas 67201

**Yes, send me a free copy of the KSN
Character Generator brochure by return mail.**

NAME

TITLE

PHONE

STATION OR FIRM

ADDRESS

CITY

STATE

ZIP

FINALLY YOUR VIDEO SUPPLY AND ACCESSORY PROBLEMS ARE OVER.



The solution is as near as your telephone. And as easy as dialing our number. Because we stock the most extensive variety of video supplies and accessories you'll find anywhere. From alignment aids to zip cord. Simple things like gaffer tape, adapters and ready-made cables...to graphic tools, maintenance supplies...all the way up to lighting kits, intercoms and test equipment. Plus just

about everything you can think of in between. (Enough to fill a book, in fact.)

The book — our catalog — is yours for the asking. So is our fast, friendly, personalized service. Talk to us next time you need anything in video supplies or accessories. You'll see we live up to our name.

Comprehensive

SERVICE CORPORATION

18 WEST 61ST STREET, NEW YORK 10023 (212) 586-6161 • 829 NORTH HIGHLAND AVE., HOLLYWOOD CA 90038 (213) 462-0969
CALL TOLL FREE 800-223-5460 EXCEPT IN NEW YORK STATE AND LOS ANGELES METRO AREA.

For More Details Circle (39) on Reply Card

In Nashville . . .
these Harris
stacked television
antennas broad-
cast two VHF sig-
nals from the
same tower.

Harris custom-designed
and tested stacked anten-
nas installed for WNGE-TV
Channel 2 and WDCN-TV
Channel 8, Nashville,
Tennessee.

For a TV antenna to meet
your specific requirements,
write Harris Corporation,
Broadcast Products
Division, Quincy, Illinois
62301.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING



For More Details Circle (56) on Reply Card

February, 1976

NEW PRODUCTS

EBS Equipment

Broadcast Engineering Tech-
niques, in Providence, Rhode Is-
land, is introducing its model
EBS-100. BET's approach to the
re-regulation of the Emergency
Broadcast System's methods for
alerts and detection of alerts is
unique and highly logical, using
digital techniques in all frequency
generation, decoding, and timing
functions.

Precision, temperature-compen-
sated IC square-wave oscillators are
used in the generator, with maxi-
mum frequency deviation of 0.3
Hz., and Total Harmonic Distortion
less than 3% at +8dBm output.

Instead of the common tuning
fork technique, BET's decoder utili-
zes two CMOS digital comparators,
matching incoming material to the
generator's accurate reference for
identification as the EBS signal.

The encoder-decoder (with op-
tional AM receiver) is in a single
unit, occupying 3½ vertical inches
of normal rack space. The front
panel, in addition to controls, is
provided with a speaker and LED
indicators for Power, Generate, and
Decode.

The Generate control, on the
front panel, is switchguarded, pre-
venting inadvertent activation. Fur-
ther, an Interrupt function is
provided to disengage the genera-
tor. The Reset control mutes the
speaker and resets the decoder
section to the "ready" state.

For More Details Circle (86) on Reply Card

Dual Cue Controller

A new "chase" feature for the
EECO Dual Cue Controller (BE-
460) when used with the Wide
Range Synchronizer (BE-450) has
been announced by **Ampex Cor-
poration**, exclusive worldwide dis-
tributor for EECO broadcast
products.

The new feature allows the user
to select either one of two tape
transports to chase the other in a
"follow-the-leader" mode during

(Continued on page 75)

MARTI . . . The Name to Remember . . .

RADIO REMOTE PICKUP 150 - 450 MHZ



**RPU
Transmitter**

PARADES • SPORTS
RECORD HOPS • NEWS
COMMUNITY
EVENTS
SUPPER CLUBS
RESTAURANTS
RELIGIOUS
SPECIAL EVENTS • OPEN
HOUSES • SALES • WATER
CARNIVALS • FAIRS

**\$975.00 (150 MHZ)
\$1145.00 (450 MHZ)**

FEATURES: • All Solid-State • Direct FM Modu-
lator • Broadcast Quality — Continuous Duty
• Four Audio Mixing Channels • Plug-in Modu-
lar Construction • I.F. Crystal Filter • Taut Band
Meters

Radio Remote Pickup Equipment is versatile,
dependable and an entree to profitable radio
broadcasting. That is the acclaim given to Marti
RPU Equipment by American Radio Broadcasters.
"How did we ever operate a radio station with-
out it?", is the comment most often heard after
equipment has been purchased and put into
service.

The progressive minded, community spirited
broadcaster, can find many uses for Remote
Pickup Equipment. He will do many more re-
motes than he is presently doing, simply be-
cause the equipment is available at a moment's
notice. To coin an old cliché, "It doesn't cost —
it pays."

Add Color to Your Remotes . . .

PORTABLE BROADCAST REMOTE PICKUP TRANSMITTER

Model RPT-1

\$495.00 (150 MHZ)

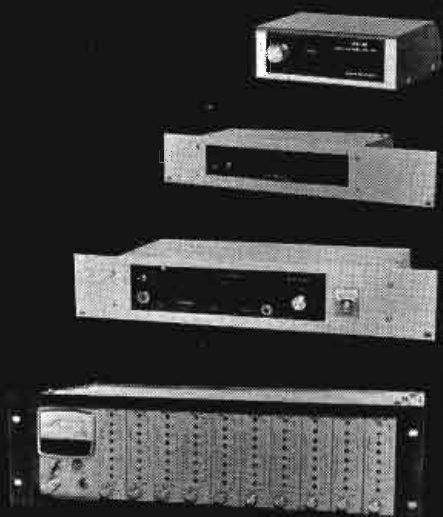
FEATURES: • Portable operation on internal re-
chargeable nickel-cadmium battery. Total weight
only 5¼ lbs. • All Solid-State • Built-in battery
charger • Dual frequency operation (One crystal
included) • Meter indicates battery condition
and modulation • Whip antenna mounted di-
rectly on unit • Broadcast-quality Compressor/
Limiter handles toughest remote pickup condi-
tions • Two microphone inputs (one push-to-
talk) and one Hi-Level input each with individ-
ual mixing gain control

COMPLETE LINE OF ACCESSORIES AVAILABLE

MARTI Electronics, Inc.
Box 661 • Cleburne, TX 76031 • 817/645-9163

For More Details Circle (57) on Reply Card 73

Audio Distribution...



...made easy!

Six different audio DA's designed to solve all of your distribution problems.

From our table top 1 in/6 out to our powerful 20 in/80 out. Stereo or mono operation, output metering, individual level controls and balanced inputs and outputs are just a few of the many features found in these superb DA's. Performance? Response — 10 Hz - 20 KHz ± 0.5 db; Dist. — 0.1%; Output level — +20 dbm max; Signal/Noise — -90 db; Channel separation — 80 db. Quality? All RAMKO products are backed by our 10 day free trial and 2 year warranty. They have to be good to do that.

Call collect or write today!

Models & Prices

DA-6/E 1x6 (table top)	\$ 145
DA-6R/E 1x6 (rack)	\$ 165
DA-6BR/E 1x6 (rack, indiv. cont.)	\$ 179
DA-6RS/E 2x12 (rack)	\$ 239
DA-16BR/E 2x16 (rack, meter, etc.)	\$ 295
DA-2080 up to 20x80 (rack)	\$325 - \$1,675

RAMKO RESEARCH

3516 C LaGrande Blvd.
Sacramento, California 98523
Telephone (916) 392-2100

For More Details Circle (58) on Reply Card

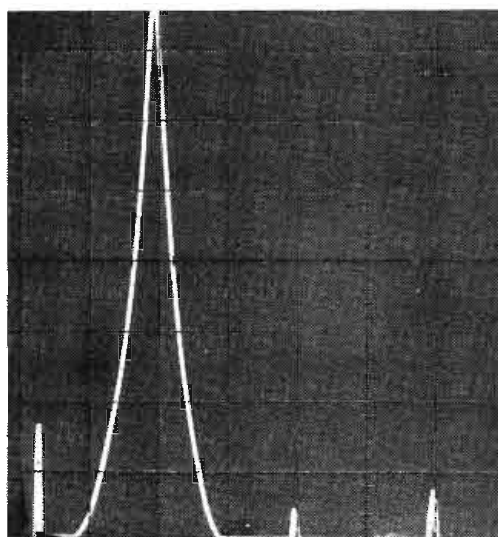


Figure 4a Encode THD with 1 kHz 0 dBm input (.0%).

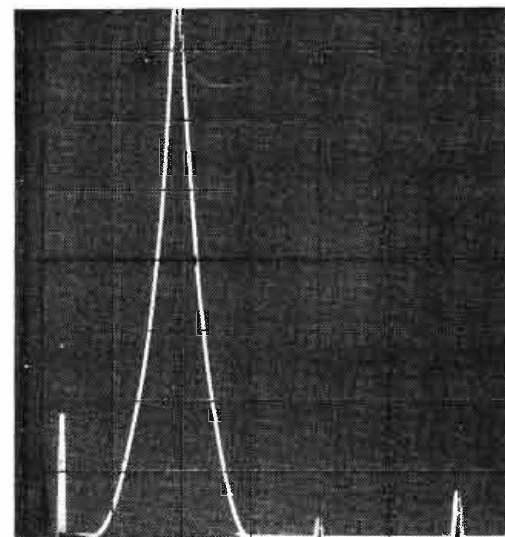


Figure 4b Decode THD with 0 dBm 1 kHz input (.0%).

(Continued from page 52)

the equivalent input noise at -90 in the decode mode. The advantages of the linear decibel system are obvious, in that level matching is not at all critical.

The preemphasis and deemphasis are fixed, as shown in Figure 2. Notice that if the O.V.U. reference level is exceeded at the encode input, the unit will bring the level down and then expand it back up in the decode mode so that about 10 dB of extra headroom can be obtained. As long as the input and output levels are a nominal O.V.U., the area from 0 reference to overload will be a mirror image when encode and decode gain is compared.

Below the 0 reference level, the unit will track accurately, even if the encode and decode inputs are badly mismatched because the gain function is a constant double the dB's going in and half the dB's coming out.

The dbx system also uses r.m.s. detectors so that the level sensing is not affected by phase shifts in the program material as would be introduced by a tape link.

The block diagram shown in Figure 3. illustrates how all of these functions are accomplished. Notice that the inputs to the r.m.s. detectors in the encode and decode function contain pre and deemphasis like the program channels so that tape saturation can be avoided when recording high level passages with lots of high frequency content.

The detectors are also bandlimited so that they will only track audio and not sub-audible record warp, rumble, air noise, etc. The band-pass of the audio channels is flat

within ± 0.5 dB from 20 to 20,000 Hz.

Frequency Response

To check the frequency response of the unit, we first measured the response of the test tape deck, a Scully 280, by itself with the dbx in the bypass mode. We recorded the record/play response error for reference and then made a dbx encoded tape on the same machine. This tape was then played back through the decoder and the difference between the bypass and encode/decode response was plotted as the dbx frequency response error.

Since the dbxII operates in the encode or decode mode, but not both simultaneously, it is not possible to simply feed tones into the input and monitor the output. This is not an operational handicap, however, because the response of the dbx is so flat that no tape deck equalization compensation is required, so, the bypass mode can be used for routine tape deck adjustments.

Figures 4a and 4b show relative second and third harmonic levels for each mode of operation. The measurements were made on a Tektronix 5L4N spectrum analyzer in a 5301 storage scope. The equipment was adjusted for a 10 dB per division display and as can be seen from the photos, the second and third harmonics are below -70dB.

The blip at the left of the fundamental is a start of trace pulse and unrelated to the distortion components. The manufacturer specs

(Continued on page 76)

fast forward and rewind operations.

This feature is in addition to the original capability of cueing two transports (master and slave) automatically to any selected point either individually or simultaneously. Also a code verification routine has been added to improve overall system operations.

With the new modification, two multi-track audio recorders can be used as a single recorder with double the track capacity.

The EECO system allows audio sweetening of video tape to also be "lip sync perfect" even when helical dubs are used for visual reference as the new audio is developed.

It also permits video and FM stereo tapes to be kept in exact sync during musical simulcasts.

Control is based on identical SMPTE/EBU Edit Code indexing recorded on one channel of each tape. Synchronization is exact for any tape lengths, regardless of normal tape stretch or slippage.

List price of the "chase" feature update kit is \$985 each. The price of the BE-460 Dual Cue Controller including the new "chase" feature remains unchanged at \$5,500. Delivery is 60 days ARO.

A four-page brochure describing the EECO Time Code Synchronization system is now available at any Ampex sales office, or at EECO Broadcast Products Group office, 1441 E. Chestnut Ave., Santa Ana, California 92701.

For More Details Circle (106) on Reply Card

Digital Multimeter

This new 3½ digit, five function, fully autoranging digital multimeter from Hewlett-Packard sells for only \$225. Voltages are measured from ± 100 microvolts to ± 1000 volts DC and from 300 microvolts to 700 volts rms AC. Resistance is measured from 1 ohm to 11 megohms. Current can be measured from 100 microamperes to 1.1 ampere DC and 300 microamperes to 1.1 ampere AC. Autozero, autopolarity and autoranging are built in.

This combination of features at a low price has been achieved through a major technological advance, according to William E. Terry, vice president and general

manager of Hewlett-Packard's Instrument Group. "Our development of fine-line, tantalum nitride resistor technology has enabled us to eliminate the use of more costly discrete precision resistors. Using this new technique, we are now able to offer this high-quality, compact DMM with features such as five functions with full autoranging at a very low price," says Terry.

Typical accuracy for DC voltage measurements is 0.5%. DC current accuracy is 1.0%. On AC voltage ranges, frequency is specified to 10 kHz, while AC current measurement is to 5 kHz. Accuracy of resistance measurements on the three highest ranges is to 0.6% and to 0.4% on the two lower ranges. Open circuit voltage is less than 4 volts.

Input resistance on all voltage ranges is 10 megohms with input capacitance of less than 30 picofarads. The 3476 is protected to 1100 volts peak on all ranges. The fuse that protects the ohms function is rated 250 volts rms. The current function is fuse protected to 1.5 amps. No special fuses are

required and they can be quickly replaced without disassembling the instrument.

A range hold feature is included that allows the instrument to be locked to any desired range. This feature is necessary when measuring diode resistance for example. It also makes repetitive measurement faster. The LED readout gives all voltage readings in volts, all resistance readings in kilohms and all current readings in amperes.

Ruggedness is assured with the high impact resistance polycarbonate case. A three-position bail gives the user flexibility in placing the 3476 for most convenient use.

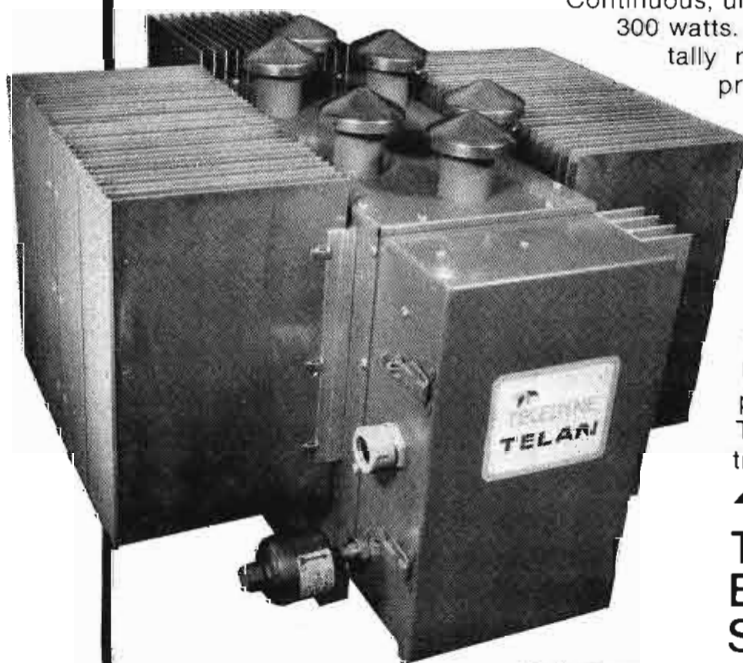
Model 3476A is AC line powered only; Model 3476B is AC line powered and also includes rechargeable nickel cadmium batteries. Typical operating time on fully charged batteries is 8 hours.

Both units measure 6.5 cm (2.3 in.) high, 16.8 cm (6.6 in.) wide and 20.6 cm (8.1 in.) deep. Model 3476A weighs 0.71 kg (1 lb. 9 oz.) and Model 3476B weighs 0.91 kg (2 lb.).

For More Details Circle (87) on Reply Card

UNATTENDED, SELF-CONTAINED, POWER SOURCE to 300 WATTS

so reliable there are no trade-offs to consider

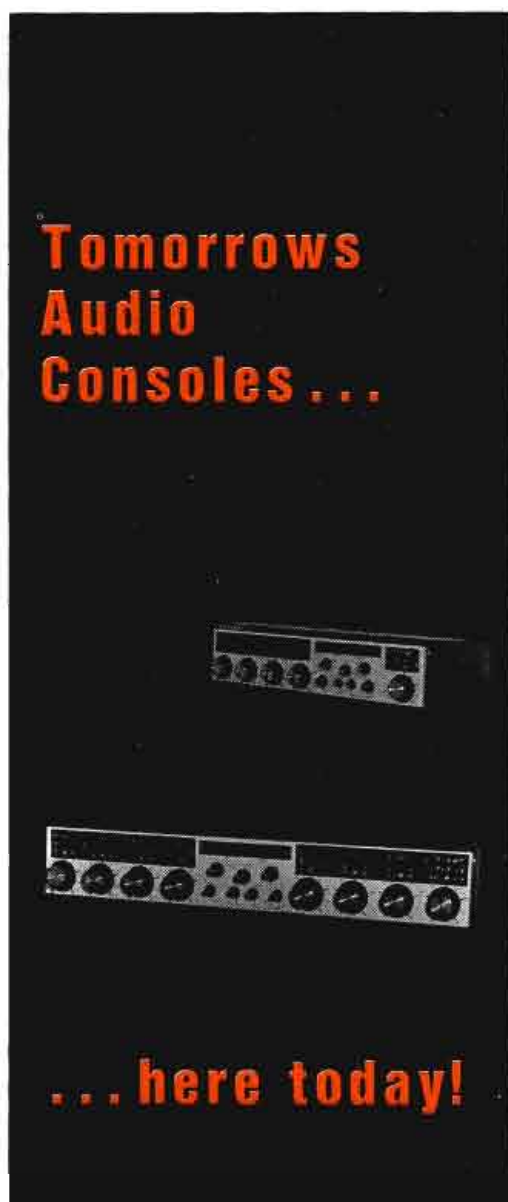


Continuous, unattended power 10 to 300 watts. That's TELAN. So totally reliable and weather-proof, it'll operate in the most remote and inaccessible locations for months without even a maintenance check. Install it in an hour or two, light a match and forget it. No moving parts and it won't flame out. Uses natural gas, propane or butane fuel. TELAN Thermoelectric Generators.

**TELEDYNE
ENERGY
SYSTEMS**

110 W. Timonium Rd., Timonium, Md. 21093
Phone: 301-252-8220 Telex: 8-7780 Cable: TELISES

For More Details Circle (59) on Reply Card



The biggest advance of audio control in the last 15 years.

Totally DC controlled for noiseless switching and audio mixing. Lighted touch pad switching eliminates mechanical noise and breakdown. Advanced solid state light emitting "VU" meters. Cermet mixers and level controls for years of trouble free operation. Plug in amplifier cards. Full range input gain select from mic thru high level. All inputs and outputs balanced. Distortion — 0/3%; Response — +0, -2 db, 20 Hz - 20 KHz; Noise — -65 db (mic inputs). Flexibility? Complete complement of accessories for input expansion, equalization, remote control, etc.

10 day free trial and 2 year warranty.

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

Models & Prices

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

RAMKO RESEARCH

3516 C LaGrande Blvd.
Sacramento, California 95823
Telephone (916) 392-2100

For More Details Circle (60) on Reply Card

(Continued from page 74)

The front panel bypass switches proved to be a welcome convenience, because much radio production work consists of transferring ad agency masters to carts. These tapes are unprocessed of course, and must be reproduced as they are, but the cart recording can be encoded so that the air product is essentially limited only by the quality of the master that the station receives.

dBm and since the unit is set up for unity gain, the output noise should also be -90 dBm. Our test unit measured -94 dBm, which is a s/n ratio of 98 dB. Overall, we found the unit to be state of the art in audio performance and conservatively rated by the manufacturer.

For the next phase of our tests, we installed the unit in the production studio at WLAK-FM in Chicago to wring it out in actual broadcast use. Our main concern was whether the unit could really affect a worthwhile reduction in noise level without having any audible effect on the program material. We recorded several segments of program material from discs onto tape through the dBxII and slowly faded the end of each selection to -60 dB so that the only signal remaining would be tape noise which we could reference to the program level of the music that was recorded before the fade.

Even when played at threshold of pain levels, the noise was inaudible; a frankly startling demonstration of the effectiveness of the system. We found that on even multiple generation the tape hiss was no longer a factor and lower recording levels could be used to obtain great headroom. We preferred to record at 3 dB below normal recording level to keep the tape distortion at insignificant levels.

Next, we compared the dbx tape copy to the original disc in instant A/B testing to see if we could detect any alteration of the original material. In everything from Elton John to Percy Faith the tape duplicate was exact in dynamics, response and clarity. The number of generations that can be tolerated is really limited more by accumulated tape drop-out (which no noise reduction system can restore) than by accumulated tape noise when the dbx system is used.

Unit Applications

Some less obvious broadcast applications for the system are made possible by the remote control feature of the unit. The bypass function can be remoted so that audio sources that are encoded can be alternated with audio sources that are not with a single unit doing all of the decoding. The decoder would be placed in an audio line that carries all of the signal sources, such as the automation system output, and switched on and off bypass as the sources require. A pair of these units could also be used by a station with marginal noise level telco loops. If the loss in the lines brings the signal level down close to the noise floor, the engineer has historically been forced to opt for repeaters in the lines because, after all, you can only drive those things so far before cross-talk becomes a factor.

With the telco repeaters, most long lines can then be brought up to the 60 dB standard, but then the lines are no longer passive and the telephone company must be depended upon to maintain a device that affects the station's overall audio performance. With a noise reduction system encoding on the studio end and decoding on the transmitter end (before the limiter), a whopping 30 dB noise reduction can be achieved with state of the art audio quality and no one else's quality control to depend on.

An additional bonus of this system comes at proof time because the high frequency audio distortion tests are usually clouded by noise, since even a 5 kHz tone will ride on the line at -8 dB or so, as the signal input is reduced to keep the modulation constant in inverse to the 75 usec. preemphasis curve. The dbx system is **not** an AGC amplifier, since the level coming out is the same as the level going in, and therefore can remain on line at proof time. Microwave S.T.L.'s could be optimized in the same way, of course.

In summary, we can say that the dbxII noise reduction system is based on sound theory, is manufactured to exceed its specifications. Space does not allow a complete review of the other obvious applications like remote broadcasts and high speed tape duplication etc. □

Microphones

Shure Brothers, Inc., Evanston, Illinois, has combined efficient background noise control and quality vocal pickup and transmission in two new, lightweight head-worn microphones for studio and remote professional broadcasting applications.

The new units are available as the Model SM10, which consists of a headband and microphone only, and the Model SM12, which has a headband, microphone, and earphone and is designed for applications where it is important for the user to receive as well as transmit. Also available is an accessory cough button, Model A10CH.

Both units feature unidirectional pickup patterns that reject unwanted background noise and miniature windscreens that block out wind noise and explosive breath sounds.

The SM10 and the SM12 are low impedance models, allowing extra-long lengths of microphone cable to be used. To prevent the microphone wires from getting in the way, each microphone is equipped with a snap-on connector that fastens to the user's belt or shirt. For maximum flexibility, the microphones are engineered to pivot and extend to fit any head and face.

For More Details Circle (88) on Reply Card

Cartridge Tape Machines

The introduction of a completely new line of broadcast audio cartridge tape reproducers and recorders has been announced by Charles E. Collett, Beucart Division Sales and Marketing Manager. **UMC Electronics Co.**

Each Beucart features the patented pancake hysteresis synchronous direct drive motor developed by UMC's Beau Motor Division. This motor represents a new breakthrough in the areas of size, weight, temperature rise, and power consumption. It provides substantial assistance in reducing Beucart's flutter and wow. The Beucart line of cart machines meet the newly adopted NAB standards for this type of equipment.

Two basic Beucart models are available, each in mono or stereo, record or playback, for either desk

or rack mounting. The Type 10 for A-size cartridges, measures a trim 3½" high x 5¼" wide x 15" deep and may be mounted three units across in a standard 19" rack. Record/playback combinations are mounted side-by-side for either desk or rack use. However, this model may be stacked one above another in various combinations to meet demanding customer applications. For processing A, B, and C-size cartridges, a Beucart Type 20 is available with dimensions of 3½" high x 10-1/8" wide x 12¼" deep. Units may be stacked one above another in different configurations.

UMC's Beau Motor Division has been serving the broadcast industry since the early 1960s and was instrumental in developing the first direct drive audio cartridge machines.

For More Details Circle (89) on Reply Card

Monitor Power Amplifier

A new compact 25-watt solid-

CAIRO LONDON MOSCOW

THE NOVA 5060-12 WAS THERE WITH PRESIDENT NIXON AND THE MAJOR TV NETWORKS; COVERED PRESIDENT FORD'S MISSION TO CHINA.



NOVA SOLID STATE INVERTERS OPERATING FROM BATTERIES PROVIDE STABILIZED AC POWER TO OPERATE REMOTE BROADCAST EQUIPMENT, TV MONITORS, TAPING EQUIPMENT, AND TELEMETRY.

AVAILABLE IN 12 AND 24VDC MODELS FROM 125VA TO 1KVA.

Need one in a hurry?

CALL US COLLECT FOR SAME DAY SHIPMENT.



ELECTRIC MANUFACTURING CO.

A subsidiary of Nova Industries, Inc.

263 Hillside Avenue • Nutley, N.J. 07110

(201) 661-3434

For More Details Circle (61) on Reply Card

MC MARTIN announces LOW FM MONITOR PRICES

FM MODULATION

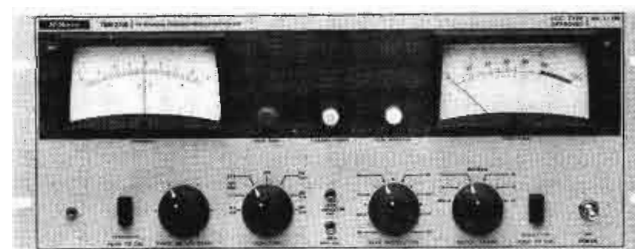
TBM-3500B



with STEREO or SCA (TBM-2200A or TBM-2000B) \$2,625.00
with STEREO and SCA (TBM-2200A & TBM-2000B) 3,950.00
for "OFF-AIR" drive, add the LL-35B 180.00

FM MODULATION and FREQUENCY

TBM-3700



with STEREO or SCA (TBM-2200A or TBM-2000B) \$2,810.00
with STEREO and SCA (TBM-2200A & TBM-2000B) 4,135.00
for "OFF-AIR" drive, add the TBM-2500C 533.50

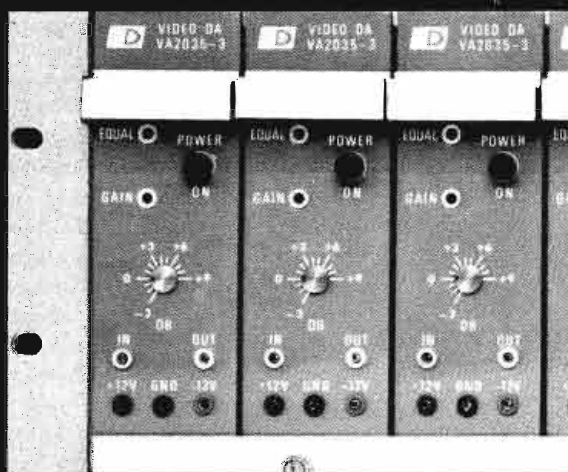
Compare features, prices and see us at Booth 609, NAB/76

McMartin

4500 South 76th Street Omaha, Nebraska 68127 (402) 331-2000 telex 048-485

For More Details Circle (62) on Reply Card

CDL/DA's



* shown

VIDEO EQUALIZING* PULSE

Specifications

- So good they have been the "standard equipment" in a major Network for 8 years.

Flexibility

- Electrically and Mechanically interchangeable
- 6 outputs
- Loop through input

Reliability

- Self-Powered
- Drift-free operation
- Thousands in use today throughout the world.

Rugged

- Extruded milled aluminum housing with stainless cover.
- Mount in rugged frames: 10 DA's per 3 RU frame and 3 DA's per 1 RU frame.

Price

- Superior performance and quality at competitive prices.

Availability

- Stock to 30 days.

For immediate additional information call:

Canada: 514-697-0811
U.S.A. (N.J.): 201-767-1300
Chicago: 312-991-4720
Los Angeles: 213-789-0574



CENTRAL DYNAMICS LTD

For More Details Circle (63) on Reply Card

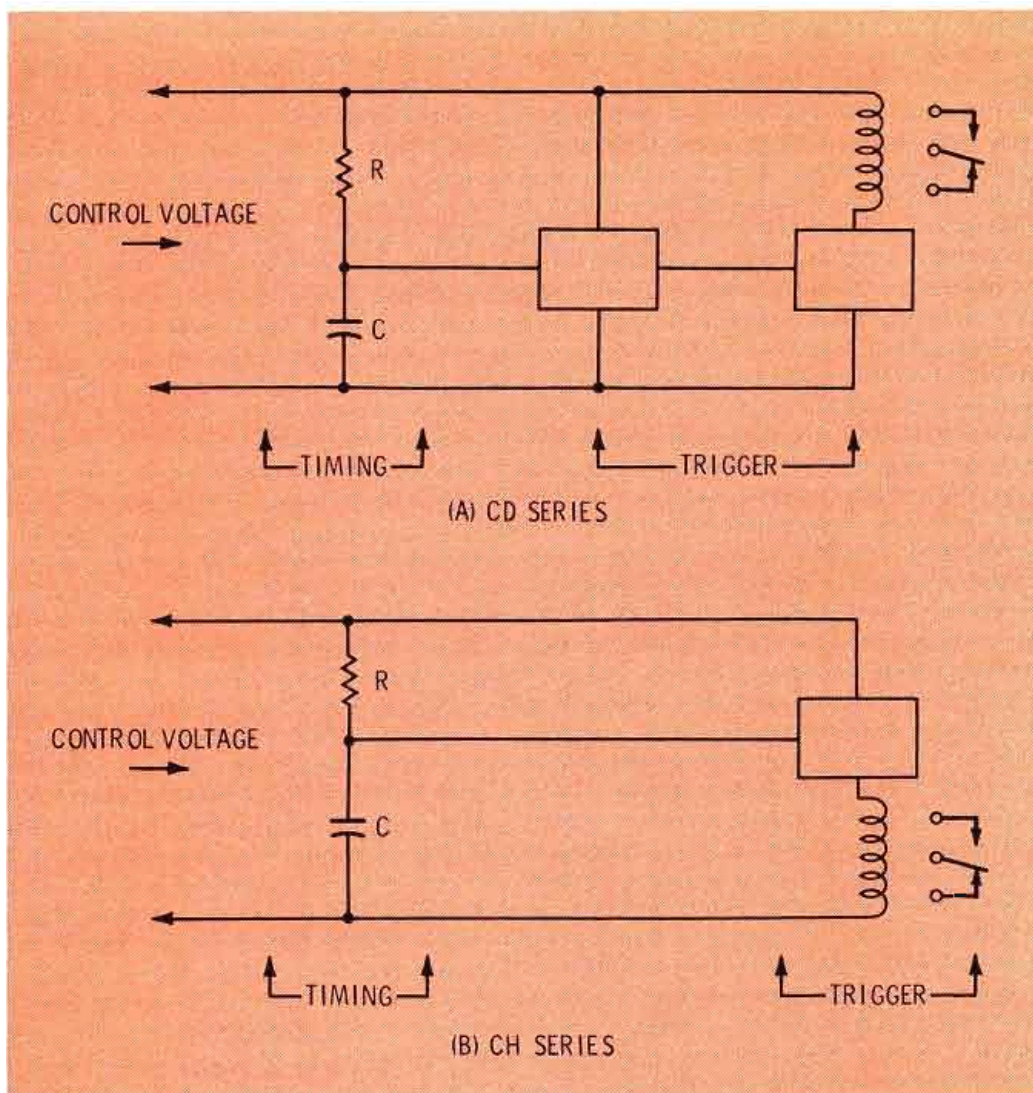


Fig. 3 Two time delay versions of Potter-Brumfield. R/C timing and solid state trigger in the input will cause either a delay in turn-on (A), or a delay in its release (B).

(Continued from page 50)

Microtronics Corp. M-272 "DIGILAY". This unit has internal solid state circuitry that will allow it to act as a Time Delay, Flip-Flop, Pulser, and may be 'locked' to the 60 Hz power line. There is enough memory incorporated that will allow it to provide up to 9 hours of delay actions. Its contacts will switch 120 V AC at 10 amps.

The relays just discussed are relatively large. The small ones operate at lower power levels. For example, the Magnecraft® class 505Q1C is an all solid state relay in a DIP package for mounting directly on a PC Board. This relay is capable of Timing-Switching-Latching, all in the one package.

Those relays mentioned previously are only a few of the many varieties available today, and there are many other areas of application other than simple/SPST switching.

Packaging:

A great many of the SS relays are

packaged in encapsulated form. Those designed as simple SPST switching of load voltages to 480 VRMS, even with all the solid state circuitry including ZVS Logic, are encapsulated in a small form with simply 4 terminals—two for the input and two for the load voltage. One such relay is the Crydom Controls (IR) model D4808 which can switch 480V RMS at 8 amps from TTL or DTL Logic, and is encapsulated in a size approximately $2\frac{1}{2} \times 1\frac{3}{4} \times \frac{3}{4}$ inches. It has 4 terminals and two mounting holes. Another model, D2404 can switch 240V RMS at 40 amp loads and is mounted in the same size case. Many of the very small relays are in packages that allow direct mounting to the PC Board and the pins solder directly to the wiring traces as do any IC.

Larger Time Delay relays are mounted in larger packages with removable covers, and these may be on plugs for plug in service or straight chassis mount. If faulty action occurs in this type relay,

(Continued on page 80)

BROADCAST ENGINEERING

ANTENNA IMPEDANCE MEASUREMENTS WITH INTERFERENCE IMMUNITY

The Model SD-31 Synthesizer/Detector Is...

NEW

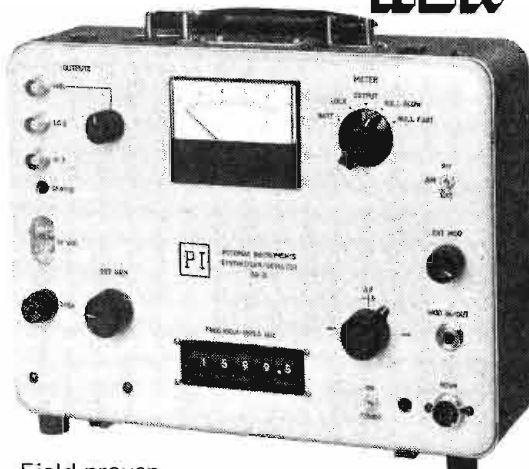
... designed for antenna impedance measurements in presence of strong interference ■ High-level oscillator compatible with General Radio 916 Series, 1606 Series, and Delta OIB-1 Impedance Bridges ■ Special coherent detector circuit rejects interfering signals during measurements ■ Crystal controlled 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 ■ Price: \$1250 complete with RX-31 Receiver — \$995 without Receiver.



CONTACT US FOR DETAILS.

POTOMAC INSTRUMENTS

932 PHILADELPHIA AVE.
SILVER SPRING, MD. 20910
(301) 589-3125

For More Details Circle (64) on Reply Card

The Model F62500 is housed in a compact chassis with brushed-aluminum front panel. Up to five of these amplifiers can be mounted in the company's 662 PM 5¼ by 19 in. rack-mounting frame.

Some important specifications of the amplifier are: power output (8-ohm load), 25 watts continuous; power output (16-ohm load), 15 watts continuous; harmonic distortion at full power, 0.4 percent; frequency response, ± 1 dB from 20 to 20,000 Hz; hum and noise, 85 dB below output; and input voltage for full output, 0.4 volt.

For More Details Circle (90) on Reply Card

Adjustable Bridging Mic Attenuator

The first adjustable, bridging microphone attenuator with six positions is now available from **Sescom, Inc.**, a southern California designer and manufacturer of broadcast accessories.

Designated Model IL-18, the new inline attenuator features a six-position balanced "O" pad, giving

state studio monitor power amplifier for recording and broadcast studios and for commercial-sound and sound-reinforcement applications is available from **Robins/Fairchild**. This unit, Model F62500, fills the need for an amplifier with higher power output than the company's 10-watt Model 610, but with lower power than the company's 70-watt Model 870 monitor amplifier. One important application of the new amplifier is for use by disc jockeys who want more headset sound than can be provided by lower-power units while monitoring a record.

The new amplifier features extremely low distortion and noise, excellent transient response, flat frequency response, and output-circuit protection against overload, open and short circuits. The unit is completely self-contained with a built-in 110 to 120 volt ac, 50 to 60 Hz power supply.

Operating from a standard 600-ohm audio line, the amplifier readily drives an 8- or 16-ohm monitor loudspeaker.

THE NEW STANDARD COVERS AM BAND PLUS HARMONICS TO 5 MHz



The Model FIM-41 Field Strength Meter has many more features —

- Measures Harmonics to -80 dB
- High Adjacent Channel Rejection
- Ganged Oscillator/Receiver Tuning
- Stable Operation over wide Temperature Range
- Low Battery Drain Circuits
- Front Panel Speaker
- Large illuminated Meter and Tuning Dial
- Indicates field strength accurately down to 10 μ volts/M
- RF input jack for tuned voltmeter applications

CONTACT US NOW FOR COMPLETE DETAILS ON OUR LINE OF FIELD STRENGTH METERS

POTOMAC INSTRUMENTS

932 PHILADELPHIA AVE.
SILVER SPRING, MARYLAND 20910 (301) 589-3125

For More Details Circle (65) on Reply Card

FIDELIPAC®

ACCESSORIES & CARTRIDGES

CART-A-ROUND CARTRIDGE STORAGE RACKS

Each WR-25 Modular Rack holds 25 Type A Cartridges . . . eight can be mounted on our Mobile Carousel Base to make up the MR-200.

WR-25 \$13.25
MR-200 \$145.95

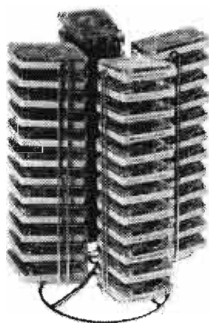
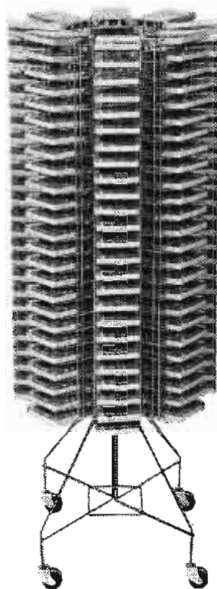


TABLE TOP CARTRIDGE RACK

Model TR-96 holds 96 Type A cartridges, Model TR-48 holds 48.
TR-96 \$73.85
TR-48 \$38.55



STUDIO ON AIR LIGHT

brilliant red lettering on jet black background can be seen even in the brightest ambient light conditions. \$29.95



CART-E-RASE DEMAGNETIZER

can be used for erasing cartridges, reel-to-reel tape, film sound stripping, etc. \$34.50



ALIGNMENT PROBLEM?

Keep your cart equipment in perfect working order with:

- 350 STA Alignment Cartridge \$38.50
- 350 STF Wow and Flutter Cartridge \$24.50
- 350 STQ Cue Test Cartridge \$35.00
- Head Insertion Gage \$3.35
- Height Gage \$12.95
- Right Angle Zenith Gage \$21.75



Contact your Fidelipac Distributor or

FIDELIPAC®
109 Gaither Drive, Mt. Laurel, NJ 08057
(609) 235-3511

© Trademark

See us at Booth #405, NAB

80 For More Details Circle (66) on Reply Card

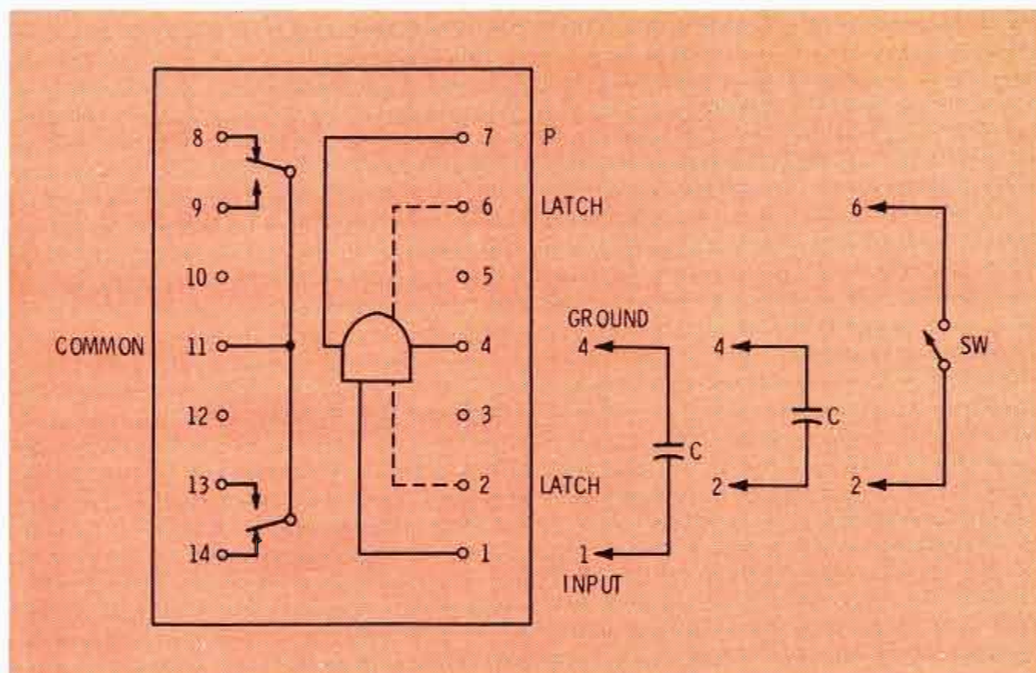


Fig. 4 Magnecraft 505QIC class all solid state relay in DIP package. The relay can act for switching, timing or latching. External capacitor to pins 1 and 4 will delay release. Capacitor at pins 2 and 4 will delay turn-on, and opening external switch at pins 1 and 6 will cause it to latch.

many of its parts can be serviced or replaced, but for the encapsulated units, the only repair is replacement.

Selection:

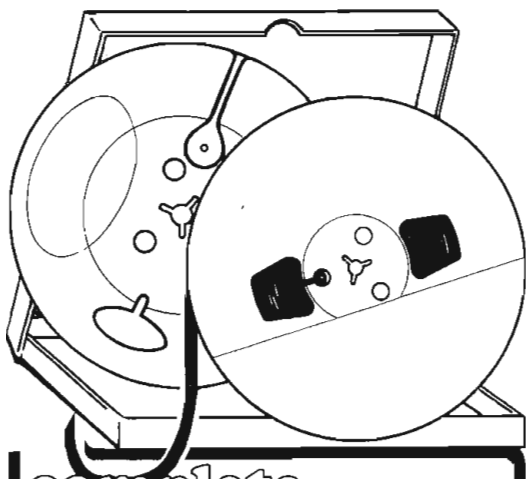
The solid state relay, whether hybrid or all solid state, has many features that may make it seem very desirable as a replacement for that clanging, buzzing, transient spitting model you now have in use. But before rushing out to buy one, first look over the specification sheets very carefully. You will need to find one that will fit the present case without too much circuit modification. You may need to make both electrical and mechanical modifications when attempting to replace an EM relay already designed into a circuit. This does not rule out a solid state replacement, although you may need to select a different model than you originally intended using.

As in any relay selection, whether EM or SS, the nature of the control voltage must be known and given the proper consideration. It is necessary to know the voltage amplitude, whether AC or DC, or if it is Logic pulse. Another important consideration is the amount of current the source can deliver without damage to itself. For example, the control ladder in many transmitters use 120 AC as the control voltage. To attempt dropping this to very

low level DC Logic signal to match a particular SS relay is impractical, while simply connecting it directly into the circuit would be a disaster. But proper selection can usually provide the answer to the particular circuit, and perhaps some modification is even desirable. For example, you could use a transformer to step down the control ladder voltage or at least that control bus in other applications to 3 to 6 volts AC (or DC) and route the control voltage at this safer low voltage. The SS Relay could then be one that uses that low voltage.

Some SS relays require another voltage and current source for operation besides the input control and load switching voltages. The specification sheet will inform you of this information. A great many models, however, require no outside voltages other than the input control and load switching voltages. The solid state elements use these voltages for their operation.

Aside from replacement of EM relays that you now have in use, you may be designing completely new circuits or equipment and controls. There are many models available and with many features that are not possible in EM relays. Almost all major relay manufacturers have various SS relays (both hybrid and all solid state) available, so your choices and application possibilities are numerous. □



complete supplies for reel to reel audio recording

TAPE AMPEX and Scotch
all professional grades
on reels or on hubs

**EMPTY
REELS** all sizes, widths
and hub types

BOXES for all reels, in various colors

LEADER-,TIMING-&SPLICING TAPES

Top Quality Competitive Pricing
Immediate Shipment
Call or Write for our Catalog



Recording supply corp.
1291 RAND RD -DES PLAINES, IL 60016
312/297-0955

For More Details Circle (67) on Reply Card



Phone 601-675-2956

TOWER PAINTING

BY

PROFESSIONALS
will give you a
BETTER JOB at a
LOWER COST with no
extra problems.

We paint all year round day
in day out. Tall towers—
Conjested areas—fragile
Antennas given special
consideration.

Let real experience simplify
your painting requirements

Dave Hovey General Contractor
Coffeeville, Miss. 38922

Tower Sales—Site Preparation
Rigging—Maintenance
Modifications—Consultation

For More Details Circle (68) on Reply Card

February, 1976

the user a signal loss range of 10dB, 15dB, 20dB, 25dB, 30dB, or the direct position. This versatility offers both better economy and convenience as it can replace all other kinds of fixed pads for field use.

Construction features include: rugged die cast housing with an epoxy finish, a CTS rotary switch with a durable aluminum knob, and 1% non-inductive precision resistors for accuracy.

The Model IL-18 is immediately available and can be ordered from one of Sescom's distributors or directly from the factory.

For More Details Circle (91) on Reply Card

Fluid Head Tripod

Cinema Products Corporation announces the availability of the Miller-Universal Model 2030 fluid tripod head.

It quickly converts to carry 20 lbs. through 30 lbs. cameras. Safely lockable at 90° tilt, totally leak-proof and dustproof sealing, fully operative in temperature range from -20°C to +75°C, it has "Autoslip" automatic self-operating and adjusting free pan. Concentric tilt lock/tension device, hydrostatic or mechanical self-equalizing. Supplied with light weight segmented ball, fully compatible with 2" radius standard ball tripod cups are also features.

For More Details Circle (92) on Reply Card

Background Music

McMartin Industries, Inc., has complemented its background music/commercial sound product line with two new models, a 25-watt unit, the MS-252; and the MS-752, 75-watt amplifier.

The two models, identical in function and mechanical package size are basic line amplifiers with built-in tone compensation and program input volume controls. A unique feature of the MS-252 and MS-752 is the ability to expand the basic line amplifier capability to accept up to two additional plug-in modules (the McMartin standard MSA-Series) where greater input flexibility is required. A wide

Spotmaster®

SERIES 1000/2000



Simple, basic cart machines at very low prices. Available in mono, stereo and delay models. Plug-in modules for record and audition. Full +16 dBm peak output with excellent frequency response.

SERIES 3000



Auto release deck with low power consumption — it's the coolest running unit in the industry. Exceeds present and proposed NAB specs. PHASE-LOK III head bracket eliminates stereo phasing problems. Full range of models and options.

SERIES 4000



Pride of the NAB show. SERIES 4000's are the ultimate cartridge machines from SPOTMASTER. They are innovative, reliable and durable without being overly complex or expensive. Optional internal tape fault/splice detection.

500 D SERIES



The traditional favorite — available in a full range of models at moderate prices. Automatic record cancel, built in mike pre-amp and full auxiliary cue tone options.

**OVER 50 MODELS OF TAPE
CARTRIDGE MACHINES**

**ALSO AUDIO CONSOLES
AND STUDIO ACCESSORIES**

**BROADCAST
ELECTRONICS, INC.**

— A FILMWAYS COMPANY —

**8810 BROOKVILLE ROAD
SILVER SPRING, MD. 20910
PHONE 301-588-4983**



For More Details Circle (69) on Reply Card

VERSATILE PROGRAM TIMERS....



Model 228

Here is a 4½ digit bi-directional counter to measure the duration of programs or events up to 2 hrs. in length. A great convenience for producers and script assistants in TV and radio control rooms, serves a multitude of functions in studio operations.

Measures elapsed time in the UP counting mode or time remaining in the DOWN mode. Thumb-wheel switch lets you preset any desired time for DOWN counting and on reaching 0:00:00 automatically reverts to UP counting, thus indicating overtime.

Provides serial BCD output to drive remote displays in studios, announce booths, recording rooms, or master controls. Can be synchronized to DynaQuip Master Clock System.



Model 229

Functionally identical to 228; however read-out can be switched to display either program time or time of day supplied by master clock.



Model 238

Has keyboard preset instead of thumb wheel switches. Digital read-out displays either program time or real time.

All features of these models, including specifications and other applications not described here, are fully outlined in free illustrated folder which is available on request.



a division of
Firan electronics inc.

355 Iroquois Shore Road
Oakville, Ontario, L6H 1M3
Canada

Telephone (416) 844-7222
Telex 06-982327

For More Details Circle (70) on Reply Card

selection of optional plug-ins, from low-level balanced microphone and RIAA-equalized phono preamplifiers to electronic buzzers or sirens, are available. Electronic mute control of the microphone channel is included in the basic amplifier models. Thus the user may purchase to his specific operating requirements, without paying for "extras" he may never need.

Frequency response characteristics: ± 1.0 dB, 40-15,000 Hz; and low distortion, less than 1.0% at the rms output levels of 25 watts and 75 watts for the respective models highlight the excellent performance from the MS-252 and MS-752 models.

For More Details Circle (93) on Reply Card

Standby Power Source

A new uninterruptible power source (UPS) and a new standby power source, two alternative systems that provide clean, continuous electrical power for critical equipment during line power failure, are being introduced by **Sola Electric Division of Sola Basic Industries**.

In the UPS system, line power simultaneously charges a 120-volt battery bank and supplies power to an inverter. The inverter supplies power to the load through a Sola CVS (sinusoidal constant voltage transformer), which regulates output voltage to within $\pm 1/4\%$ of nominal, screens out line noise and maintains a near-pure sinusoidal wave shape.

In event of line failure, the inverter simply continues to draw power from the battery bank. Since batteries and inverter are always connected there is no switchover delay and no noticeable voltage fluctuations to the load.

Frequency of the AC output, under normal conditions, is synchronized with AC input. During input line failure, however, the output frequency is determined by a stable internal oscillator.

In the event of internal component failure, a mechanical bypass switch automatically transfers the load directly to the AC input line with a maximum interruption of approximately 100 ms. An optional solid state by-pass switch

is available for those applications that cannot tolerate a 100 ms. interruption. In automatic operation, the solid state switch completes the transfer in 4 ms. or less. Operated manually, the switch provides a no-break transfer.

By contrast, the Standby Power system is designed for applications where transfer delay is less critical. A solid state inverter and a battery bank remain isolated from the load until line power falls below a

SAVE ABOUT 50% OF POWER TUBE COSTS

NEW:
3,000 HOUR
WARRANTY!



**IF YOU USE 3CX2500,
4CX5000, 4CX10000, 4CX15000
AND SIMILAR TYPES**

Freeland Products offers expert reprocessing of certain types of thoriated filament tubes. Our service is backed by a warranty and over 30 years experience.

Send today for descriptive brochure and price list. Freeland reprocessing assures **FULL AVERAGE EMISSION LIFE** of new tubes—yet you'll save up to 50% of original cost!

Scores of Satisfied Customers

WAOB	KHOU	WRUF
KBCL	CJRC	WSMB
KALB	WHAS	WTAE
WBKH	WHB	WTIX
KCIJ	WIRK	KVOL
KCIM	WJCW	KWHI
WCCO	WJDX	WWST
WCMI	WJLS	WPRS
WDAE	WAMX	KNOE
KCMO	KLCN	WGSO
WSAV	KLIV	WMPS
KFDA	WMRI	WHBC
WFOR	KOKE	WDWS
KGBC	KOMA	WBTM
WGAC	KHYM	WGAF
KEEL	WPLO	KMLB
KUPK	WQAM	KOAX
WERC	WQMV	WROB

And Many More!

Freeland Products Co.

3233 Conti St. • New Orleans, La. 70119
504/822-9223

For More Details Circle (81) on Reply Card

BROADCAST ENGINEERING

A COMPACT WITH ALL THE OPTIONS



The ROBINS/FAIRCHILD Model 659A, REVERBERTRON, is a complete dynamic reverberation system designed to enhance Broadcast/Production or Recording Studio sound.

With solid state electronics and high performance electro-mechanical delay lines in two separate enclosures, the REVERBERTRON is compact in size yet loaded with features. Continuous reverb mix controls, VU metering, selectable decay times, 3 band equalization and remote control . . . to name a few. All in 7" of rack space.

REVERBERTRON! Designed to fit your rack and priced to fit your budget.

FOR COMPLETE DETAILS, CALL OR WRITE SAM JONES.

ROBINS & FAIRCHILD

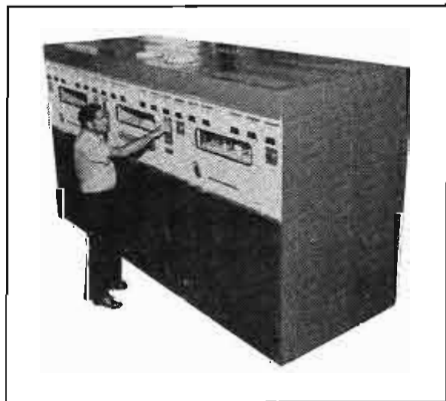
A Robins Industries Corporation

75 Austin Boulevard, Commack, N.Y. 11725
(516) 543-5200

For More Details Circle (71) on Reply Card

QUALITY TALKS FOR KSDO

San Diego, California



Continental's 317C is the best measure for any 50 kW AM transmitter purchase. Performance, 125% positive modulation and reserve power capabilities are unbeatable. Today's best sound in 50 kW AM is Continental.

Continental Electronics

CONTINENTAL ELECTRONICS MFG. CO.
BOX 17040 DALLAS, TEXAS 75217

For More Details Circle (72) on Reply Card

February, 1976

pre-set level. When that limit is exceeded, a by-pass switch transfers the load to the inverter, which begins drawing power from the battery bank. There is a power delay of approximately 200 ms. during transfer.

For More Details Circle (94) on Reply Card

Recording Console Module

The new series of MAP 8422 Console Control Modules provide comprehensive switching and control facilities for multi-track recording, quad-stereo-mono mixdown, and monitoring required in today's recording and production consoles. They are available from Modular Audio Products, a unit of **Modular Devices, Inc.**, Bohemia, New York.

System features of the 8422 Series include: selectable Mic/High Level inputs with programmable LED peak level indication; an internal power network for condenser mics; switchable 70 Hz Hi Pass Filters; Channel Mute and Solo on all inputs; Quad Panning and Quad/4 Track/Stereo mode selection; Direct Track Feed; two independent Echo channels with pre-post fader selection, delay, echo and monitor send and return functions; two independent Cue channels; and self-contained Multi-track mixing amplifiers with full range rotary Submaster level controls. Complete control facilities for Control Room and Studio Monitoring, Talkback and Slate are also provided.

The entire series has been designed for direct plug-in to printed circuit motherboards, simplifying console layout, assembly and troubleshooting.

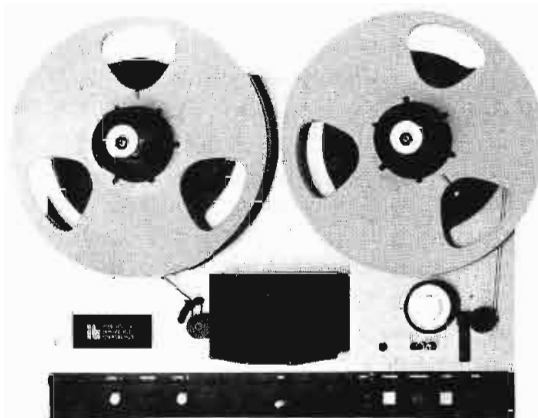
For More Details Circle (95) on Reply Card

Modular Tone Detection

Frequency Devices, Inc. introduces modular Touch Tone detectors. Two standard modules are used to provide the functions of Band Separation, Level Control and Tone Identification. Both modules are low profile (0.4 in.) and require no adjustment.

The system consists of two multi-function modules:

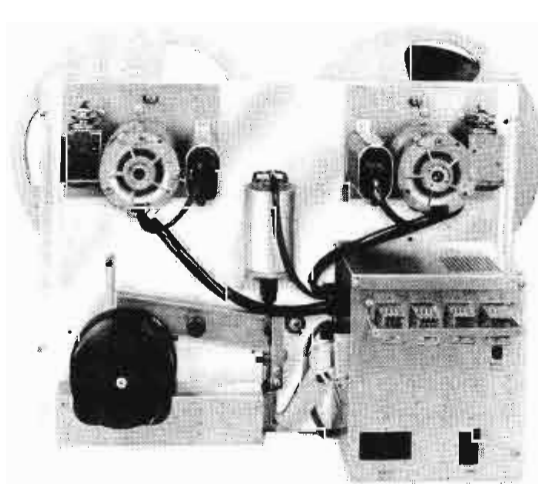
Professional



ITC's 750 Series Reproducer

1/2 Track Stereo \$1150

- Fully serviceable *in* the equipment rack.
- Straight-line tape threading.
- Complete access to head with flip-top head cover.
- Professional +8 dBm output with 10 dB headroom.
- Safe tape handling provided with differential braking.
- Optional motion sensing / start memory.
- ITC's two year warranty.



For more information contact your automation company or call ITC collect at 309-828-1381.

**INTERNATIONAL
TAPETRONICS
CORPORATION**

2425 S. Main; Bloomington, Illinois

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

© 1975 by ITC

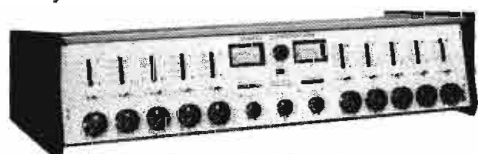
For More Details Circle (73) on Reply Card

Station Managers:

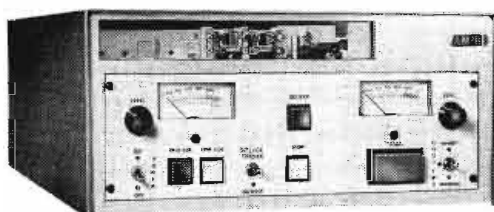
AMPRO HAS PROVEN THAT YOU CAN DO IT . . .

We have designed a line of Audio Consoles and Cartridge Tape Equipment that has all the technical features and reliability of the most expensive equipment on the market. The only difference is in the cost of our equipment. It allows you to stay well within your budgets.

Before you sign that purchase order for your new Consoles and Cart Equipment, have your CE check out AMPRO. Financing available to qualified buyers. Call collect today for details.



40 Input, 10 Channel Stereo Console



Stereo Recorder/Reproducer with Splice Finder Option



AMPRO CORPORATION
850 PENNSYLVANIA BLVD.
FEASTERVILLE, PA 19047
(215) 322-5100

Professional Equipment For Broadcasting Professionals

See us at Booth #812, NAB
For More Details Circle (74) on Reply Card

- 1) Model 550-1 Low Group, Tone Detector Module
- 2) Model 550-2 High Group, Tone Detector Module

When used as a set these components will detect the standard Bell System Touch Tones with relative amplitudes of $\pm 15\text{dB}$ and absolute amplitudes in the range from -30dBm to 0dBm . The detection and hold times have been set for non-ambiguous detection of 40 ms. on and 40 ms. off tone bursts. Outputs are open collector logic which may be interfaced with CMOS or T²L logic.

Several band separation, amplitude scaling and level detection operations have been incorporated into the 550 design. These enable the 550 to operate accurately in the presence of dial tones, trunk tones, voice signals and a wide range of input tone amplitudes (0 to -30dBm).

The Model #550-1 and #550-2 Tone Detectors scale the sensitivity of the level detectors to the amplitude of the input signal and filter and level detect to determine which tone is present. If multiple tones are present within the band only

the largest tone will be detected and then only if its amplitude is more than 8dB higher than the other tones.

For More Details Circle (99) on Reply Card

Subchannel FM Receiver

With the introduction of its Model TR-E6, FM Subchannel Receiver, **McMartin Industries, Inc.**, Omaha, Nebraska, has expanded its line of FM subchannel (SCA) receivers designed specifically for in-home reception of special programs for use by the visually-handicapped, or for large-audience educational purposes.

The new TR-E6 provides this service at lower costs than previous units.

Simple operation, with only two front panel controls is featured. One is a combination power switch/volume control; the second provides fine tuning for optimum station reception. A telescoping whip antenna may be oriented for maximum signal pick-up and maximum crosstalk effect between the main and subchannels. An external FM antenna may be attached in low-signal locations.

Maximum shock-hazard protection for the user is insured by use of an encapsulated power transformer which plugs directly into any standard wall receptacle. By this method only extremely low voltage, well below shock level, is fed to the TR-E6 unit.

For More Details Circle (100) on Reply Card

LIVE Microwave Antennas

Nurad, Inc. exhibited its microwave antenna products for the TV industry at the National Association of Broadcasters Convention in Las Vegas.

The Nurad antenna systems designed for LIVE (Live Instant Video Electronics) in the 2.0 GHz through 13.0 GHz Bands was on display.

The Nurad Model 20 CR 2 is a 2 GHz circularly polarized four-foot diameter dish antenna used as the transmit element for remote TV broadcasting. It has been especially designed for LIVE Journalism.

This unique antenna utilizes an optimum designed Klaven Cavity Feed. The gain of the Model 20 CR 2 is greater than 25 dB with a nominal 9° beam-width. Some special features

Mark IV-T Weatherminder

The original weather console designed especially for radio station local programming. Although many have tried to copy it for the last 20 years we can and will, on request, send you a list of hundreds of radio stations that still use and prefer the Mark IV. Real professional equipment at a modest price.

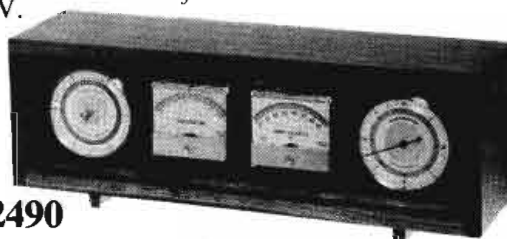
Texas Electronics, Inc.
P. O. Box 7225B
Dallas, TX 75209 ■ (214) 631-2490

For More Details Circle (75) on Reply Card



**Wind Direction & Speed
Barometric Pressure
Remote Temperature**

Also, a complete line of weather instruments, recorders, sensors, controllers, etc. Ask for Sheet BW-72.



EBS

COMPLETE PACKAGE

ONLY

\$295



Foolproof Digital Logic Circuitry
Requires only 3 1/2 inches in rack
Crystal-Stabilized Encoder & Decoder
Status Indicators - Self Test Provision
No Troublesome Front Panel Adjustments

+14 DBM 600 OHM Bal. Output
Automatic Program Switching
Remote or Local Control
FCC Certified & Type-Accepted
2 CH. XTAL Controlled AM Receiver Avail.

INQUIRE ABOUT SPECIAL OPTIONS AND GROUP DISCOUNTS

RIVERS ASSOCIATES, INC.

P.O. Box 58 - Leominster, Mass. 01453
(617) 537-4821

For More Details Circle (76) on Reply Card

include a bore-sighting scope and "quick-disconnect" pins for easy and fast removal of the feed assembly.

For More Details Circle (101) on Reply Card

Vertical Interval Production Switcher

A totally new switching package—the ADC 553—has been designed by American Data Corporation for the video market.

This vertical interval production switcher was designed to provide small studio and van operations with state-of-the-art features. For example, Soft Wipe and Linear Key are standard features. Also, new designs from ADC allow combining of two 553's for greatly increased capabilities.

The special effects generator provides nine wipes, including circle, square, diamond, diagonal, H&V splits, and corner inserts.

In the key mode, the special effects generator offers a choice of self or matte key on internal or external sources, and an external chroma keyer may be used on the external input. Soft wipes are provided with operator control for the degree of softness.

The keying system is linear in nature so that edge crawl and key

breakup are minimized.

A blackburst and color background generator is included to provide fades or wipes to any color or black, and in conjunction with the matte keyer, will provide colored insert keying.

For More Details Circle (102) on Reply Card

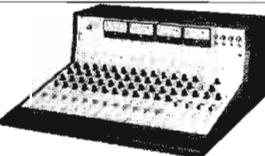
Video Control Center

Dynair Electronics, Inc., San Diego, announces the new Model VCC-310A Video Control Center. This unique video switcher is designed to centralize the normal control functions of a television surveillance system and minimize operating controls and overall system cost.

The unit incorporates three solid-state, 10-input busses, providing automatic alarm actuation, manual selection, and sequential switching. Facilities are provided for interface with a VTR, remote control of cameras/pan-tilt, door or gate entry control intercom, as well as remote control and status display of each switching buss.

Useful for all surveillance systems, the VCC-310A is ideal for systems using up to 30 cameras. Patient monitoring, industrial process control, and facilities surveillance are a few applications for which this unit was designed. Broadcasters concerned about plant protection, will find the automatic alarm buss particularly useful. It allows essentially unattended operation since intrusion detectors located in areas under camera surveillance are wired to the VCC-310A. Video from the associated cameras will then be switched to a time-lapse or standard VTR.

For More Details Circle (105) 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, CALIF. 90038 (213) 934-3566	

For More Details Circle (104) on Reply Card

BUILD A BETTER STUDIO

Call Aderhold Construction Company. A complete team of professional designers, architects, builders and engineers. No problem too large or too small. 404/233-5413.



Aderhold Construction Company

3384 Peachtree Rd. NE / Atlanta, Georgia 30326

For More Details Circle (103) on Reply Card



ULTIMATE ACCURACY!

Radio-Controlled Quartz
Crystal Movement

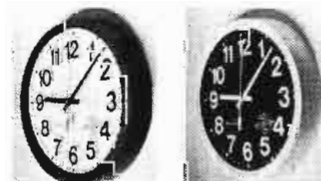
This amazing timepiece solves the problem of *absolute accuracy* that is so necessary in the modern communication industry.

Each clock contains a solid state radio receiver that is constantly tuned to the National Bureau of Standards' station WWV. Periodically the clock hears a signal that triggers the up-dating mechanism, correcting any minor deviation of the second hand.

The clock is also equipped with battery stand-by power. Line power surges, brown-outs, and power failures have no effect on the clock.

Available now for **\$187.50.***

White or black dial



*Volume discounts for multiple orders

**RADIO
TIME SERVICE
INCORPORATED**

P.O. Box 6613
Tucson, Arizona 85733
(602) 793-8174

For More Details Circle (78) on Reply Card

**Unique
approach to
cartridge
tape
equipment.**

here
Beaucart is coming.
See the revolutionary
Beaucart on page 13.

For More Details Circle (77) on Reply Card
February, 1976

Visual emergency Warnings for the deaf

The Commission has proposed rules to require television stations to transmit all emergency notifications visually as well as aurally so persons with impaired hearing may be made aware of emergency situations.

The action was in response to a joint petition by four organizations representing the deaf — D.E.A.F.W.A.T.C.H. (Demanding Equal Access to Facts and Warnings Aired on Television for Citizens who are Hearing Impaired), the National Association of the Deaf, Deafpride, Incorporated and the Alexander Graham Bell Association for the Deaf.

The petitioners noted that in 1970 the FCC issued a public notice entitled "The Use of Telecasts to Inform and Alert Viewers With Impaired Hearing," to all television licensees requesting them to air emergency notifications and entertainment programming visually as well as aurally on a voluntary basis.

The petitioners noted that the Commission, in stating its concern with the dearth of programming of value to the deaf, said it would "... observe developments in this area ... and if the situation does not develop satisfactorily it may be necessary to begin rulemaking looking toward the adoption of minimum requirements."

Noting that only approximately 30 percent of U.S. television stations visually duplicate any oral announcements, the petitioners requested the Commission to proceed with its stated intention to initiate rulemaking.

Under the proposed amendments to Part 73 of the rules, television station licensees will be required to:

- Transmit any emergency information aurally and visually
- Conclude emergency transmissions with the request "if you have hearing-impaired or blind friends or neighbors, please pass this information on to them."

advertisers' index

Aderhold Construction Company	85
Akai America, Ltd.	23
Allied Broadcast Equipment	60
American Data Corporation	7
Ampro Corporation	84
Automated Processes, Inc.	1
Belar Electronic Laboratory, Inc.	16
Berkey Colortran	24
Broadcast Electronics, Inc.	58, 81
Broadcast Engineering Techniques	86
CMX Systems	9
CSI Electronics, Inc.	86
Canon Video	17
Central Dynamics Ltd.	15, 63, 78
Chyron Telesystems	68
Comprehensive Service Corporation	CE-4
Consolidated Video Systems	22
Continental Electronics Mfg. Co.	83
dbx, Incorporated	20
Datatek Corporation	57
Datatron Editing Systems	61
Dynair Electronics, Inc.	21
Dynasciences Corporation	57
ES Enterprises	60
Edutron	25
English Electric Valve	
North America Ltd.	54
Fidelipac	80
Firan Electronics, Inc.	82
Freeland Products Company	82
The Grass Valley Group, Inc.	3
Clifford B Hannay & Son, Inc.	67
Harris Corporation	10, 73
Dave Hovey	81
Ikegami	48 & 49
International Tapetronics Corp.	59, 83
Jamieson Film Company	8
Kansas State Network	CE-3
Lenco, Inc.	29
LPB Inc.	67
McMartin Industries, Inc.	62, 77
Marti Electronics, Inc.	73
Minneapolis Magnetics, Inc.	14
Moseley Associates, Inc.	31
Nova Industries, Inc.	77
Opamp Labs, Inc.	85
Potomac Instruments, Inc.	79
Radio Time Service	85
Ramko Research	74, 76
Recording Supply Corporation	81
Recortec, Inc.	43
Rivers Associates	84
Robins/Fairchild	83
SC Electronics	45
Shintron Company, Inc.	12
Shure Brothers, Inc.	Cover 4
Sony Corporation of America	18 & 19
Sound Technology	40
Sparta Div. of Cetec Corp.	5
Spotmaster	58, 81
Strand Century, Inc.	64
Teledyne Energy Systems	75
Telemet Company	Cover 2
Television Microtime	Cover 3
Telex Communications, Inc.	37
Texas Electronics, Inc.	84
Thomson-CSF Laboratories, Inc.	35
Time & Frequency Technology, Inc.	47
UMC Electronics Company	8, 13, 85
United Recording Electronics, Inc.	56
Vamco Engineering	14
Varian, Eimac Division	27
Video Aids Corp. of Colorado	65
Vital Industries, Inc.	11
Wilkinson Electronics, Inc.	66

THE BEI EBS 100? yes & no.

Encoder - Decoder and optional receiver in 3.5 inches of rack space.
Two temperature-compensated precision audio oscillators.
A CMOS digital comparator Decoder.

Not three separate units.
No expensive crystals, ovens, or dividers
No piezoelectric or mechanical filters.

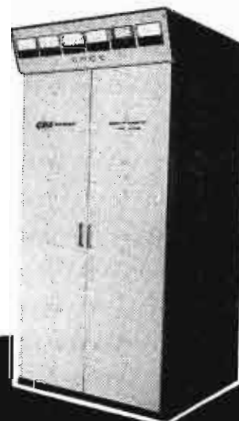
IC reliability, 2-day burn-in, stereo line switching.

yes, it makes sense. no kidding.

Broadcast Engineering Techniques 206 Doyle Ave. Providence, R.I. 02906 (401) 861-6007

For More Details Circle (79) on Reply Card

From
80 Years of Experience
Comes the Finest
AM & FM Broadcast Transmitters
Ever Manufactured!
CSI ELECTRONICS INC.



CSI

ELECTRONICS INC.

2607 River Road
Cinnaminson, New Jersey, 08077 Telephone: (609) 786-1060

For More Details Circle (80) on Reply Card

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

RALPH E. EVANS ASSOCIATES

Consulting Telecommunications Engineers
AM-FM-TV-CATV-ITFS
3500 North Sherman Boulevard

MILWAUKEE, WISCONSIN 53216

PHONE: (414) 442-4210 Member AFCCE

SMITH and POWSTENKO

Broadcasting and Telecommunications
Consultants

2000 N. Street, N.W.
Washington, D. C. 20036
(202) 293-7742

Joseph & Donna Roizen VIDEO CONSULTANTS

International TV Systems
Marketing/Technical Writing
800 Welch Rd., Suite 354
Palo Alto, Ca. 94304
Tel: (415)326-6103

LIGHTNING ELIMINATION ASSOCIATES CONSULTING ENGINEERS LIGHTNING RELATED PROTECTION

strikes - surges - transients, etc.

ROY B. CARPENTER, JR. - DIRECTOR
9102 Firestone Blvd., Downey Ca. 90241
(213) 923-1268 Cable: LEAINC

Applied Video Electronics, Inc.

STUDIO SYSTEMS DESIGN AND INSTAL-
LATION ENGINEERING. REFURBISHING/
MODIFYING COLOR CAMERAS AND
QUADRUPLIX VIDEO TAPE RECORDERS.

Post Office Box 25
Brunswick, Ohio 44212
Phone (216) 225-4443

Oscar Leon Cuellar

Consulting Engineer
1563 South Hudson
(303) 756-8456

DENVER, Colorado 80222

Member AFCCE

P. H. LEE ASSOCIATES, INC.

Over 36 Years in Communications
And Broadcast Engineering

AM-FM-TV Frequency Measurements

P.O. Box 1575
Thousand Oaks, Calif. 91360
(805) 492-5055 (213) 889-7769

PROFESSIONAL SERVICES

TELECOMMUNICATIONS
AND
BROADCAST CONSULTANTS

Tabcon Inc.

Sales / Programing / Management / Engineering
Field Services

918-742-5410

4425 East 31st St.
Tulsa, Okla. 74135

W. H. BRADLEY, P.E.

Consulting Radio Engineer
Engineering Applications
& Field Engineering

Phone: 918-245-5444

300 West 41 Street,
SAND SPRINGS, OKLAHOMA, 74063

CLASSIFIED

Advertising rates in Classified Section are 25 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, \$2.00.

For ads on which replies are sent to us for forwarding (blind ads), there is an additional charge of \$3.00 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

EARN YOUR ELECTRONICS DEGREE by correspondence, G. I. Bill approved. For free brochure, write Grantham School of Engineering, Information Desk, 2000 Stoner Avenue, Los Angeles, Calif. 90025. 8-72-tf

FIRST PHONE in six to twelve weeks through tape recorded lessons at home plus one week personal instruction in Boston, Philadelphia, Detroit, Atlanta, Kansas City, Seattle or Los Angeles. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266, Telephone 213-379-4461. 8-75-tf

BROADCAST ENDORSEMENT and third phone preparation on cassettes. Illustration book includes current FCC-type exams. Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266. 8-75-tf

GET YOUR FIRST TO GET THERE FIRST! DON MARTIN SCHOOL OF COMMUNICATIONS/ Since 1937, training Broadcasters for Broadcasting! 1st Phone training using latest methods and completely equipped Transmitter studio. Call or write for details and start dates. Don Martin School, 7080 Hollywood Blvd., 5th floor, Hollywood, CA 90028. Call (213) 462-3281 or (213) 657-5886. 8-75-tf

PASS FCC EXAMS with Ameco books. Each book contains FCC questions plus simplified answers plus FCC-type exams and answers. 3rd class includes broadcast endorsement \$1.00. 2nd class \$2.25, 1st class \$1.50. Free catalog. Ameco Publishing, 275G Hillside Ave., Williston Park, N.Y. 11596. 8-72-tf

PASS FCC first and second class exams with new 21-lesson, 450-page course. Starts with basic electricity. Over 600 FCC-type, multiple-choice questions and sample exams included. No previous technical knowledge required. Commercial Radio Operator Theory Course, #15-01. Only \$5.95. Ameco Publishing, 275G Hillside Ave., Williston Park, N.Y. 11596. 8-72-tf

WANTED

WANTED: PRE 1926 RADIOS AND TUBES, ESPECIALLY IN NEW CONDITION. STATE MAKE, MODEL, CONDITION AND PRICE WANTED. AUGUST J. LINK, SURCOM ASSOCIATES, 1147 VENICE BLVD., LOS ANGELES, CALIFORNIA 90015. 8-75-tf

WANTED: Used RCA TTU-30 UHF Transmitter tunable to Ch. 50 preferred. R. Moffett, KOCE-TV, 15744 Golden West Street, Huntington Beach, CA 92647. 1-76-2t

WANTED: All surplus broadcast equipment especially clean A.M. & F.M. transmitters, capacitors, 112 Clark & Potomac Phase monitors, sealed strength meters, etc. High prices. All custom duties paid. Surplus Equipment Sales at 2 Thorncliffe Pk. Dr., Unit 28, Toronto 17, Ont., Canada (416) 421-5631. 1-76-tf

SERVICES

FREQUENCY MEASURING SERVICE—WE'RE #2 —MONITOR REPAIRS—MOBILE UNIT— covers Northern 2/3 Ill., Eastern Iowa, Eastern Minn., Southern 2/3 Wis., Western Mich., and Western Ind., monthly. Radio Aids, 528 Ravine Ave., Lake Bluff, Illinois 60044, (312) 234-0953. 2-74-tf

BROADCAST CRYSTALS for AM, FM or TV transmitters. Frequency change, repair or replacement of oven types; also new vacuum types. Quality products, reasonable prices and better delivery! Don't be without a spare crystal. Repair of G.R. 1931-A/B modulation monitors and frequency change of AM and FM frequency monitors. Over 30 years in the business. Eidson Electronic Co., Box 96, Temple, Texas 76501. Phone (817) 773-3901. 12-74-tf

COMMERCIAL RADIO MONITORING CO. Precision frequency measurements since 1932. Local and mobile service covering entire midwest plus. Test instruments, counters, monitors repaired and certified. Lee's Summit, Mo. 64063. (816) 524-3777. 9-74-tf

SPOTMASTER PARTS—24 hour service. Repairs and rebuilding of your Spotmaster equipment. Franchised Spotmaster repair service. 90 day warranty. COMMUNICATION MEDIAS/BROADCAST COMPONENT DISTRIBUTORS, P.O. Box 54, Allentown, Pa. 18105, 215-437-0607. 6-75-12t

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

HELIAX-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

BUILD YOUR OWN TV AND RADIO PRODUCTION EQUIPMENT. Easy, inexpensive, (mostly IC). Plans or kits: Special Effects Generator, Automatic Logger, Vertical Interval Video Switcher, Solid State Lighting Board, Preset Audio-Video Board, Preset Lighting Board, Crystal Controlled Wireless Mikes with Matching receivers. Subsonic Tone Control for audio tapes, 8MM SOF Cameras and Projectors, Distribution Amplifiers (Sync. Video, Audio), Audio Control Boards (Studio & Remote) Proc-Amp with compensation and regeneration for adapting Helical Scan VTR's to broadcast standards. PLUS specialized correspondence courses in TELEPHONE Engineering (\$39.50), and Integrated Circuit Engineering (\$49.50). Plans from \$5.95 to \$15. SUPER CATALOG plus years updating of new devices Air Mailed \$1.00. Don Britton Enterprises, P.O. Drawer G, Waikiki, Ha. 96815. 5-74-24t

CAMERA TUBES...ALL TYPES EXCEPT ORTHICONS CAN NOW BE RECONDITIONED AT AN UNBELIEVABLE PRICE, LEAD OXIDE TYPES \$300.00, VIDICONS FROM \$35 TO \$200.00. ALL RECONDITIONED TUBES COME WITH 500 HOUR WARRANTY. FOR DETAILS WRITE: RODONCO ENGINEERING, CAMERA TUBE DIV., 4020 STAPLETON DR., BLOOMINGTON, IND. 47401. 8-75-tf

EQUIPMENT FOR SALE

MICA AND VACUUM transmitting capacitors. Large stock; Immediate delivery. Price lists on request. SURCOM ASSOCIATES, 1147 Venice Blvd., Los Angeles, Cal. 90015 (213) 382-6985. 6-75-tf

SCREW KIT for XLR plugs, cable mount, male or female. 3 kits for a dollar ppd. Tenel 4122 Kroemer Road, Fort Wayne, Indiana 46818. 12-75-3t

HP 140A OSCILLOSCOPE, HP 1415A Time Domain Reflectometer, HP 805A slotted line, like new, manuals, Frank Stewart, 1212 Wisteria Way, Richardson, Texas 75080. 2-76-1t

RECORDING TAPE SPECIAL: 1 mil milar, 3600' on 10 1/2 x 1/4" plastic reel—splice free—100 lot—\$1.60, 1,000 lot—\$1.25. Accurate Sound Company, 114 5th Avenue, Redwood City, CA 94063, 415-365-2843. 2-76-1t

FOR SALE: Five 300 foot microwave towers and reflectors. Contact: Larry Young, Chief Engineer, WDTB-TV, Panama City, Florida 32401, (904) 769-2313. 2-76-1t

AVAILABLE: Complete turnkey recording studio, midtown New York location. Possible long term lease on space and long term equipment lease, or outright equipment purchase. 5,500 sq. ft. studio fully equipped with 24 in-16 out Audio Designs and misc. musical instruments. Vocal booth. Mixdown/screening room with ann. booth for voice over with 35 mm. and 16 mm. film projectors equipped for direct projection or CCTV for scoring. Complete set-up of several 35 mm. and 16mm. film dubbers and recorders (Magna-Tech) including 4-track pickup recorder. All dubbers interlock with projectors. Many film accessories such as synchronizers and splicers. Also small equipped voice studio with console and tape machines. Three "live" echo chambers. Write to: Dept. 347, Broadcast Engineering, 1014 Wyandotte Street, Kansas City, Mo. 64105. 2-76-1t

FOR SALE: Panasonic CATV television camera Model WV-360P. One year old. Excellent condition. \$300 plus shipping. Contact Daniel Reed, 832 E. McCracken, Hoopeston, Illinois 60942, (217) 283-6171. 2-76-1t

CCA 10,000 D am transmitter, good condition, spare tubes, 850 kHz, \$9000.00. Would make good main or auxillary. KTAC Tacoma. 206-473-0085. 2-76-1t

RHODE & SCHWARTZ deviation meter model FMV BN4620 Serial 127423, \$2500.00 or swap on 1957 Thunderbird. (904) 587-5263, 968-6734. 2-76-2t

FOR SALE: 2 IVC 760 1" color video recorders with assembly edit; 1 IVC 870 1" color video recorder with insert edit. Make us an offer, call 608-222-7317, ask for Jim. 2-76-1t

FOR SALE: ONE AMPEX VR 660B, EXCELLENT CONDITION, LOW HOURS, CONTACT TECHNICAL DIRECTOR, CKRT-TV LTD, 1 FRONTENAC ST., RIVIERE DU LOUP, QUEBEC, CANADA. PHONE NUMBER: (418) 862-8241. 2-76-1t

AMPEX VR-1100. Excellent condition with "Allen FMS 1124 modified to high bond 7.06 MHZ, Allen 1240 switcher, diamond DPA-3 color adapter and amplex mark ten video head assembly installed. Provision for external air compressor. Best reasonable offer. (303) 433-7443, Denver. 2-76-1t

USED broadcast and recording equipment, audio and video. Write or phone for FREE list. Television Enterprises, 2583 CALADIUM Drive, Atlanta, Georgia 30345. (404) 939-1549. 2-76-1t

SPOTMASTER EQUIPMENT AND PARTS now in Texas from Sales Southwest, 4002 Houston Highway, Victoria, Texas 77901. 512-578-4323. 11-75-tf

AMPEX SERVICE COMPANY: Complete factory service for Ampex equipment; professional audio; one-inch helical scan video; video closed circuit cameras; video systems; instrumentation and consumer audio. Service available at 2609 Greenleaf Avenue, Elk Grove Village, Ill. 60007; 500 Rodier Dr., Glendale, Ca. 91201; 75 Commerce Way, Hackensack, N.J. 07601. 12-75-3t

EQUIPMENT FOR SALE (CONT.)

SPOTMASTER, FIDELIPAC, RUSSCO, ROH, ELECTRO-VOICE, OTARI, RAMKO, SCOTCH, STANTON, NORTRONICS, SHURE, SENN-HEISER, TELEX, MAGNECORD, and VIKING are all items distributed and serviced by COMMUNICATION MEDIAS/BROADCAST EQUIPMENT DISTRIBUTORS, P.O. Box 54, Allentown, Pa. 18105. 215-437-0607. "Sudden Service" our specialty. 6-75-12t

WHATEVER YOUR EQUIPMENT NEEDS—new or used—check us first. We specialize in broadcast equipment. Send \$1.00 for our complete listings. Broadcast Equipment & Supply Co., Box 3141, Bristol, Tenn. 37620. 3-75-tf

MAGNECORD PT6-A RECORDERS. Rebuilt units and new and used Magnecord, Telex, Viking, and Spotmaster parts. Huge supply, lowest prices. **REBUILT CARTRIDGE TAPE EQUIPMENT.** Spotlessly clean and thoroughly tested. 30 day moneyback guarantee. **ONE YEAR** warranty. **REPAIR AND RECONDITIONING SERVICES** for cartridge equipment by factory trained technicians. Send for complete information: AUTODYNE, Box 1004, Rockville, Md. 20850, (301) 762-7626. 8-75-tf

RAZOR BLADES. Single Edge, Tape Editing, \$23/M, Flyer, RALTEC, 25885 Highland, Cleveland, Ohio 44143. 9-75-6t

BROADCAST CRYSTALS for AM, FM or TV transmitters. frequency change, repair or replacement of oven types. Also new 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 frequency monitors. Over 30 years in the business. Eidson Electronic Co., Box 96, Temple, Texas, 76501. Phone (817) 773-3901. 12-74-tf

A FEW COMPETITIVELY PRICED used Revox A77 decks available. Completely reconditioned by Revox, virtually indistinguishable from new and have the standard Revox 90 day warranty for rebuilt machines. Satisfaction guaranteed. Example, A77 with Dolby, \$675, plus shipping. Write requirements to ESSi, Box 854, Hicksville, N.Y. 11802 (516) 921-2620. 10-75-6t

STODDART RADIO interference-field intensity meters. Stoddart NM-22A, 150KHZ-32MHZ. Complete - \$2,195, less antennas - \$1,595. Stoddart NM-30A, 20-400MHZ. Complete - \$1,295. Stoddart NM-52A, 375-1000MHZ. Complete - \$1,495, less antennas - \$1,095. All are in excellent condition and calibrated prior to shipment. Surcom Associates, (213) 382-6985. 6-75-tf

MOTORS FOR SPOTMASTERS

NEW Paps hysteresis synchronous motor HSZ 20.50-4-470D as used in series 400 and 500 machines. Price \$49.00 each prepaid, while they last. 90 day warranty. Terms check with order only, no COD's. Not recommended for Tapecaster series 600 or 700. 1-72-tf

TAPECASTER TCM, INC., Box 662
Rockville, Maryland 20851

FOR SALE: Television STL System Rathen KTR 2-7 GHz dual link for audio and video complete with ant., trans. line, and 8' X 12' reflector. Also TR 22 High band color video tape machine. Write WXON-TV, P.O. Box 2020, Southfield, MI, 48075 or call 313-355-2901. 11-75-tf

VIDEO TAPE: Scotch 3M type 400, cleaned and evaluated, good condition, half hour reels with plastic shipper, 35 Dollars each. Short ends type 400 7-28 minutes in length, One Dollar per Minute. Scotch 399, \$5.00 per 30 minutes. Ampex 175 video tape \$15.00 per half hour. **MONEY BACK GUARANTEE.** QUAD TAPE SALES, P.O. Box 23534, Washington, D.C. 20024. Phone 703-569-9212. 12-75-3t

FULL LINE TUNING and phasing components available, including contractors, also large supply separate contacts for E. F. Johnson contractors. Write: Geleco Electronics, Ltd., #2 Thorncliffe Park Drive, Unit 28, Toronto 17, Canada. Phone: (416) 421-5631. 2-75-tf

HELP WANTED

MOVE UP from your present job in broadcast engineering. We handle all engineering jobs and openings coast to coast. Send full resume confidentially now. The AMPS Agency, 6331 Hollywood Blvd., Suite 623, Los Angeles, Calif. 90028. Tel: (213) 462-7301. 8-73-tf

ATTENTION CHIEF ENGINEERS: We need to add five people of your caliber to our expanding staff. Are you tired of a 7 day week, 24 hour day? Would you like to get that monkey off your back? If you are under 40 with 7 years experience in studio and transmitter supervision and maintenance, and would like to work 5 days a week, 7 hours a day for a damn good salary, send resume to Robert A. Gay, Director of Engineering, WAAY-TV, 1000 Monte Sano Blvd., Huntsville, Alabama 35801. 1-76-3t

NEW PATENTED master antenna system used throughout U.S. needs local supervision of installations one day per week. I have made over \$200.00 per day in supervision fees. Must be electronic troubleshooter. Protected territory. Send resume to Melvin Cohen, 1620 N. Federal Highway, Boynton Beach, Fla. 33435. Enclose 13 cent addressed envelope. Be patient for my reply. 2-76-2t

HOME BOX OFFICE, a subsidiary of TIME, INC.—The National Terrestrial and Satellite program distributor to the cable industry, is looking for an experienced tv & audio engineer with background in microwave, cable & pay tv hardware. Duties include signal quality control & interfacing with cable systems. 30% travel in the Northeast anticipated. Send resume to Mr. George Gilbert, Director of Network Operations, Time/Life Building, Rockefeller Center, NY, NY 10020. 2-76-1t

Broadcast engineering®

Regional advertising
sales offices

Kansas City, Missouri

John Cox, 1014 Wyandotte St., Kansas City, Mo. 64105, (913) 888-4664

Indianapolis, Indiana

Roy Henry, 2469 E. 98th St., Indianapolis, Ind. 46280, (317) 846-7026

New York, New York

Stan Osborn, 60 E. 42nd St., Room 1227, New York, N.Y. 10017, (212) 687-7240

Mountain View, California

Dennis Triola, 2680 Bayshore Frontage Rd., Room 102, Mountain View, Ca. 94043, (415) 961-0378

London W.C.2, England

John Ashcraft & Co., 12 Bear St., Leicester Square, Tele: 930-0525

Badhoevedorp, Holland

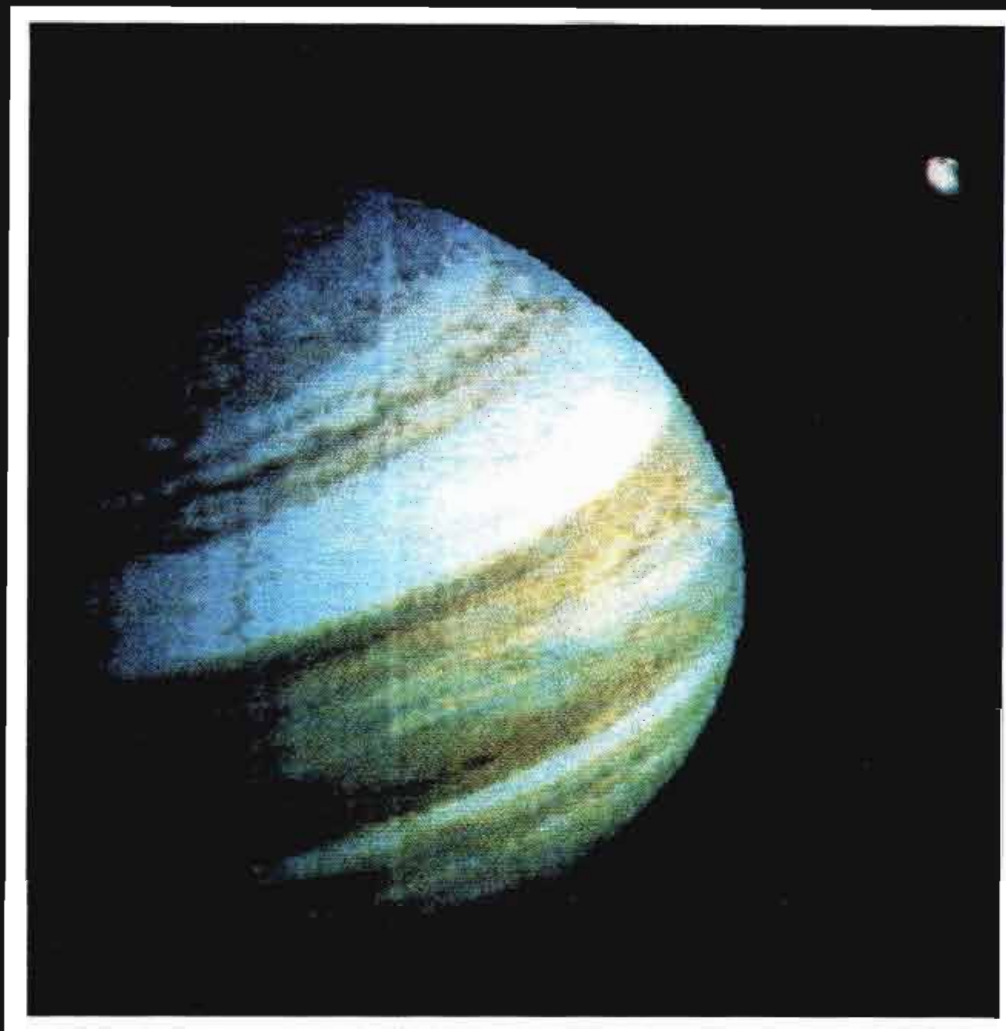
John Ashcraft & Co., John J. Lucassen, Mgr., Sloterweg 303

Tokyo, Japan

International Media Representatives, Ltd., Shiba-Kotohiracho, Minato-ku, Tele: 502-0656

Classified Ads
Can Work For You, Too

When your program travels $\frac{1}{2}$ billion miles ... you can't afford to lose it!



**Unretouched photo of video transmitted from
Jupiter and processed through Microtime TBC**

For the Pioneer II Jupiter Fly-By program, a prime concern was the reliability of its television equipment. Live video from Jupiter was transmitted almost $\frac{1}{2}$ billion miles — the first such close-up pictures of our solar system's largest planet. NASA could not afford equipment failures.

A Microtime Time Base Corrector was chosen because Microtime means reliability. When you are programming from $\frac{1}{2}$ billion miles away, reliability is what counts!

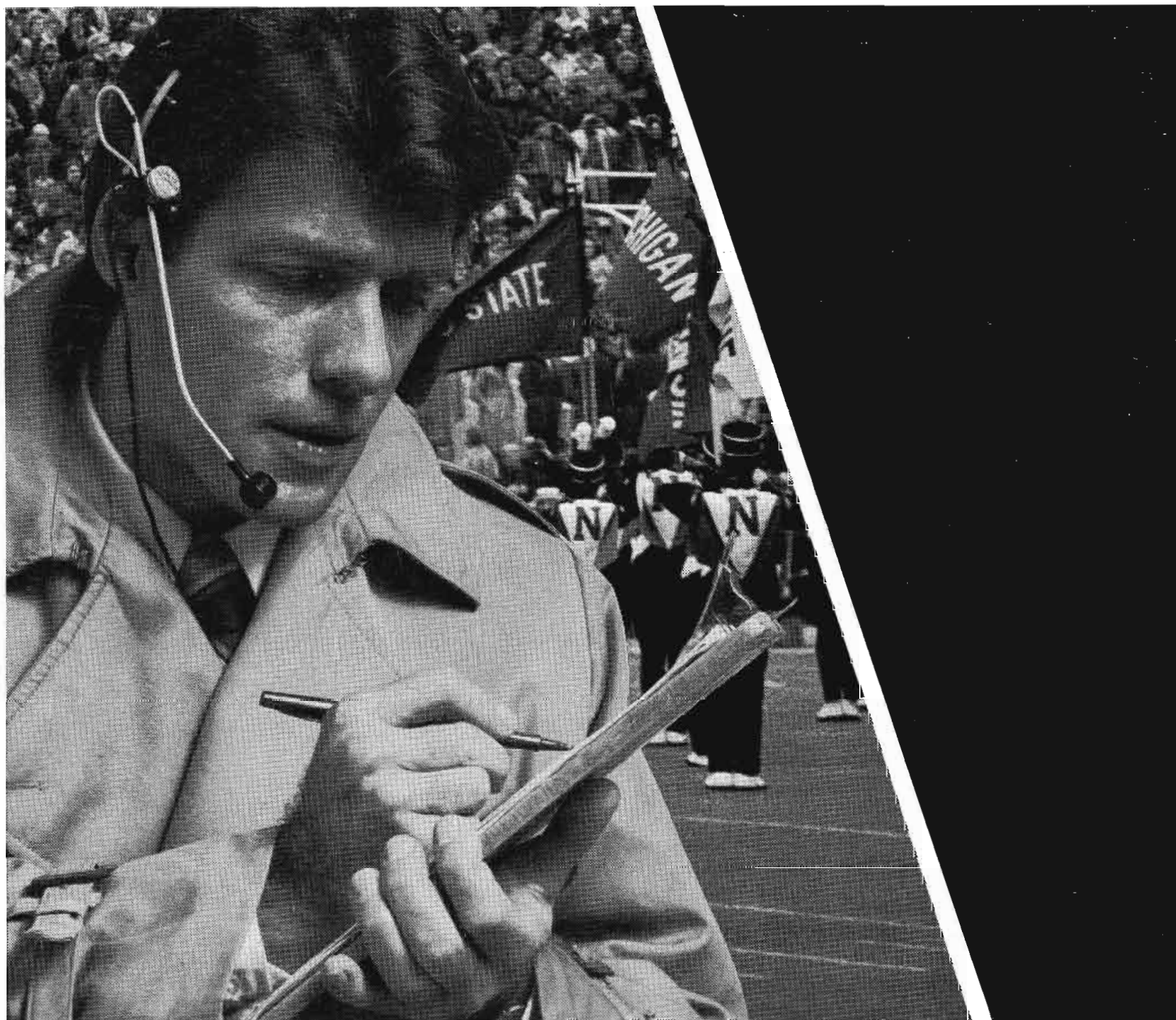
Reliability is important to you, even if your program doesn't come from Jupiter.

Microtime — the reliable one.

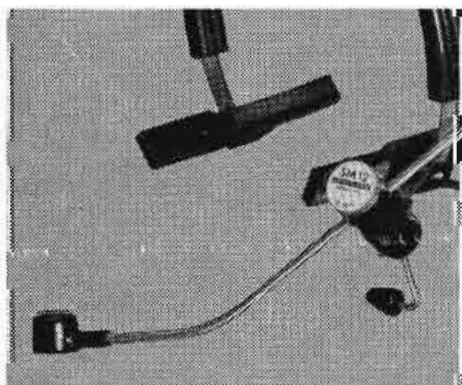
1280 Blue Hills Avenue
Bloomfield, CT 06002
(203) 242-4242
TWX 710-425-2390

MICROTIME

For More Details Circle (2) on Reply Card



Next best thing to a sound proof booth.



Shure's new headset microphones are coming through loud and clear. With their unique miniature dynamic element placed right at the end of the boom, Shure's broadcast team eliminates the harsh "telephone" sound and standing waves generated by hollow-tube microphones. The SM10 microphone and the SM12 microphone/receiver have a unidirectional pickup pattern that rejects unwanted background noise, too. In fact, this is the first practical headset microphone that offers a high quality frequency response, effective noise rejection, unobstructed vision design, and unobtrusive size.

Shure Brothers Inc.
222 Hartrey Ave., Evanston, IL 60204
In Canada: A. C. Simmonds & Sons Limited



Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

For More Details Circle (3) on Reply Card