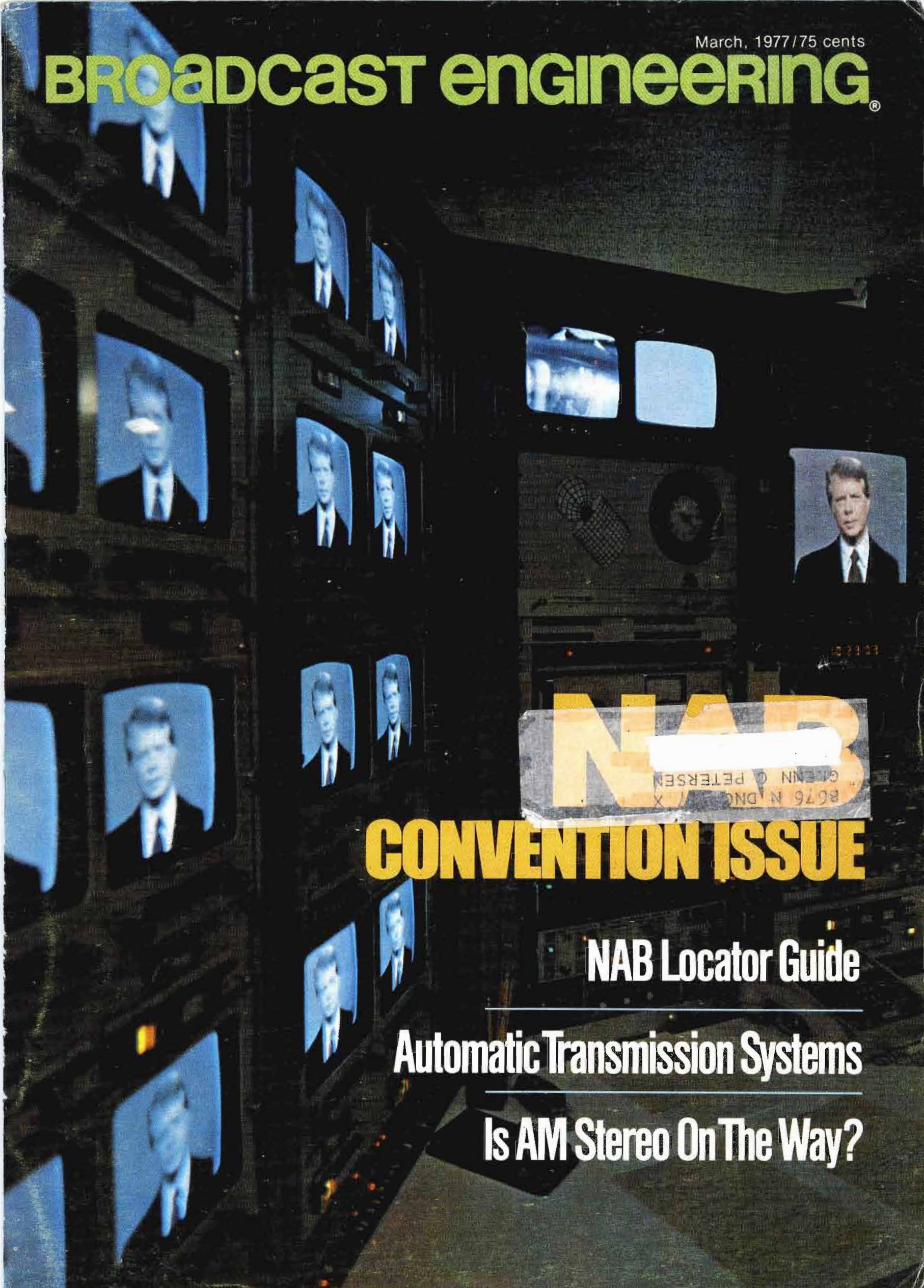


March, 1977/75 cents

BROADCAST engineering®




CONVENTION ISSUE

NAB Locator Guide

Automatic Transmission Systems

Is AM Stereo On The Way?



(213) 655-0303
Your Direct Line
to Quality Professional
Audio Equipment

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

Consoles

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

Tape Machines

3M • Electro Sound and Otari

Synchronizers

Automated Processes • 3M • EECO

Monitor Speakers

Westlake Audio • JBL • Gauss/Cetec

Amplifiers

Crown • JBL • Cerwin-Vega • SAE

Microphones

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

Support Equipment

Allison Research • Amber • Atlas •
Auratone • Countryman • DBX • Dolby •
Editall • Eventide Clockworks • Inovonics
• Koss • Lang Electronics • MRL • MXR •
Multi-Sync • Orban-Parasound • Pandora
• Pultec • Sennheiser • Sony • Stephens
• Superex • U.R.E.I. • White • EMT • Micmix

**Custom Acoustic Design
and Construction**

Complete studio, control room and
live chamber design, construction,
wiring and system interface.

from acoustic design
to down beat...

Westlake
Audio

6311 Wilshire Blvd.
Los Angeles, California 90048
(213) 655-0303

For More Details Circle (1) on Reply Card



CMX SYSTEMS COMPANY

N.A.B. SHERATON PARK

BOOTH #226



**ASK
ALFRED
MULLER
WHY
HE
BOUGHT
THE
CMX 340X
EDITING
SYSTEM**

**SHERATON
PARK**

BOOTH #226

March 27-30

at

N.A.B.

cmx systems
ORROX

3303 SCOTT BLVD., SANTA CLARA, CA

For More Details Circle (4) on Reply Card

- 22 **Sheraton Park Exhibitors.** The first of three hotel articles, showing the exhibitors, their product lines, and new equipment.
- 44 **Shoreham Exhibitors.** Exhibitor lists, including ad locator lines.
- 62 **Washington Hilton Exhibitors.** A third hotel is included in the NAB convention hotel group.
- 33 **NAB Exhibitor Locator Guide.** This special section will help you find the exhibitor's booth on the exhibit floor.
- 74 **ATS: Now That We Have It...BE** visits the FCC for interpretations of the new Rule on ATS. *Robert A. Jones.*
- 84 **AM Stereo: Is It Really Coming?** A brief history of AM stereo and an update on where we stand now. *Ron Whittaker.*
- 98 **AM And FM Loudness.** A rewrite of a paper presented at several NAB seminars on loudness factors. *R. R. Weirather.*
- 108 **BE Tests The Orban Optimod.** A report of on-air tests by BE editor. *Dennis Ciapura.*
- 124 **SMPTE Report.** A summary of the winter meeting of the SMPTE. *Joe Roizen.*

About The Cover

Washington conventions usually mean a visit from the President. The picture was taken by Western Union International as the signal was being distributed via satellite. (Photo courtesy of WUI)

DEPARTMENTS

Direct Current	4
Industry News	8
Zoom In	17
SBE Journal	144
Blue Bananas.....	150
Digital Lab	118
People In The News	140
New Products	68
Ad Index	184
Classified Ads	182

Editorial, advertising and circulation correspondence should be addressed to: 9221 Quivira Road, P.O. Box 12901, Overland Park, Kansas 66212 (a suburb of Kansas City, Missouri). (913) 888-4664.

Editorial

Ronald N. Merrell, *Editorial Director*
Carl Babcoke, *Technical*
Ron Whittaker, *Production Spotlight*
Howard T. Head, *FCC Rules*
Robert A. Jones, *Facilities*
Peggy Brown, *Editorial Assistant*
Dudley Rose, *Graphic Designer*
Joe Roizen, *Video*
Peter Burk, *Radio Workshop*
Dennis Ciapura, *Audio Editor*

CIRCULATION

Gred Garrison, *Director*
Evelyn Rogers, *Manager*



Member, American Business Press



Member, Business Publications Audit of Circulation

ADMINISTRATION

George H. Seferovich, *President*
Mike Kreiter, *Publisher*

ADVERTISING SALES

Gloria Parmenter, *Production*
P.O. Box 12901
Overland Park, KS 66212
(913) 888-4664
Regional advertising sales offices listed on ad index page.

BROADCAST ENGINEERING is published monthly by Intertec Publishing Corp., 9221 Quivira Road, Overland Park, Ks. 66212.

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

SUBSCRIPTIONS: BROADCAST ENGINEERING is mailed free to qualified persons in occupations described above.

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.

Allow 2-3 weeks for new subscriptions.

Allow 4-6 weeks delivery for change of address.

Controlled circulation postage paid at Kansas City, Missouri.

Copyright, 1977, Intertec Publishing Corp. All Rights Reserved: Material may not be reproduced or photocopied in any form without written permission of Publisher.

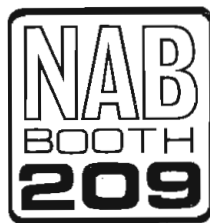


INTERTEC PUBLISHING CORP.



DVE

DIGITAL VIDEO EFFECTS: A unique range of electronic effects previously unachievable except by optical techniques.



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.



March, 1977/By Howard T. Head and Harold L. Kassens

NAB is meeting in Washington this year and this is a special reason for trying to bring some of the new "Washington Spirit" into our forecast, but there are also a lot of new faces and it may be next year before we can tell whether the following guesses turn out to be smooth or crunchy peanut butter, and with this corn we bring you our 1977...

POMPOUS PREDICTIONS

AM Stereo

The work of a Joint Committee sponsored by NAB, IEEE, EIA, and NRBA is well under way and testing of the various systems under consideration is scheduled for this spring. The Committee will complete its work and deliberations during the coming year and will submit its report to the Commission. The Commission is not likely to act on the report until next year.

Automatic Transmission Systems

Fully automatic transmission systems are now authorized for FM radio stations and for AM radio stations employing non-directional antennas. The Commission will shortly expand this authorization to include AM directional antennas (except a relatively few directionals classified as "critical") and TV stations. All that will be required of the licensee is that the person on duty have a restricted radio telephone permit and that a first class operator be available when needed.

Small Diameter Earth Stations

There will be a rapid expansion in the authorization and use of small diameter (4.5 meters or less) earth stations for receive-only satellite uses. There are already over 100 such stations used principally for pay-cable TV operation serving over one million customers, and at least one background music service has successfully tested systems of this type for direct relaying of background music.

Continued on page 6

The CETEC Broadcast Group is really worth listening to.

Mike Shafer and Dick Maynard
are the voice of the *good* group of
CETEC professionals in the Rocky Mountain States.

- Their customers listen to them. They listen to their customers. Jim Hayes, KODI, Cody, Wyoming, wanted to make his news guys more productive. He wanted his guys chasing news, not reading history. So he automated with CETEC Schafer. Ray Ricci, KOLL, Gillette, Wyoming, designed his new 24 hour, 7 days a week, stereo FM around a CETEC Sparta transmitter and CETEC Schafer automation. 28 days later he was in the black! Dell Wood, KRKE, Albuquerque, New Mexico, wanted to program his FM with a progressive rock format. But, he had to be certain he would be competitive and efficient. So he automated with CETEC Schafer. Mike and Dick are used to listening and solving. They've been there before . . . Mike as CE for KREX AM/FM TV, and Dick as GM of KREX AM/FM.
- All of our voices in the field have been involved professionally . . . as owners, managers, program directors, or engineers. Wouldn't you, as a *professional broadcaster*, prefer to talk to a *broadcast professional*?
- . . . about the good group of products from Schafer, Jampro, and Sparta.

 **Cetec Broadcast Group**
The Broadcast Divisions of Cetec Corporation
75 Castilian Drive Goleta, California 93017
Telephone: (805) 968-1561



Mike Shafer

303/243-5373

Dick Maynard

For More Details Circle (5) on Reply Card

DIRECT CURRENT FROM D. C.

Continued from page 4

1979 World Administrative Radio Conference (WARC)

The United States must establish its position for the 1979 WARC within the coming year. This position will include proposals for land mobile sharing of at least some of the UHF-TV broadcast channels. It will be proposed to extend the limits of the present AM broadcast band both upward and downward; proposals to reduce channel width below the present 10 kHz are outside the scope of WARC.

FM Quadraphonic Sound

The report of the NQRC has been before the Commission for some time. The Commission's Laboratory Division is conducting further tests of quadraphonic systems and the results of these tests will be complete within the next few months. The Commission will issue a formal proposal for FM quadraphonic sound during the year and will invite comments from all interested parties.

AM Clear Channels

All parties interested in the AM clear channel case will have been heard from by the middle of the year. The Commission will be confronted with a range of options: maintain the status quo, permit power above 50 kW on some or all of the remaining Class I-A clear channels, and break down some of the clear channels. The Commission will also consider whether to pay serious attention to a proposal by the Corporation for Public Broadcasting (CPB) to create additional AM channels by reducing the channel width to 9 kHz.

Circular Polarization for TV

The Commission has pending a proposal to authorize circular polarization for TV transmission on all channels on an optional basis. The Commission is inclined to act favorably on this proposal, although they have been urged to delay approval until further tests have been made to permit an evaluation of the worth of circular polarization, especially at UHF.

UHF TV Improvement Program

The Commission has already acted to improve the comparability of UHF and VHF antennas attached to receivers. A proposal is pending to lower the permissible UHF receiver noise figure but the Commission has requested substantial additional information. A report will be made to the Commission during the year on a "receiver of tomorrow" expected to feature improved UHF performance.

Now you can get a technician
who knows cameras or a camera
that doesn't need technicians.



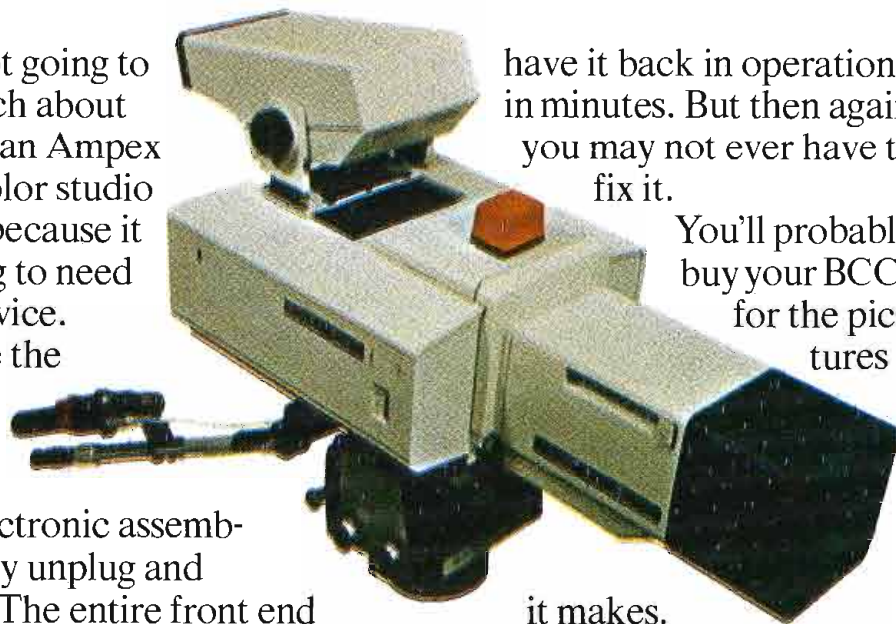
BCC-1 stays buttoned up.

You're not going to learn much about servicing an Ampex BCC-1 color studio camera, because it isn't going to need much service.

Inside the well-designed case, major electronic assemblies merely unplug and slide out. The entire front end also lifts away in a jiffy. And the optical components are sealed against contamination, firmly mated and precisely aligned. If, for any reason, you have to fix a BCC-1 camera, you'll probably

have it back in operation in minutes. But then again, you may not ever have to fix it.

You'll probably buy your BCC-1 for the pictures



it makes.

Steady, centered, sharp pictures within seconds of powering up from a cold start. Highly stable circuitry. Extended-red Plumbicon* tube fidelity. A masterpiece of graphic response.

But don't spend all your time admiring the picture. Save a good thought or two for the BCC-1 reliability. And if you don't trust your own evaluation, ask a technician about Ampex quality.

BCC-1 is the color camera designed by Ampex for broadcasters who can't take chances.

AMPEX

Complete technical and performance specifications are available in a free brochure. Write us at 401 Broadway, Redwood City, California 94063, or call (415) 367-2011.

*T.M. N.V. Philips

Visit Ampex at NAB. We'll be in the Lincoln and Monroe Rooms of the Washington Hilton Hotel.

For More Details Circle (6) on Reply Card

INDUSTRY NEWS

KBMA-TV's Bob Wormington: "Go Earth Stations, Fast"

Independent stations which do not now have Earth Stations for reception of satellite programming offerings were urged to make the investment as rapidly as possible "if we are truly to obtain fourth network status," by Bob Wormington, President and General Manager of station KBMA-TV, Kansas City, at the Fourth Annual Convention of the Association of Independent Television Stations, (INTV), in San Francisco.

Despite the investment which Wormington estimated to be about \$100,000 for a 10-meter dish, "the price of a couple of TV cameras," he pointed out that the savings in satellite transmission for various sports programming alone would amortize the costs in a comparatively short time.

"In 14 different sports events" said Wormington, "KBMA-TV's average savings were 20 percent, satellite vs land lines. In a 45-game baseball schedule our savings will average out to about 25 percent and we'll amortize the cost of our satellite in about five years."

Estimated savings projected by KBMA-TV for transmitting programs from various parts of the country according to Wormington were: Oakland to Kansas City—63 percent vs land lines; From Boston-Kansas City—60 percent; From Toronto-Kansas City—26 percent; Baltimore to Kansas City—an \$1100 savings; From Minneapolis to Baltimore—direct \$1400 savings; via land lines from Chicago—an \$800 savings and from coast-to-coast (New York-Oakland) a savings of over \$4000 via satellite. All of the savings were based on a three-hour usage; the average time of a baseball game.

Wormington noted that if the independent stations were to become viable fourth network representatives, independents in the top

25 markets should have Earth Stations for effective distribution of available alternate programming efforts. "If we can serve the top 25 markets via satellite-Earth Station," said Wormington, "we can approach a true network status. If we can add a few of the network affiliates via our programming schedules in other markets we will have further expanded our potential as a possible fourth network."

Pointing out that the new "Operation Prime Time" programming concept, designed specifically for independent TV stations was "a giant step towards the development of an alternate network," Wormington said that this pioneering independent station programming effort coupled with a mixture of top-level sports and other high quality program offerings, "could be the corner stone for attaining fourth network status for independents in the future."

In addition to the need for more independent stations to invest in Earth Stations in the near future, Wormington also noted that there was a definite need for more transmission points on the part of the satellite operators. "RCA, for instance," said Wormington, "has only 6-up links and 4-down links in New York. 3-up and 2-down in Los Angeles, 2-up and 1-down in San Francisco, 1-up and 1-down in Houston and 2-up and 1-down in Atlanta. Chicago," he said, "is a major bottle-neck for distribution having only 1-up and 1-down link. There should be links available for each of the top 25 markets."

Wormington also told the INTV convention delegates that there were "few" technical problems to setting up Earth Stations once clearance had been given. "It took us about 10 days to set up our dish outside our station site," he said, "and when we went on the air

carrying the ITNA news programs at the Republican Convention in Kansas City, there were few technical flaws, the picture was excellent and we had no trouble with the feed to the ITNA stations."

Wormington also warned the independent station operators not to wait for the smaller dishes people have been talking about. "The FCC has approved a small Earth Station antenna of 15 foot diameter (4.5 meters) but it is not of broadcast quality," he said. "So be careful."

KBMA-TV, which acted as the Flagship station for the distribution of the ITNA news feeds from the Republican Convention was also the first TV station to telecast baseball games direct from Oakland to Kansas City via satellite as a part of its regular programming schedule. The station is also to add a transmit capacity to its earth station in Kansas City, which will make it one of three broadcasting stations so equipped.

Senators To Address NAB Convention

Senator Ernest F. Hollings (D-S.C.) scheduled to become chairman of the Senate Communications Subcommittee, and Congressman Lionel Van Deerlin (D-Calif.), chairman of the House Communications Subcommittee, will address radio and television executives during the 55th annual convention of the National Association of Broadcasters.

The convention and concurrent broadcast engineering conference will be held March 27-30 in Washington, D.C.

Senator Hollings will speak at the opening television session March 28 and at the general radio session March 29. Congressman Van Deerlin will address the opening radio session March 28 and the television session March 29.

The meetings will be held in three Washington hotels—radio in the Sheraton Park, television in the Washington Hilton, and engineering in the Shoreham Americana. (See articles in this issue for exhibitor lists and exhibit floor plans.)

This is National Be Kind To Tape Operators Week

- Let him know at least 5 minutes in advance when overtime is required.
- Try to limit tape schedule changes to 20 seconds before air time.
- Tell him the cart machine is down at least 15 seconds before air time.
- Be gentle when you tell him the next break is scheduled for seventeen 10 second spots.
- Do not schedule spots on machine #7 when you only have 6 VTR's.



"Max, this is the third free giveaway poster in the series."

"Yes, Maxine, and anyone can call or write for their copy."

**SEE US AT NAB BOOTH #226,
SHERATON PARK HOTEL.**



Videomax has refurbished more types of quad heads than any other company in the world. See Videomax for heads "better than new" with the best price and performance advantages in the industry.

vmx[®] videomax[®]

Videomax, An Orrox Company
3303 Scott Boulevard, Santa Clara, CA 95050
Phone: (408) 988-2000 Telex: 910-338-0554

SALES AND SERVICE — New York: (212) 947-8031, Los Angeles: (213) 980-7927, Atlanta: (404) 992-4490

Munich Office: (089) 967-622

For More Details Circle (7) on Reply Card

The eyes of the world are upon us.

Around the world, more people now look to Electrohome for excellence in video equipment than ever before.

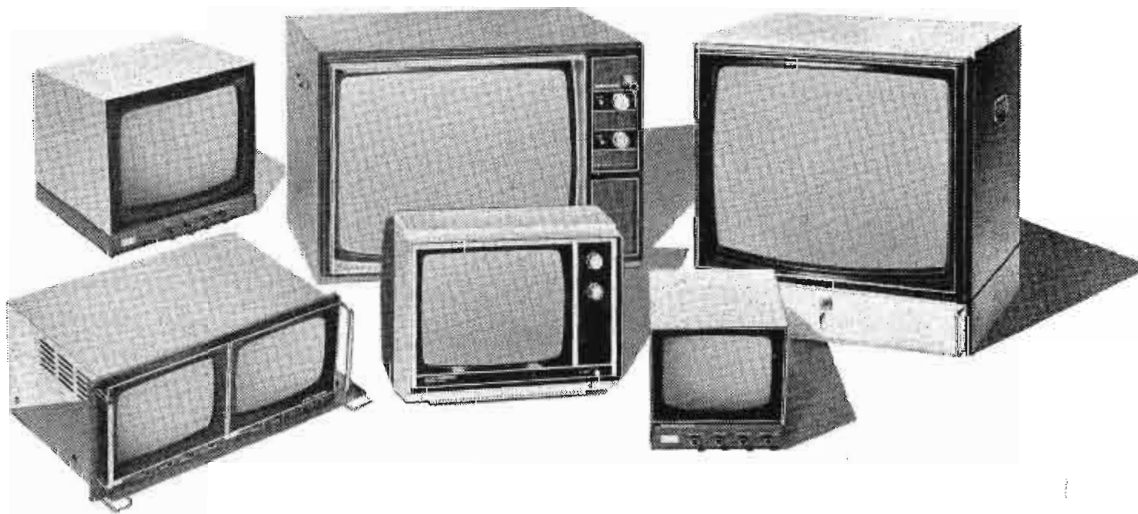
We manufacture solid state video monitors in monochrome and color to NTSC and PAL standards for broadcast, educational, industrial, commercial, medical, security and data applications.

The reason for such wide-spread acceptance is two-fold: a standard of quality and a record of service to our customers that have earned our products top rating around the world.

For complete information, contact Electrohome Limited at one of these offices:

Kitchener, Ontario, Canada N2G 4J6
519/744-7111 Telex 069-5449

Electro-Visual Corporation of America
3617 West MacArthur Blvd.,
Suite #508,
Santa Ana, California 92704
714/545-6991 (Mr. Norman Bennett)



ELECTROHOME

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

Distributed in:

Austria	France	Netherlands	Sweden
Australia	Greece	New Zealand	Switzerland
Belgium	Hong Kong	Norway	Taiwan
Canada	Israel	Philippines	Thailand
Denmark	Italy	Portugal	United States
Egypt	Japan	Saudi Arabia	United Kingdom
Eire	Malaysia	South Africa	Venezuela
Finland	Mexico	Spain	West Germany

For More Details Circle (8) on Reply Card

Industry News

NAB Battling FTC On Drugs

The National Association of Broadcasters said the proposal to regulate the advertising of over-the-counter drugs by the Federal Trade Commission "would unduly restrict the flow of information and disserve the public whose protection is intended."

It further stated that the manner in which the Commission has conducted its inquiry raises substantial legal and Constitutional questions.

In its filing with the Commission, NAB said the FTC should not extend the Food and Drug Administration's labeling requirements to advertising, adding that it "is apparently determined to take the FDA's judgment as gospel from which there can be no deviation."

The Association pointed out that strict limitations on allowable terminology "are inappropriate and incompatible with the broadcast media and its impact upon viewers and listeners."

Product labels and advertising, NAB said, "may not always serve the same roles or functions for consumers. A term which is appropriate for a label due to its scientific exactitude may for that same reason be inappropriate for advertising. Scientific terms are rarely part of the consumer's everyday vocabulary."

Furthermore, NAB stated, the Commission cannot simply presume that only pre-cleared or FDA-approved terminology is not deceptive or unfair as the law clearly places the burden upon the Commission to prove, by substantial evidence, the validity of such a presumption.

Another point NAB raised is that the FTC rule would not now and should not apply to ingredients, claims or other conditions placed in category III by the FDA. Other parties to the proceeding have asked that the rule be expanded to include products falling within category III. (Category III includes those products for which data are currently insufficient to permit an

Continued on page 14

the McCurdy package

The McCurdy Package offers exceptional user flexibility. Individual components are designed to integrate and expand in accordance with future needs.

Our systems engineering is backed by 28 years of experience in building quality equipment for the country's leading stations.

SS8400 mono package



McCURDY RADIO INDUSTRIES INCORPORATED, 1051 CLINTON STREET, BUFFALO, NEW YORK 14206 (716) 854-6700 TWX 610-492-3219
 McCURDY RADIO INDUSTRIES INCORPORATED, SADDLE RIVER, NEW JERSEY P.O. BOX 86, 07458 (201) 327-0750 TWX 610-492-3219
 McCURDY RADIO INDUSTRIES LIMITED, 108 CARNFORTH ROAD, TORONTO, ONTARIO, CANADA M4A 2L4 (416) 751-6262 TELEX 06-963533

For More Details Circle (9) on Reply Card



The fire, earthquake, election and touchdown company now brings you love scenes in Studio Two.

The new HK-312 studio camera from Ikegami, the ENG experts.

Wherever there's been news, from natural disasters to national elections to sport events, Ikegami ENG cameras have been there with the news teams. Now Ikegami makes news of its own: the introduction of our new state-of-the-art HK-312 studio and field camera.

We've built ENG cameras so good in the rough-and-tumble of news-gathering that more Ikegami ENG cameras are in use than all others combined.

So imagine how good an Ikegami camera can be in the stable environment of a studio.

Very good indeed.

Ikegami's new HK-312 color-TV camera is like no other. It has a built-in minicomputer that helps trim the daily camera checkout from a one-hour ritual to an automatic run-through that's shorter than a 20-second commercial. With its auxiliary computer, you'll be able to cycle your Ikegami HK-312 (and up to four other Ikegami HK-312 cameras linked to it) through every adjustment parameter in under two minutes: white balance, black balance, flare correction, gamma correction, video gain, beam alignment, and eight registration functions.

All this before you start shooting. The HK-312 gives you three 30-mm Plumbicon tubes for highest picture quality. You frame your shot on a high-intensity, high-resolution, seven-inch tiltable viewfinder. Signal-to-noise ratio is better than 54 dB.

We've combined the zoom lens and camera tube into a single rigid assembly for highest accuracy of the optical axis. Class-A deflection amplifiers assure maximum linearity and best picture quality. Black level balance correction is automatic. Picture quality and brightness are maintained in spite of flare.

A complete two-line image enhancer provides horizontal and vertical detail correction. A special comb filter keeps background noise to a minimum.

All this and a lot more.

If your budget or production requirements are smaller, use our tried-and-tested TK-355 studio camera. Five were used for network feed at the 1976 Democratic National Convention where camera failure would blow a lot more than a few fuses.

The TK-355 uses three 25-mm Plumbicon tubes which are bias-lighted for reduced lag at low lighting levels. This reduces studio lighting and air conditioning power consumption. And the camera is more compact and lighter, a little easier to maneuver. The unique half-rack CCU facilitates multi-camera studio installations.

Both broadcast cameras use TV-81 minicable for ease of handling.

If you need a small, fixed-position camera for announcer booth and newscasting, check out the Ikegami HK-309. It can be operated remotely or simply turned on and left in fixed position.

For movies, the Ikegami TK-950 is a large-image film-chain broadcast camera system for 16-mm or 35-mm film or slides with highest quality color reproduction. Much of its operation is automatic, requiring a minimum of engineering support. Its unique optical system is dust-shielded and unusually compact.

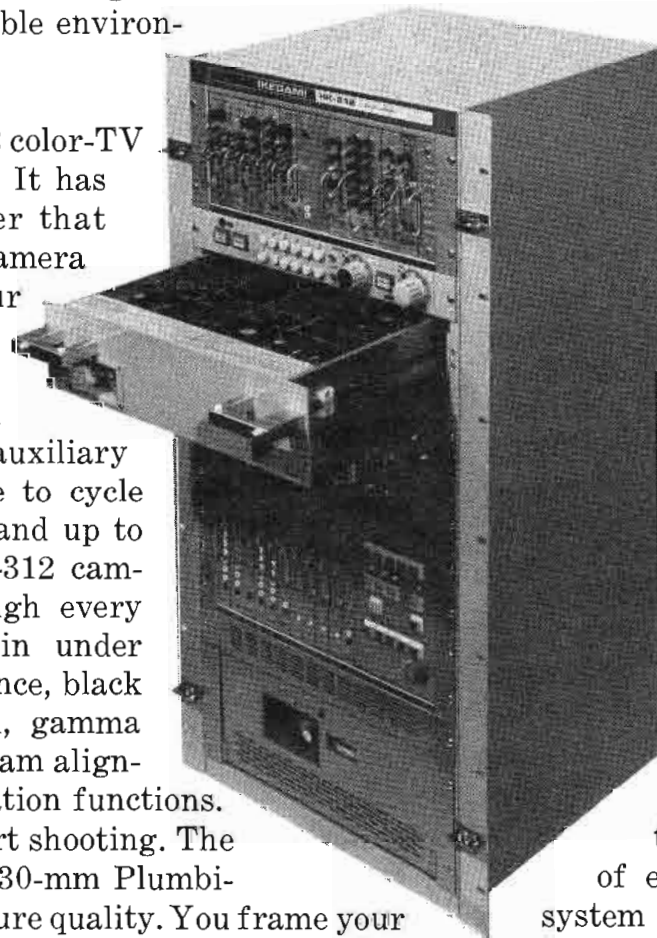
Ikegami has been famous for its ENG cameras for a long time. Now take a look at what we can do with studio cameras. For specs or a demonstration, get in touch with us. We have nation-wide distribution.

Ikegami

Ikegami Electronics (USA) Inc., 29-19 39th Ave., Long Island City, N.Y. 11101 • (212) 932-2577

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

Camera-control unit for the HK-312



For More Details Circle (10) on Reply Card

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

See us at NAB - Booth 107, Sheraton-Park
A member of the GEC-English Electric Group of Companies

Industry News

Continued from page 10

FDA classification as either generally recognized as safe and effective or not safe and effective.)

NAB said that "unless and until the FDA ultimately deems these products or product claims as falling within the prohibitions of category III, the FTC has no authority to regulate their advertisement."

Finally, NAB said that the proposed rule would prohibit all speech not previously cleared by the FDA and that the rule would affect commercial speech regardless of its ultimate truthfulness. Adoption of such a rule would raise substantial First Amendment questions, the Association said.

Clear Channel Deadline Extended

The Commission has extended to April 25 the deadline for filing reply comments in the standard broadcast clear channel inquiry and rule-making proceeding.

On December 5, 1975, the Commission reopened its AM clear channel proceeding that had been terminated in 1961. The FCC's stated purpose of the proceeding was to seek information for possible amendment of the rules governing the use of the 25 clear channels listed in Section 73.25(a) of the rules, including allowing Class I-A stations to operate with higher power (in excess of 50 kw).

Originally, comments were due by March 16, 1976, and replies by April 18, 1976. These dates subsequently were extended several times resulting in the current deadlines of November 22 for comments and January 24 for replies.

Clear Channel Broadcasting Service (CCBS) requested that the date for filing reply comments be extended for five months, until June 30, contending that the extension was necessary due to the lengthy, complex and numerous comments submitted in the proceeding.

It also pointed out that its engineers currently are engaged in

Continued on page 16

For More Details Circle (11) on Reply Card

The Memorex Video Cassette. It looks like any other on the outside. But it's one of a kind on the inside.



The inside.

That's where the Memorex Video Cassette with Chromium Dioxide Tape excels.

First we make our own cassette shell to be sure it's a perfect fit for the tape. So the chance of mechanical failure is negligible.

Then we add the traditionally fine performance of the Memorex Chromium Dioxide Tape. Tape that offers precise image quality again and again. And once we put it together, you have the video cassette you can rely on. From the inside out.

Memorex Video Tape. Because we make it inside and out.



MEMOREX VIDEO TAPE.

Precision made for precise performance.

©1976, Memorex Corporation, Santa Clara, California 95052

For More Details Circle (12) on Reply Card

FIDELIPAC® Accessories and 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 \$ 15.00
MR-200 \$145.95

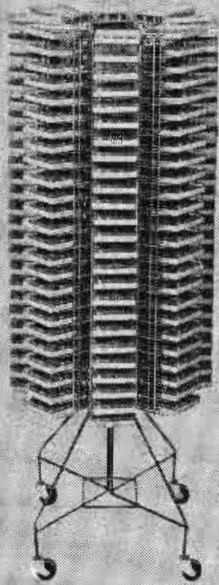


TABLE TOP CARTRIDGE RACK (not shown) Model TR-96 holds 96 Type A cartridges. Model TR-48 holds 48.

TR-96 \$73.85
TR-48 \$38.55

ALIGNMENT PROBLEM?

Keep your cart equipment in perfect working order with:

- 350STA Alignment Cartridge \$38.50
- 350STF Wow and Flutter Cartridge \$24.50
- 350STQ Cue Test Cartridge \$35.00
- Head Insertion Gage \$3.35
- Height Gage \$14.95



• Right Angle Zenith Gage \$21.75

CART-E-RASE DEMAGNETIZER

Can be used for erasing cartridges, reel-to-reel tape, film sound striping, etc. \$34.50



STUDIO ON AIR LIGHT

Brilliant red lettering on jet black background can be seen in the brightest ambient light conditions. \$29.95



Contact your Fidelipac Distributor or

FIDELIPAC®

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

See us at NAB - Booth 218, Sheraton-Park

® Trademark

For More Details Circle (13) on Reply Card

Frezzi Belts 'em



For hand-held lights, hand-held video color cameras, 16mm ciné cameras.

Model F-30 Slim-line Electronic Power Belt. Output 30 volts, 4 Ah, with reliable nickel-cadmium batteries. Automatic drop-out protects batteries from over-discharge. 12-hour trickle charger, 120 volts AC, 50/60hz, standard. Non-crack epoxy-finish metal battery compartments on leather.

½-hr. Rapid-Charge: F-30EXF Belt with external charger.

For information call (N.J. 201) 427-1160 (N.Y.C. 212) 594-2294



Frezzolini Electronics Inc.

7 Valley St. Hawthorne, N.J. 07506 USA

For More Details Circle (14) on Reply Card

Industry News

Continued from page 14

preparing comments to the Third Notice of Inquiry in Docket 20271 regarding preparation for the World Administrative Radio Conference (WARC), which has caused delays to its preparation of comments in the clear channel proceeding.

FCC Will Accept Small Dishes

Subscribers to many of the nation's more than 3,400 cable television systems could have their viewing options expanded dramatically as a result of action taken by the Federal Communications Commission.

By unanimous vote, the FCC has agreed to accept applications for small dish antennas to be used by cable systems in the reception of domestic communications satellite transmissions. The decision, which was consistent with extensive engineering data supplied by the National Cable Television Association, will reduce by nearly a third the cost of constructing earth station facilities.

NCTA President Robert L. Schmidt hailed the FCC's decision. "The Commission's new procedures for licensing earth receiving stations simplify applications and will open satellite service to many small and medium-sized communities," he said.

Under previous FCC rules, receive-only earth terminals used in satellite/cable television interconnections had to be at least nine meters in diameter. The Commission, after reviewing extensive data submitted by NCTA, said it would process applications for earth station antennas (or dishes) as small as 4.5 meters diameter meeting applicable technical requirements.

The Commission's action will allow smaller cable systems to expand program and information distribution options at considerable savings. Nine meter dishes cost approximately \$100,000. The newly-approved smaller facilities cost between \$25,000 and \$50,000 to install.

Zoom In!

This is the official column of the American Society of TV Cameramen (ASTVC). The ASTVC can be contacted by writing to: P.O. Box 296, Sparkill, NY 10976. (914) 359-5985.

Take 1!...ASTVC at the Inauguration

Among the many engineers, cameramen and assorted technical wizards assigned to the Washington area for the 1977 inauguration of President Jimmy Carter were many carrying the ASTVC identification card. Tom Jocelyn from Metro-Media's WTTG, Frank Melchiorre and Marv Cahn from ABC, NY, and George Weisz along with Bob Zweck from NBC, NY to name just a few....We were happy to have George along to rap with as he was one of the original "founding fathers" of ASTVC.

Although there were many NBC technical-types assigned to the big event, there were only five men assigned the specific chores of airing the nightly news....and they were all from the NY crew who regularly do the show when it is in Rockefeller Center including, in addition to Weisz and Zweck, Jack Durkin, Charlie Wilson, and Arnold Gold....

The assignment was a good one, the Metro-liner travel enjoyable, and the hotel accommodations at the Arlington Hyatt House luxurious....but a bonus feature was the chance to meet with counterparts from other stations such as WTOP, WRC,...etc....Indeed, after exchanging some questions and answers, we find that people such as WTOP's Charlie Balkan and WRC's Leigh Sutherland and George Lopez might be the nucleus for a membership drive to add to the group now formed at WTTG-TV....

For the benefit of any reader interested in affiliating with the Washington Metropolitan area chapter, we suggest that he or she contact the membership director, ASTVC, Box 296, Sparkill, NY 10976. Those interested will be put in touch with a Washington area rep closest to your home or station.

As a note of technical interest, we should point out that whereas in NY a cameraman is a cameraman (for the most part), in Washington **one** does multi-functions as is true in most of the rest of the nation's TV stations....It was quite an experience to be sent up

the ladder to hang lights, change the filaments, set the dimmers and so on....And in all truthfulness, quite enjoyable....

Take 2!...The Swedish Guild of TV Cameramen proposes an Alliance!

The American Society of TV

Cameramen has been corresponding with its British counterpart (The Guild of TV Cameramen) for some time now. One of the subjects that is the center of attention concerns itself with the eventual formation of some sort of international

Continued on page 18

Want to get
more excitement
on your
TV screen?

With Chyron II and
Chyron IIIB TV Titling
and Graphic Systems
you can...

ZOOM

OVERLAP COLOR

ANIMATE Shift

GRAPHIC STORE CRAWL

ROLL MULTIHUE

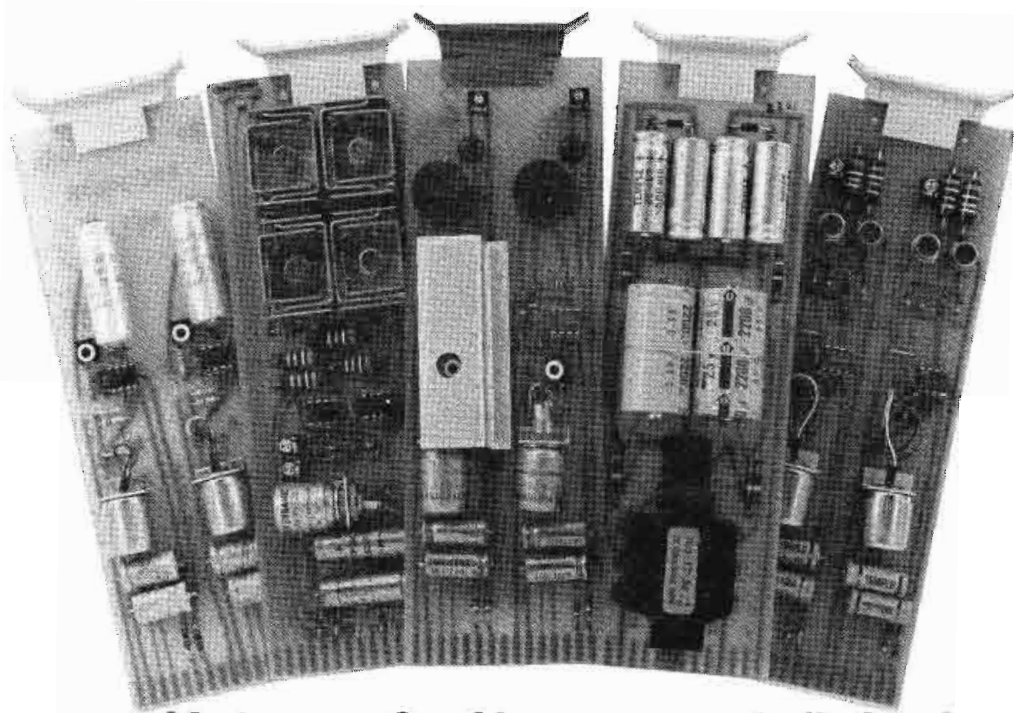
Outline etc. FLASH

FOR COMPLETE INFORMATION CALL OR WRITE:

CHYRON TELESYSTEMS
DIVISION OF CHYRON CORPORATION

223 NEWTOWN ROAD, PLAINVIEW, NEW YORK 11803 • TELEPHONE: (516) 249-3296 • TELEX: 144522 CHYRON PLVW
NAB SHERATON PARK BOOTH NO. 303

It's in the cards



and Integra 3 offers you a full deck

- | | |
|--------------------------------|----------------------------------|
| Mike preamps | Mike preamp/limiters |
| Line preamps | Stereo preamp/limiter |
| Line amplifiers | Stereo mike preamp/limiters |
| Booster amplifiers | Stereo line preamps |
| Bridging amplifiers | Stereo bridging preamps |
| Stereo amplifiers | Stereo booster preamps |
| Stereo preamps | Monitor power amplifiers |
| Four-channel | Stereo equalized phono preamps |
| booster amplifiers | Stereo equalized tape preamps |
| Distribution amplifiers | Switchers |
| Mixing amplifiers | Line-level transformers |
| Power supplies | Stereo line-level transformers |
| Preamp/compressor | Tone oscillators |
| Mike preamp/compressors | Stereo mixing preamps |
| Stereo mike preamp compressors | Tape automation oscillators |
| Stereo preamp/compressors | Tape automation notch filters |
| Preamp/limiter | Mono and stereo remote controls. |

We have more cards and they're less expensive.

Whether you are in broadcasting, recording, sound reinforcement, communications, engineered sound or theater sound—we have the cards for you.

Integra 3 is a complete system of audio processing components and accessories in modular form built around a large number of the highest quality, standardized PC boards which use the latest IC technology. The boards are compact in size (only 2½ by 7½ in.), use epoxy-glass 2-ounce clad material with precious-metal-plated contacts. The circuits are the latest IC op amps and other similar components which feature widest frequency range, lowest distortion, highest signal-to-noise ratios, best overall performance, maximum economy and reliability. Servicing is simplified by the slide-in/slide-out modular design.

For complete details, contact **Robins Broadcast & Sound Equipment Corp.**,* a Robins Industries Corp., Commack, N.Y. 11725. Telephone 516-543-5200.

*Formerly Fairchild Sound.

See us at NAB-Booth 545, Shoreham



For More Details Circle (16) on Reply Card

Zoom In!

Continued from page 17

federation of TV associations. Vern Dyer, our British liaison member, has been proposing this sort of thing from time to time. Now, we have received direct communication from the Swedish Guild....who propose the very same sort of thing. It seems that after consulting with the British, the Swedish Guild will be taking the initiative in establishing some sort of dialogue relevant to "ground rules" for all interested national groups....We, in our turn, have responded to their inquiry with a hearty endorsement of the project. We eagerly await further developments on this international scene and will certainly keep the membership informed of any and all progress....The prospect of an international convention of TV cameramen sounds mighty interesting....Where do you propose we hold the first one?....

Take 3!...T-Shirt, anyone???

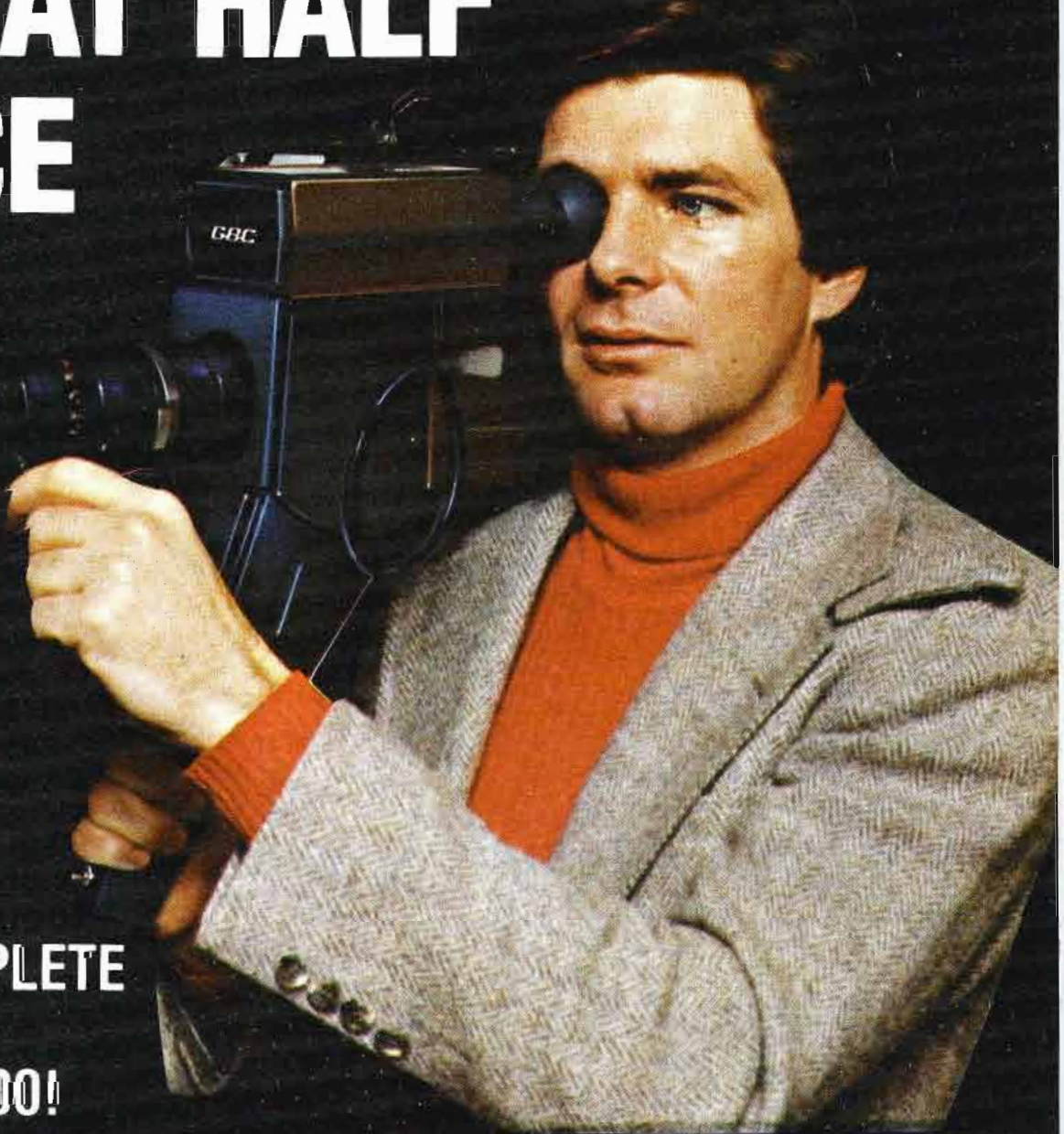
Associate Director for Member Services Greg Suhm has informed this column that the T-Shirts are about to be filled....Greg, who incidentally designed ASTVC's new logo, is about to place an order for X number of these shirts which will feature the ASTVC logo over the appropriate pocket area and which will come in assorted sizes such as small, medium, large and extra large. We **know** that there are many of you out there in radio-land that have been eagerly awaiting just such news....Therefore, we now ask you to get off your camera pedestal and let us know how many shirts you want for your wife, kids, favorite in-laws and, of course, yourself....Give us an idea of quantity and the sizes desired and we will forward an order form with all further particulars and the price for the whole bit....At this writing, we anticipate that the shirts will be in the price range of \$3.00....

Greg tells us that next up will be lapel insignia, tie-tacs, charms, blazer patches, license plates and other items featuring the ASTVC logo....Please write in to this column and let us know what items

Continued on page 20

NOW! AN 'ENG' BROADCAST CAMERA AT HALF THE PRICE AND TWICE THE QUALITY!

THE GBC CTC-7X COMPLETE
& SELF-CONTAINED
FOR LESS THAN \$20,000!



INCLUDES—CAMERA... VIEWFINDER... 6X ZOOM LENS...
PICK-UP TUBES... BATTERY BELT WITH CHARGER... PLUS
THESE OUTSTANDING FEATURES—SELF-CONTAINED, no
backpack; HIGH SENSITIVITY—broadcast pictures at 20FC;
usable pictures at 5FC; +6 db BOOST; PRISM OPTICS; BIAS
LIGHTS; DIGITAL AUTOMATIC WHITE BALANCE; VERTICAL IN-
TERVAL COLOR BARS; ENHANCER; 1½" CRT ELECTRONIC
VIEWFINDER

NOW IN STOCK FOR IMMEDIATE DELIVERY
FOR FAST ACTION CALL TOLL FREE 800-221-2240

GBC **CLOSED** **TV** **CORP.**
CIRCUIT

NEW YORK:
74 FIFTH AVENUE
New York, N.Y. 10011
(212) 989-4433

WEST COAST:
20620 SOUTH LEAPWOOD AVENUE
Carson, California 90746
(213) 538-4770

BOSTON • WASHINGTON D.C. • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • FACTORY: PRINCETON, N.J.
For More Details Circle (17) on Reply Card

NECESSITY A ~~LUXURY~~ YOU CAN AFFORD.

Routing Switchers:

Frame Size (system expandable)

40 x 20	3 level	audio & video plus aux.
20 x 10	3 level	
20 x 10	5 level	
16 x 10	audio & video with P.B. control	
15 x 2	audio & video	variety of controls
15 x 6		
15 x 12		
48 x 10 or 24 x 20	audio variety of controls	

40x

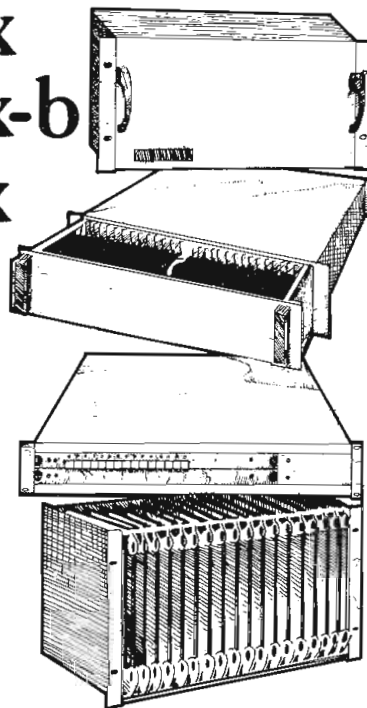
20x-b

20x

Rx

15x

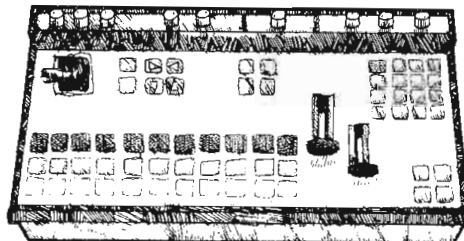
Ax



Production Switchers:

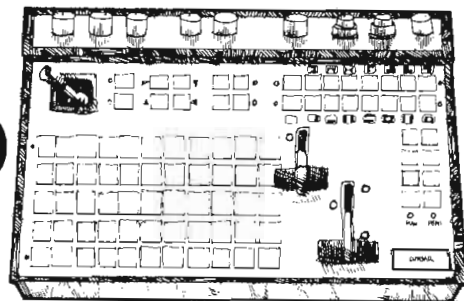
3 Bus 11 Inputs
Soft Wipes
Linear Key
All Vertical Interval
19 Effects
28 Features in one
Low Cost Unit

3100



5 Bus 11 Inputs
Remote Control
Chroma Key
Key Edger
Border Generator
Audio - Follow
Soft Wipes and Keys

3300



COMING SOON

3400

6 Bus - 3 Mix Effects

Low Cost



COMMUNICATIONS TECHNOLOGY, INC.

3070 Leeman Ferry Rd. Huntsville, Alabama 35801 Phone 883-7370 TWX 810-726-2105

Zoom In!

Continued from page 18

you might be interested in, even if we failed to mention them above. If you have a good idea, we'll try to supply it.

Speaking of thoughts from the Member Services area reminds me that Jack Keyes of Canon, USA let us know that he will be expecting to see as many of us as possible at their Hospitality Suite in Washington during the upcoming NAB convention....This is an event that we should all try to attend, if at all possible....Also important....we would like you all to try to be there for the presentation to BE and Ron Merrell....

Take 4!...CB and ENG

What with the emphasis shifting from film to ENG in the news area, more and more of our colleagues are being assigned to mobile vans or station wagons or even converted sedans....They inform this column that in addition to the standard commercial phone that ties them in with their assignment desk, they find both CB and ham gear coming in mighty handy. It seems that this additional gear gives them the extra "ears" sometimes quite important while travelling through areas with fast breaking news such as in disaster areas. We can foresee how those possessing this assortment of electronic gear may have the "jump" over those not so equipped....Another desirable item for the mobile ENG crew may very well be the HI/LO band scanner for the PS band along with the weather channel....

Whenever stories are sent to this column relating experiences in the field utilizing the aforementioned equipment, we shall pass it on to our readers. Send your info to: Editor, ASTVC Column, Box 296, Sparkill, NY 10976.

Until next time....
SLO-fade to black...

For Latest News
See
Direct Current page 4

At NAB I'll show you an easy new way to measure IMD



INTERMODULATION DISTORTION MEASUREMENTS TO .001%

"If you'd like a really easy way to measure IMD, I'll show you one at NAB.

"I can measure IMD just by pushing a button. How's that for easy measuring?

"And I can switch between IMD and harmonic distortion measurements just by pushing a button.

"What's more, I can measure IMD as low as .001% in 3 seconds.

AVAILABLE IN BOTH S-T SYSTEMS

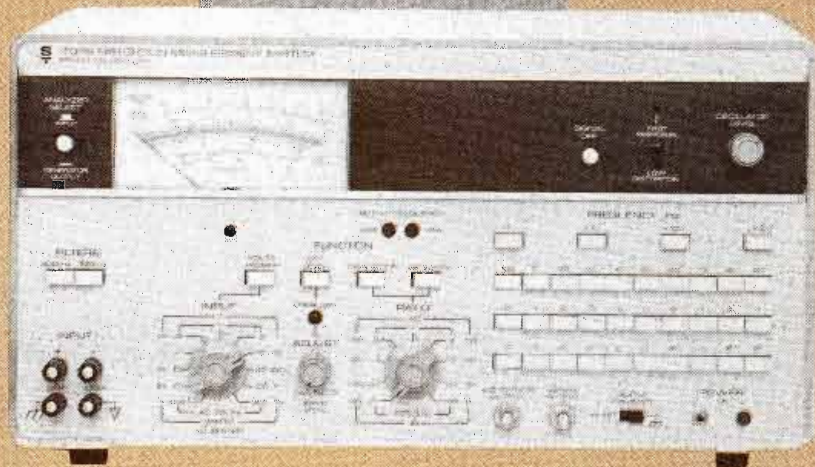
"The IMD feature is an option in Sound Tech's Total Harmonic Distortion Measuring Systems. You can have the option in both the Sound Tech 1700B and 1710A Distortion Measuring Systems. The IMD controls are all in this panel section I'm holding.

WE'LL HAVE OTHER NEWS AT NAB

"I'll also have these other features to show you at NAB:

- Our 1710A System for measuring distortion in **balanced circuits.**
- Our Automatic Set Level feature that lets me (or you) make 10 distortion measurements in one minute.

"Come to booth 561 at the Shoreham Americana and say hello."



SEND FOR FREE INFORMATION

To:
SOUND TECHNOLOGY
1400 Dell Ave.
Campbell, Ca. 95008

Send coupon now and
get the literature
on this important
measuring development.

Name _____

Firm _____

Street _____

City, State _____

Zip _____

Phone _____

Summary



SOUND TECHNOLOGY

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

For More Details Circle (19) on Reply Card



Sheraton Park Exhibitors Guide

Although Washington, D.C. has been the scene of many NAB conventions, the 1977 version will be the last in that city for several years. Typically, the Sheraton Park has been the headquarters hotel for past conventions. And just as typically, convention attendees have been getting lost in its caverns or stuck between floors in its elevators.

And this year, with the surge of new exhibitors and expanding demands for floor space, the Sheraton Park will share the spotlight with the Shoreham and the Washington Hilton. The sheer size of it all will make this the biggest and most challenging of all NAB conventions.

In this article, we're bringing to

you all the information we had at press time on who would be showing what equipment and what will be shown for the first time. You'll note that some exhibitors have a red "running line" under their exhibit info. This red line refers you to the exhibitors advertising in this issue.

If hospitality suite information was available at press time, it was included. And in another section of this issue you'll find a set of floor plans, showing—hotel by hotel—where all the exhibitors are located. We'll have extras to hand out at the convention. Last minute changes will be included on the last page of the section we'll hand out at NAB.

Acrodyne Industries Inc.—Booth 202. 100 Watt UHF translator, 10 Watt VHF TV translator, 10 Watt VHF TV transmitter, 10 Watt UHF translator, and 100 Watt VHF transmitter.

New: 6 kW visual 600 Watt aural VHF externally diplexed transmitter.

[See ad on page 125](#)

A. F. Associates—Booth 224 (in Consolidated Video Systems booth). Remanufactured tape machines.

New: AFR-1200 quad tape machine.

[See ad on page 27](#)

Alford Manufacturing Company—Booth 212.

Amco Engineering Co.—Booth 308. Video monitoring consoles, studio control consoles, studio work stations, power supply cabinets and

Continued on page 26

The CVS Time Machine

It's the CVS-520, only digital TBC that can colorize a quad from the past . . . bring quad quality to today's ENG . . . and handle signal processing breakthroughs yet to come. In fact, just about any TBC job you can think of, the CVS-520 can do. For segmented and non-segmented VTRs, both quad and helical.

For example, the CVS-520 automatically detects direct or heterodyne color. So, you can switch at vertical intervals between any vertical locked VTRs, no matter what color system they use.

In addition, an automatic burst-add circuit provides burst at the output at all times (unless programmed to

be deleted) even when you're processing monochrome signals.

There's also a built-in fully adjustable proc amp, a built-in digital drop out compensator, a line by line velocity corrector, and a gen-lockable sync generator. You also get digital output drives for future expansion.

As for quality, a few specs tell the CVS-520 story. Like a signal to noise ratio of 60 dB. A differential phase less than 2 degrees. And differential gain less than 2 percent.

In short, the CVS-520 is all the TBC you're likely to need for a long time to come. For a demonstration, call or write.



CVS Consolidated
Video
Systems, inc.

For More Details Circle (20) on Reply Card

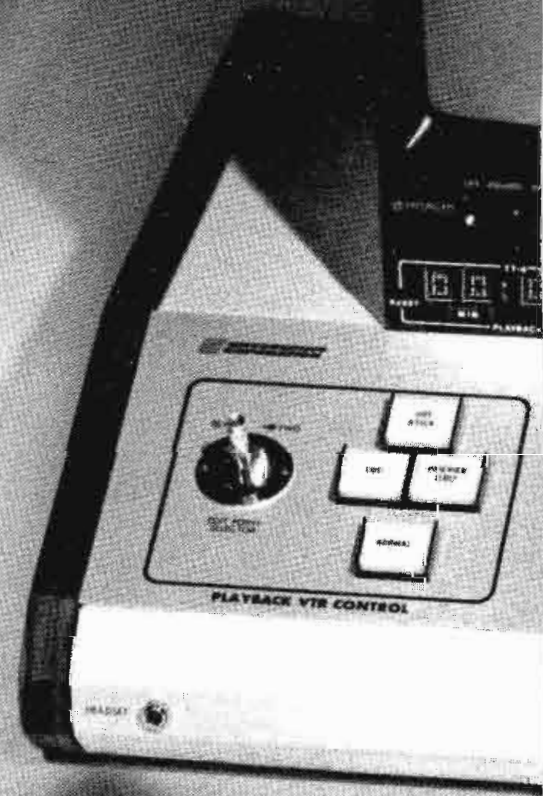
3300 Edward Avenue, Santa Clara, California 95050 (408) 247-2050

Introducing the Family of

Now you can add that perfect touch of editing professionalism to any news story or commercial on helical videocassettes with Convergence Corporation's Family of Fabulous Frame Finders. Discover how fast and easy it is to find any frame you're looking for and how simple it is to automatically do what you want once you're there.



SM-2 Joystick Search Module gives you incredibly flexible tape handling and remote control on a stand-alone VCR. The unique Convergence joystick allows you to see pictures at speeds continuously variable from still frame to three times normal play in forward and reverse. The LED tape timer lets you quickly screen and log news stories or commercials for pre-edit decision making. The SM-2 also programs precise on-air roll cues and lets you slave extra playback machines for A/B rolls.



ECS-1 Joystick Editor provides, for the first time, film-style editing flexibility on helical videocassettes. News film editors converting to video tape find the ECS-1 a snap to operate. In fact, networks and group owners are already using the ECS-1 by the hundreds. Production houses have found our Editor to be perfect for economical on-line and off-line editing. The Convergence Editor is great by itself, but it's fantastic when combined with the PC-3 and the TT-4 — the newest members of our Fabulous Family.

See us at NAB-Shoreham Hotel, Booth 509

For More Details Circle (21) on Reply Card

Fabulous Frame Finders.



TT-4 Digital LED Tape Timer fits neatly under the monitor on a standard ECS-1. It counts control track pulses to let you know where you're at and where you're going. It's just what helical video tape editors have been looking for. The TT-4 counts up and down and can be reset to zero or preset to any number. It even times assemble edits to give you accumulated program time. Buy it now or add it later.

PC-3 Program Computer combined with the ECS-1 gives you precise end insert timing and scene duration timing. Insert and stopwatch functions are programmable with the simple-to-operate PC-3 computer keyboard. Now you can automatically preview insert edits as many times as you want and trim them up to ± 99 frames from the keyboard. What's more, plug your PC-3 into a TT-4 and get keyboard access to automatic bidirectional tape search.

Take the time and trouble out of your VCR searching and editing. Join the Family of Fabulous Frame Finders today. They'll help you find exactly what you're looking for. For complete specifications and address of your nearest distributor, write Department BME9.

**CONVERGENCE
CORPORATION**

17935 SKY PARK CIRCLE / IRVINE, CALIFORNIA 92714 / (714) 549-3146

Sheraton Park

Continued from page 23

consoles, cabinet systems, styled or plain for housing total station operations. [See ads on pages 146, 147](#)

American Data Division, Airpax Electronics—Booth 101. Distribution switching system, four channel parallel video processor, production switching systems, modular amplifiers, one bus quad split, and 18x1, 12x1 and 12x5 routing switchers.

New: Distribution switching system, production switching systems, and modular amplifiers. [See ad on page 131](#)

American Electronic Laboratories—Booth 216. AM and FM broadcast transmitters, stereo generators, and exciters.

Belar Electronics Laboratory Inc.—Booth 317.

New: ATS accessories, FM modulation monitor, AM frequency monitor, FM stereo modulation monitor, and equipment designed for ATS use.

[See ad on page 123](#)

Bird Electronic Corporation—Booth 311. RF directional wattmeters, RF loads, self-cooling line terminations (RF), and hi-power transmission line filters.

New: VSWR/power meters, RF control/monitor, and first live RF power feed at NAB (For measurement demos). Co-op venture with CST.

[See ad on page 176](#)

Bogner Broadcast Equipment—Booth 201 (in CCA booth). TV CP antenna, and FM antenna.

New: Emergency antenna.

Booth 110 (in EMCEE booth). Low & medium power translator line.

[See ad on page 102](#)

Boston Insulated Wire & Cable Co.—Booth 108.

Broadcast Electronics, Inc.—Booth 206. Tape cartridge machines, audio control consoles, AGC amplifiers, limiting amplifiers, turntables, and package studio systems.

New: Multi-deck tape cartridge systems. **Hos. suite:** E-420.

Canon U.S.A., Inc.—Booth 301. Zoom lenses for broadcast and CCTV cameras.

New: Studio/field zoom lens.

[See ad on page 59](#)

Capitol Magnetic Products—Booth 313. Mastering tape, low noise tape, 2 mill low noise print tape, and audiopack A-2 broadcast cartridge. **Hosp. Suite:** F540, F541. [See ad on page 117](#)

CCA Electronics Corporation—Booth 201. AM and FM broadcast transmitters and accessories, consoles, mixers and accessories, TV products and accessories, FM circularly polarized antennas, and UHF-TV antenna.

New: Optimod stereo generator, modular audio consoles and accessories, and FM 55 kW broadcast transmitter. [See ad on page 95](#)

Ceco Communications Inc.—Booth 204. Electron transmitting tubes.

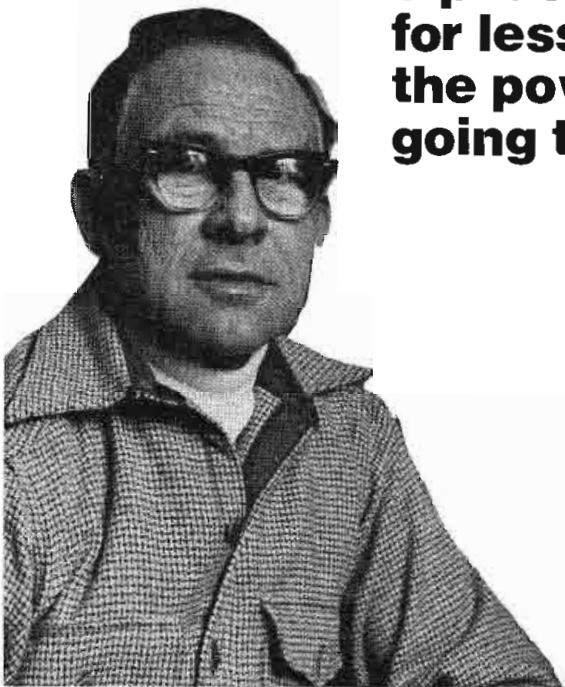
Central Dynamics Corp.—Booth 104. Video production switchers, master control automation system, tape editing systems, downstream keyer, RGB and encoded chromakeyers, digital sync decoder, audio mixer/switcher, distribution amplifiers for pulse, cable equalizing, STL's and broadband applications.

New: Production switcher with sequential effects amplifier, and System 100 Master Control Automation with interface to BIAS Business Automation System. **Hos. Suite:** Sheraton Park. [See ad on page 115](#)

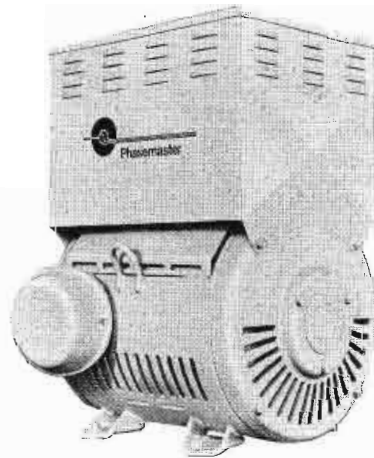
Cetec Broadcast Group—Booth 227. AM and FM transmitters, audio studio and remote equipment, FM antennas, and radio automation systems.

New: FM antenna, 3-stack tape cart playback and multi-cart system playback. [See ad on page 5](#)

“Here’s how we brought 3-phase power to WSLW for less than 5% of what the power company was going to charge us.”



Claude F. Jones, Vice President and General Manager



When WSLW decided on moving their transmitter to higher ground to increase their service area and potential listenership, they were faced with the problem of 3-phase power availability. WSLW's Vice President and General Manager, Claude F. Jones first called the Utility Company for an estimate. Then he called Kay Industries. Mr. Jones found the difference hard to believe. Kay's Phasemaster® Rotary Converter brought 3-phase power to WSLW for less than 5% of what it would have cost to bring in utility-supplied 3-phase power. And with the Phasemaster®, not only were transient spikes eliminated but, WSLW also got excellent voltage regulation.

The Phasemaster® 3-Phase Rotary Converter is making it possible for AM and FM stations all over the country to economically convert single phase to 3-phase power. A full line of these rotary converters, from ¼ to 200 HP, is available from Kay Industries, Inc. For more information concerning the Phasemaster's® various broadcast applications, write to Kay Industries.

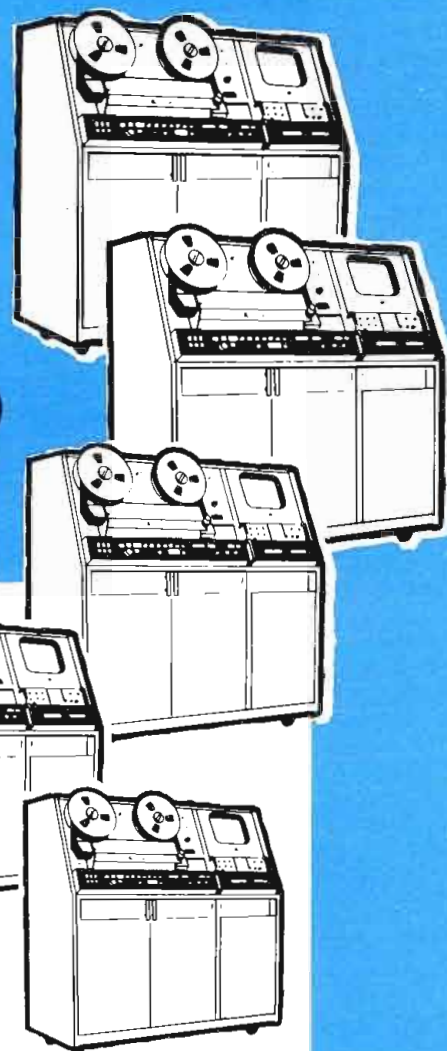
Phasemaster® Rotary Converter, the equivalent of utility-supplied 3-phase power at an affordable price.

**See Us At The NAB Show,
BOOTH 610**

KAY INDUSTRIES, INC.
604 North Hill Street, Dept. BE
South Bend, Indiana 46617
219/234-0171

For More Details Circle (22) on Reply Card

Who would buy a "preowned" 2" VTR from AFA?



TV STATIONS

KDAL-TV Duluth, MN AMPEX VR-2000
WAST-TV Albany, N.Y. RCA TR-70C
WHP-TV Harrisburg, PA AMPEX VR-1200
WAEO-TV Rhinelander, WI RCA TR-70C
WZTV-TV Nashville, TN AMPEX VR-2000
WVEC-TV Norfolk, VA AMPEX VR-2000
KEVN-TV Rapid City, SD (2) AMPEX VR-1200's

PRODUCTION FACILITIES

EUE Screen Gems New York, N.Y. (2) AMPEX VR-2000's
National Video Center New York, N.Y. AMPEX HS-100
Dolphin Production New York, N.Y. AMPEX VR-2000
Innervision Productions St. Louis, MO AMPEX VR-1200
Media Stream Lake Charles, LA (2) AMPEX VR-1200's

MANUFACTURERS

Consolidated Video Systems, Inc. Santa Clara, CA AMPEX VR-2000
Recortec Inc. Sunnyvale, CA (2) AMPEX VR-1200's
Spin Physics, Inc. San Diego, CA AMPEX VR-1200
Computer Magnetics Corp. Sunnyvale, CA AMPEX VR-1200

INSTITUTIONS

N.Y. Institute of Technology - Video Center N.Y. AMPEX VR-2000
Kansas City Baptist Temple Kansas City, MO AMPEX VR-1200
National Aeronautics & Space Administration AMPEX VR-1200

They did... how about you?

AFA can fill your need with a customized, fully rebuilt video tape recorder. Call us today for complete information.

AFA

A.F. ASSOCIATES, INC.
100 Stonehurst Court
Northvale, N.J. 07647

201-767-1000

For More Details Circle (23) on Reply Card
www.americanradiohistory.com

Sheraton Park

Continued from page 26

Chyron Telesystems—Booth 303.

New: Graphics generator, and titling generator. [See ad on page 17](#)

CMX Systems, Orrox Corporation—Booth 226. Expandable computer-assisted video tape editing system, and portable SMPTE time code generator, and time code reader/display.

[See ad on page 1](#)

The Collins Commercial Telecommunications Division of Rockwell International Corporation—Booth 217. AM and FM transmitters and consoles, and full line of audio equipment.

New: 5-kW AM, a 25-kW FM transmitter, Mark 8 audio console, and two FM antennas. [See ad on page 45](#)

Commercial Electronics Inc.—Booth 222. Color television camera systems, including studio, ENG and portable production, lenses, and video support equipment.

New: Totally modular professional color TV camera system: completely portable hand-held, remotely controlled hand-held, hand-held portable with studio system capabilities, studio system camera with portable capabilities, self-contained studio camera, and studio system camera with remote CCU 2/3" or 1" tubes.

Consolidated Video Systems, Inc.—Booth 224. Broadcast and CCTV time-base correctors. [See ad on page 23](#)

Continental Electronics Mfg. Co.—Booth 220. 5, 10 and 50 thousand Watt AM transmitters.
Hos. Suite: A311. [See ad on page 133](#)

CSI Electronics, Inc.—Booth 309. 4 Watt-20 kW AM transmitters, and 10 Watt-25 kW FM transmitters.
New: 250 Watt solid state FM transmitter.

Delta Electronics Inc.—Booth 300. Antenna monitors, remote control systems, RF ammeter systems, impedance bridges, receiver generators, meter jacks, and torodial current transformers.
New: Units for ATS. [See ad on page 87](#)

Di-Tech Inc.—Booth 109. Video D.A., Pulse D.A., video passive switchers, Video D.A. with diff. input, clamper and equalizer, Pulse D.A. with variable delay, audio/video routing switchers, touch tone systems, audio monitor/amplifier, video presence detector, and video presence detector with relay switching.

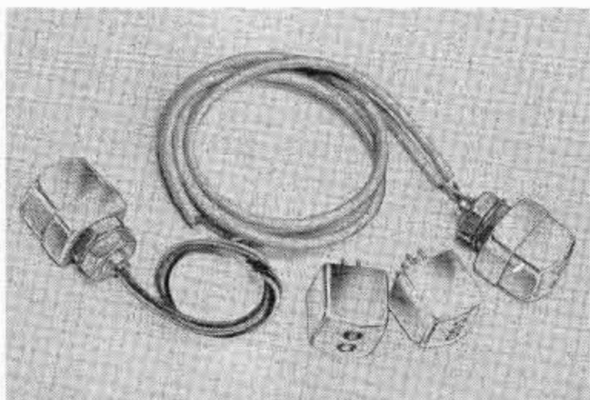
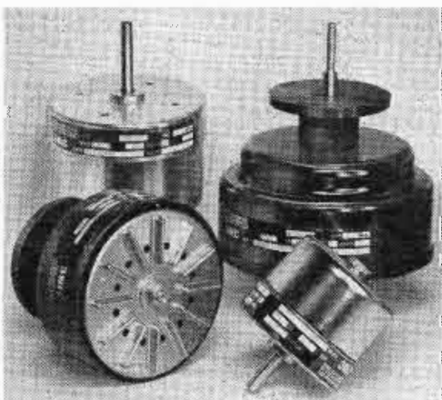
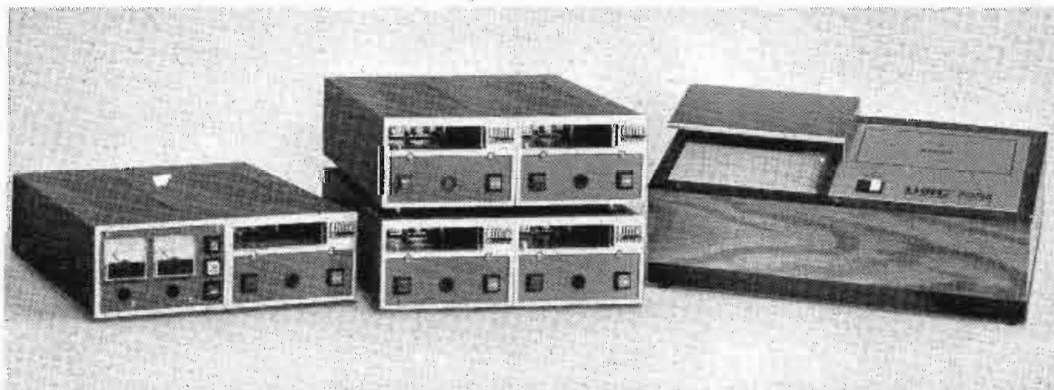
Electronics, Missiles & Communications, Inc.—Booth 110. UHF/VHF television transmitters and translators, MDS transmitter, MDS high power amplifier, UHF transmitting antennas, ITFS transmitter, and ITFS receiving converter.
New: Low noise, low cost MDS pre-amp, high performance television translator, television translator with SAW filtering, and backpack portable television transmitter. [See ad on page 107](#)

English Electric Valve North America Ltd.—Booth 106 (in Marconi booth). 1" ledicoms, extended red, 1" ACT, and 30mm coaxial ledicoms.
New: 1" extended red, and 1" ACT.
[See ad on page 14](#)

Fidelipac—Booth 218. Master cart, alignment, wow & flutter, and cue cartridges, studio on-air light, cartridge storage racks, tape eraser, height gage for tape guides, head insertion and night-angle zenith gages, cleaning fluid, splicing blocks & kits, and removeable cartridge labels.
New: Wow & flutter meter.
[See ad on page 16](#)

Fuji Video Tape—Booth 225. Low noise broadcast video tape, and u-matic video cassettes.
New: Fire retardant shipper, high performance mastering video tape, mini cassette for portable u-matic recorders, high energy 1" video tape, and stock video tape.

Committed to serving the broadcaster.



Beucart and Beau.

Our introduction of Beucart® audio cartridge tape machines in 1976 was one indication of our dedication to solving problems and simplifying operations for the broadcaster. But we don't want you to forget our Beau hysteresis synchronous drive motors, Beucart splice finders, or Beau audio tape heads, either. Our product line is expanding and we know you'll be excited by the new products we'll be adding shortly.

Keep your eye on UMC for innovations in broadcasting. What you see is just the beginning. Please write or call (203) 288-7731 for complete information.

UMC
BEUCART DIVISION
UMC ELECTRONICS CO.

460 Sackett Point Rd. North Haven, CT 06473

"See us at NAB, Shoreham Americana, Booth 562"

For More Details Circle (24) on Reply Card

Continued on page 30

A CHARACTER GENERATOR FOR EVERY PURPOSE ENG to Studio A

NAB '76--In case you missed us--We introduced the first microcomputer based character generator system to offer

innovations such as 12 character sizes, color graphics, absolute centering and many other features surpassing the capabilities of other character generators costing twice as much.

Years of experience and a sympathetic ear to the market place combined with microcomputer technology enabled us to offer a character generator that met the professional's demands at a surprisingly low cost...In other words...MUCH MORE FOR LESS!!

**COMMAND PERFORMANCE
AT A REASONABLE
PRICE**

NAB '77--Don't miss us this time !!

Because we've expanded our Q series product line to include a character generator for every Purpose, Budget and Performance Criteria.

Features include: • 12, 24 or more Character Sizes (per font) • Color backgrounds, Characters and Graphics • Logos, Line Graphics, Time Display • Unlimited Random Access Memory • Universal EIA Synchronization -- Stand Alone -- Upstream -- Downstream with Matte • Compact Construction • Operational Simplicity • Self Contained Maintenance Program • And More!!

**OUR Q SERIES CHARACTER
GENERATORS DO IT ALL**

**Booth 701 Shoreham
(Bird Cage Walk)**

**SYSTEM
CONCEPTS**

SYSTEM CONCEPTS, INC.
395 Ironwood Drive
Salt Lake City, Utah 84115
(801) 486-3833

For More Details Circle (25) on Reply Card

ASSURE PEAK SIGNAL OUTPUT

... with trimmable Vacuum Capacitors from ITT Jennings.

The unique construction of these capacitors combines a tunable and a fixed capacitor in the same ceramic envelope with a VACUUM dielectric. This combination offers higher current ratings, smaller size, greater thermal stability, and better reliability than conventional designs. They are ideal for high frequency unattended transmitter operation, or anywhere stable peak signal output is important.



- Current ratings: 200 A. Rms. @ 9 KVAC to 85 A. Rms. @ 50 KVAC.
- Capacitance values available from 20 to 1357 pFd.
- Size: All models are just 4.5" tall by 5.3" in diameter and come with built-in mounting rings for ease of installation.
- Operating Temperature: -55°C. to +125°C.

If you are concerned with antenna phasing or matching, or working with grid bias or tank filter networks, you will want to know more about the Trimmable Vacuum Capacitors from ITT Jennings. For more information contact: ITT Jennings, 970 McLaughlin, San Jose, CA 95122, (408) 292-4025.

JENNINGS **ITT**

For More Details Circle (26) on Reply Card

Continued from page 28

The Grass Valley Group, Inc.—Booth 209. Production, master control, routing, and automation switchers, digital machine control systems, automatic program control equipment, video, pulse, and subcarried distribution, sync generators and auto-changeover systems, and processing amplifiers.

New: NEC frame synchronizers, and digital video effects systems. **Hos. Suite:** A500. See ad on page 3

GTE Sylvania—Booth 302. Lamps for studio lighting, and sun guns for "on the spot" lighting.

New: Daylight fill lamps.

Hammond Industries (Revox and Beyer)—Booth 221. Tape recorders, reel-to-reel, and microphones.

New: Amplifier, and PPM meters.

Harris Corporation, Broadcast Products Division—Booth 205. Live color cameras, television transmitter, 1 and 5 kW AM transmitters, 2500 Watt FM transmitter, 20 kW FM transmitter, micro-computer prog. auto, stereo consoles, turntable, cart machines, test racks, TV test rack, TV antenna display, FM antenna display, camera in film chain configuration, and a automatic transmission system demo.

New: 2.5 and 20 kW FM transmitters, and FM processor. **Hos. Suite:** D500. See ads on pages 169, 171, 173, 175

Hitachi Denshi America, Ltd.—Booth 228. Portable ENG cameras, and studio/portable camera.

New: Portable ENG camera.

See ad on page 113

Innovative Television Equipment—Booth 310. Camera support dollies, tripods, pedestals, pan/tilt heads, and accessories.

New: Camera heads and tripod.

International Tapetronics Corp.—Booth 229. Cartridge reproducers and recorder/reproducers, record/reproduce/delay machine, economy line of cartridge reproducers and recorder/reproducers, reel-to-reel recorder/reproducers, eraser/splice locator, cartridge recorder/reproducer with motor driven record head, three deck reproducer, and reproducer only for automation use. See ads on pages 48-49

Kliegl Bros.—Booth 107. Q-level 2000 lighting control system, portable dimming system, 2 kW softlite, 4 kW softlite, TV lighting fixtures, and 5Q portable lighting kit.

New: Memory lighting control systems, and portable dimming system.

Lenco, Inc., Electronics Division—Booth 312A. NTSC encoders, b/w

Continued on page 32

The Railriders Are Here!



Convert your overcrowded film and VTR libraries to the new "Instant Access" high-density systems engineered and distributed by Storeel. Modular **Rapid Transit Storage™** maximizes units stored per square foot of floor space, minimizes retrieval time.

Our ten years of design and engineering experience pay off in solutions to your storage problems. Call or write "The Railriders" at Storeel today for free estimate.

If it needs to be stored, it deserves Storeel®

STOREROOL CORP.

See you at NAB

Booth 441

Washington Hilton

4993 New Peachtree Road • Atlanta, Georgia 30341 • Telephone (404) 458-3280

For More Details Circle (27) on Reply Card



Our broadcast consoles get around.

Mexico City. Nashville. San Juan. New York. Tampa. Brazil. Albuquerque. Fort Worth. Haiti. Japan. Tacoma.

All over the world broadcast engineers are finding that ADM® broadcast consoles have the advanced performance and engineering they require. And for good reason . . . our specifications are the finest in the industry!

Expressly designed for broadcasting, ADM full-featured consoles provide complete flexibility through plug-in modular components. And human engineering supplies ease of operation through functional lay-out of controls.

For individual broadcaster's needs, ADM custom-engineers consoles to customer specifications.

All ADM consoles are ruggedly built. Or we wouldn't back them with the strongest warranty in the business—an exclusive 5-year warranty.

No wonder ADM consoles take a lot of exotic trips.



The sound heard
'round the world.

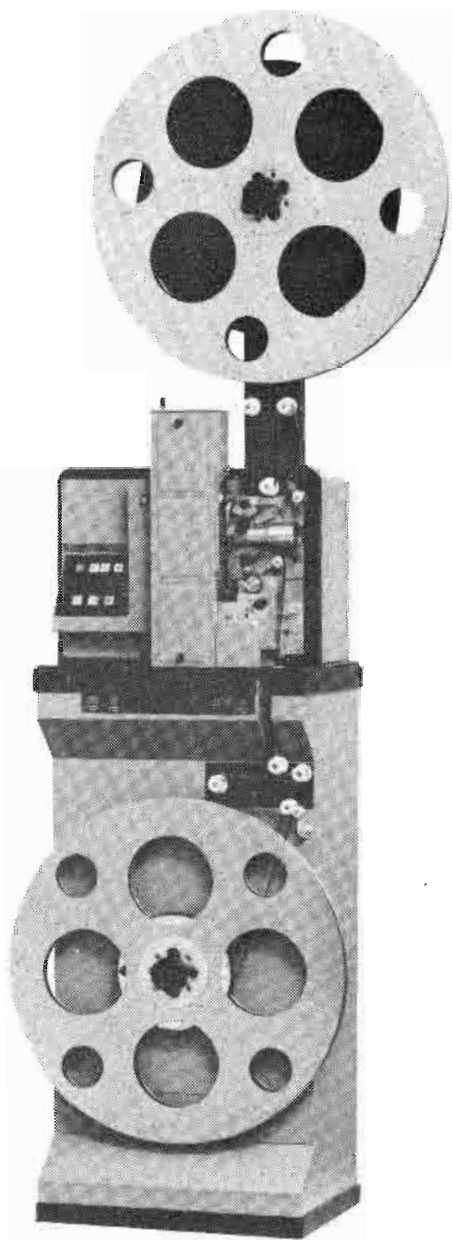
AUDIO DESIGNS AND MANUFACTURING, INC. • 16005 Sturgeon, Roseville, Michigan 48066 • Phone: (313) 778-8400 • Cable: AUDEX • TLX-23-1114

AMPEX DISTRIBUTED OUTSIDE U.S.A. BY AMPEX INTERNATIONAL OPERATIONS, INC.

For More Details Circle (28) on Reply Card

The new ATHENA[®] 5000

A professional broadcast
television film chain projector
in the medium price range.



See the new ATHENA 5000
at N.A.B., booth No. 566,
Shoreham Hotel



L-W INTERNATIONAL

6416 Variel Ave., Woodland Hills,
CA 91367, USA • (213) 348-8614

Sheraton Park

Continued from page 30

cameras, video noise meter, sync changeover switch, video presence detector, Video D.A.'s, Pulse D.A.'s, Subcarrier D.A.'s, Pulse Delay D.A.'s, cable equalizers, stabilizing amplifier, sync generators, sync generators with genlock, sync generators with helical genlock, sync generator substitute, automatic sync changeover switch, NTSC color bar generator, blackburst generator, color background generator, bar-dot generator, visual reference generator, multiburst generator, video sweep generator, staircase generator, ramp generator, system delay, NTSC chroma decoder, universal amplifier, sub-carrier oscillator, video clippers, video impedance matching amplifier, and differential input video amplifier.

New: Video processing amplifier, video delay amplifier, b/w video monitors, and 8x1 video switcher.

Listec Television Equipment Corp.—Booth 305. Television camera, mounting equipment, pedestals, tripods, dollies, cam heads and cranes, captioning equipment including slide projectors and roller machines.

New: Self levelling pedestal.

Marconi Electronics, Inc. Communications and Broadcast Division—Booth 106. Working demonstration of Mark VIII TV studio camera associated portable head, vision switcher, film chain, and DICE-digital intercontinental conversion equipment.

[See ad on page 51](#)

Marconi Electronics, Inc. Instruments Division—Booth 106. Fully automatic VITS measuring system which conforms to the requirements of NTC report #7, digital phase and gain test set, and comprehensive TV swept measuring system.

[See ad on page 51](#)

Marti Electronics, Inc.—Booth 207. Aural STL-mono-stereo, radio remote pickup, audio amplifiers, and remote control systems-digital.

New: Remote pickup equipment.

[See ads on pages 174, 177](#)

McCurdy Radio—Booth 315. Stereo reproduction package, AM air package, intercoms, switchers, audio distribution and television production console.

New: Audio D.A., and monitor amplifiers. [See ad on page 11](#)

McMartin Industries, Inc.—Booth 200A. AM transmitters, exciters, audio consoles, remote pickup broadcast products, FM SCA receivers and monitors.

New: 55 kW FM transmitter. **Hos. Suite: M790-794.**

Micro Consultants, Inc.—Booth 312. Synchronizers, timebase corrector, analog to digital converters, digital to analog converters, digital video converter, and digital image processor.

New: Timebase corrector, digital to analog converter, digital image processor, analog to digital converter, and digital video converter.

[See ad on page 109](#)

Microtime, Inc.—Booth 314. Time base correctors, image corrector, automatic broadcast control system, and remote synchronizers. [See ad on page 77](#)

Micro-Trak Corporation—Booth 219. Audio production system, news production, automatic antenna heater control system, tone arms, four and five channel audio consoles, phono preamps, turntables, studio furniture, audio tape cartridge racks, and production controller.

New: Newsdesk, audio console monaural, audio console stereo, automatic antenna heater control system, and phono preamps. [See ad on page 181](#)

Microwave Associates, Inc.—Booth 200. 2, 7, or 13 GHz ENG microwave systems—versatile “window” minicam links, mobile van high power transmitters and down links, STL and TSL links, long-haul 2, 7, and 13 GHz high power heterodyne systems, and complete engineer, furnish, and install services.

New: 15 Watt max. solid state 2 GHz RF booster, and all channel 2 GHz high power portable ENG link.

Mole-Richardson Co.—Booth 102. Studio lights, hangers, and mounting fixtures.

Moseley Associates, Inc.—Booth 203. Aural studio-transmitter link equipment, stereo generating equipment, remote pickup equipment, audio limiter, analog and digital transmitter remote control systems, automatic transmitter logging equipment, and automatic transmission system, and equipment for AM and FM applications. [See ads on pages 80, 106, 138, 168](#)

Nurad, Inc.—Booth 230. SUPERQUAD™ scanner, GOLDENROD™, DUALROD™, dual-band microwave antennas, ENG/EJ antenna systems, omnidirectional microwave antennas, and helicopter antenna systems.

New: SUPERQUAD™ scanner, a high gain pan-only, quad-polarized antenna system for extended-range, ENG/EJ operations, dual-band antennas; and digital remote control systems for ENG/EJ quad-polarized antennas.

[See ad on page 137](#)

Continued on page 42

NAB Convention '77

EXHIBITOR GUIDE

Includes floor plans for the equipment exhibit areas of the Sheraton Park, Shoreham Americana, and Washington Hilton hotels.

There are four NAB sections in this issue of **Broadcast Engineering**. The first three are "hotel articles," designed to give you the equipment lineups and equipment to be introduced at the convention. If you haven't gone through them yet, turn back to the first of these articles and make the following plan of attack.

As you scan the exhibitors list of each hotel, circle or mark those that have equipment you want to see. After you've read the first hotel article, turn to this section and find that hotel's floor plan. Now, circle or mark the booths you'll want to visit. Do that for each article, and you'll have a plan of attack for each hotel and a pretty fair idea of what will be shown at this convention.

Of course, you'll note that the hotel articles include advertising information lines at the end of each exhibitor's summary who advertised in this issue. That will give you the jump on looking at equipment introductions.

On the back page of this section, we're going to make some additions especially for those who couldn't crack the exhibit floor waiting line. Some exhibitors will have made changes in both booths

and equipment. In this issue, the last page of this section is a schedule of sessions. But we'll have extra copies at the convention. And on those copies we'll drop the schedule and indicate all the late changes brought to our attention. What you see in this issue is all that was available to us at press time.

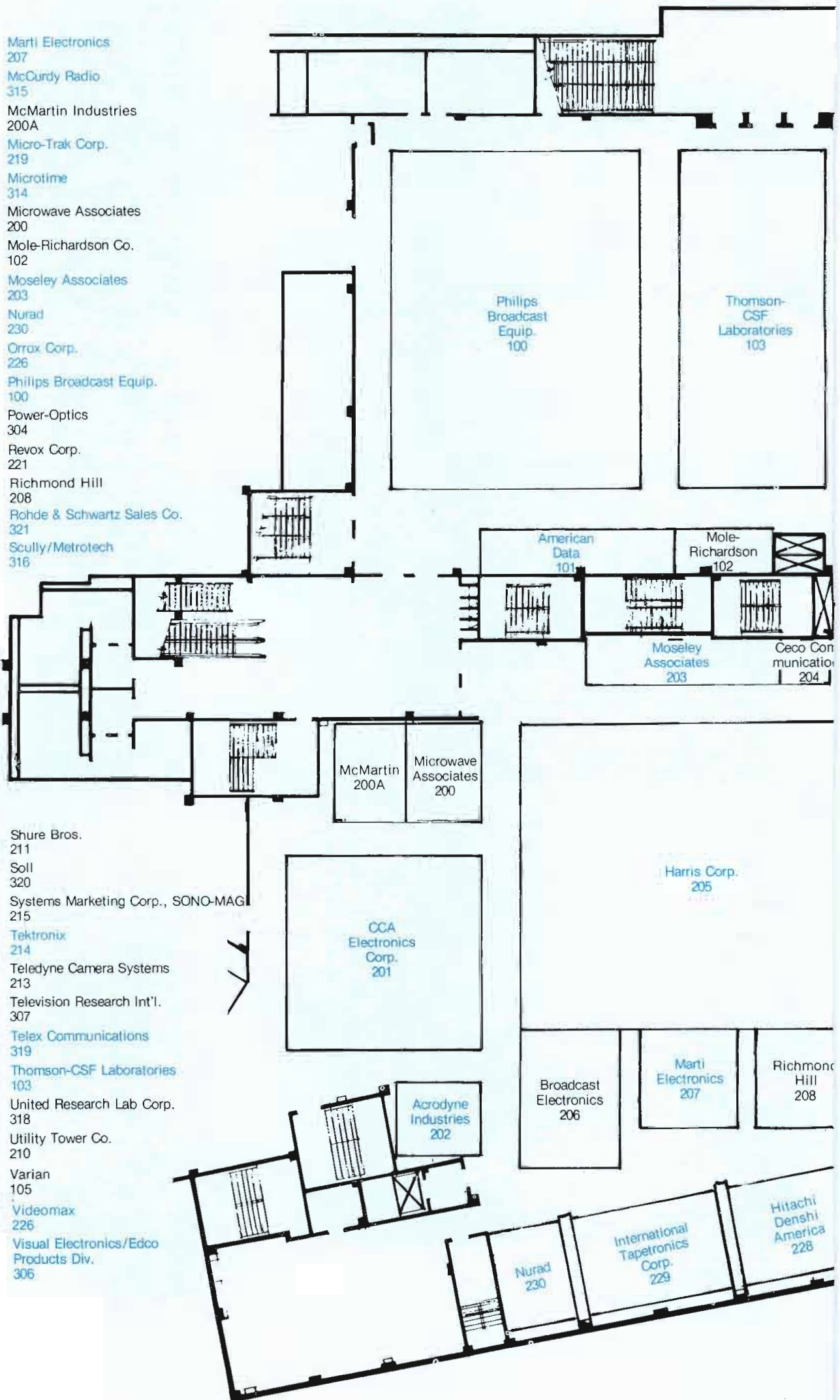
Because so many companies are exhibiting this year, not all of them could be squeezed into the hotel exhibit areas. Several companies will be exhibiting their equipment in hospitality suites. So, if you missed seeing that company you had hoped to find amid the exhibits, chances are good they'll be exhibiting in a suite. Be sure to check all those hospitality suites listed in the lobby of each hotel. Equipment exhibited this way will allow plenty of hands-on tweaking and a friendly atmosphere.

The companies listed in **blue** in this section are those who advertised in this issue. If you missed them in the hotel articles, return to "go," collect yourself, and start over again. While there will be surprise equipment unveilings at the convention, the ads will give you a fair idea of what's new and where to find it.

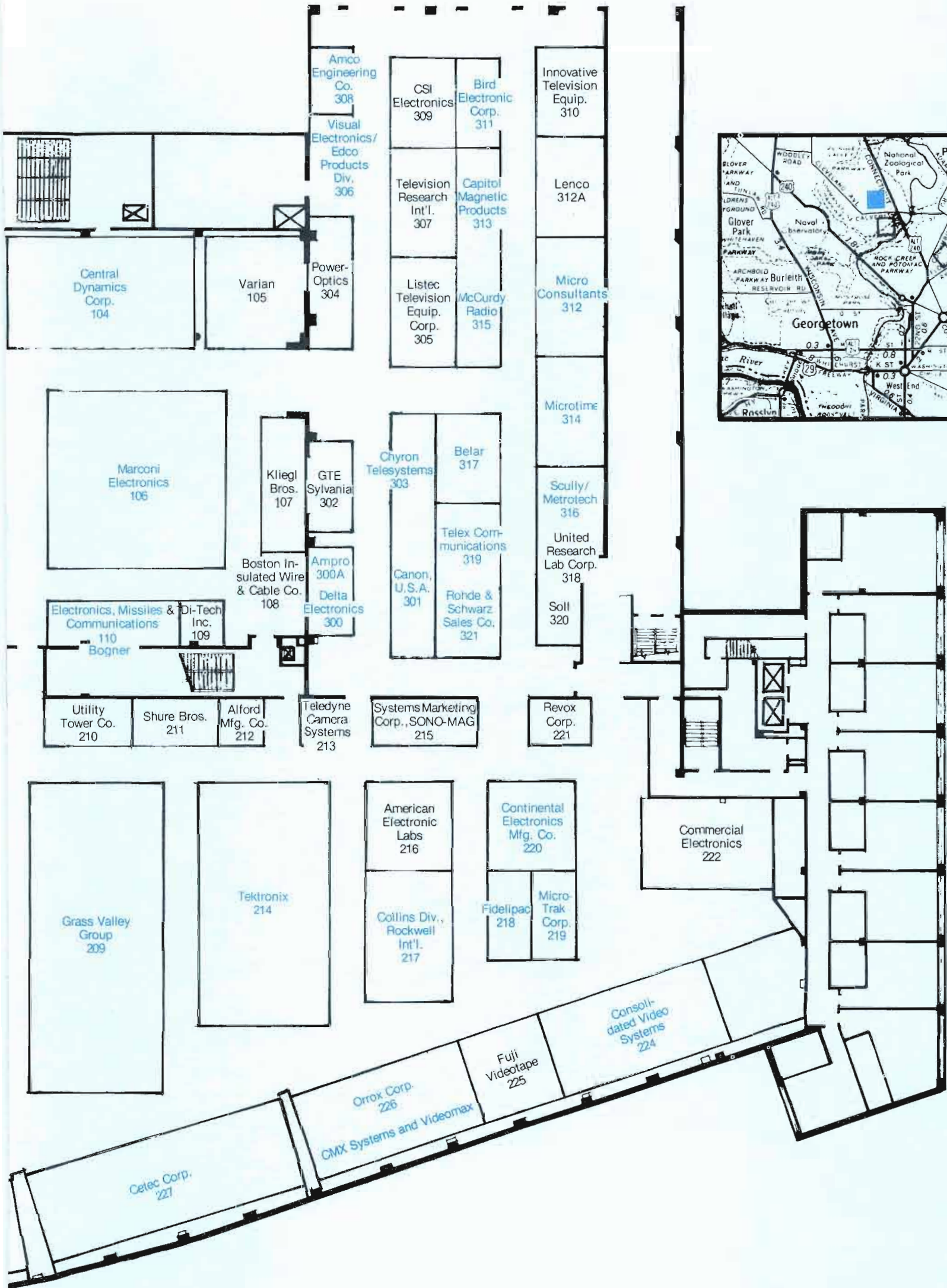
Sheraton Park

- Acrodyne Industries
202
- Alford Mfg. Co.
212
- Amco Engineering Co.
308
- Ampro
300A
- American Data
101
- American Electronic Labs
216
- Belar
317
- Bird Electronic Corp.
311
- Bogner
110
- Boston Insulated Wire & Cable Co.
108
- Broadcast Electronics
206
- CCA Electronics Corp.
201
- CSI Electronics
309
- Canon, U.S.A.
301
- Capitol Magnetic Products
313
- Ceco Communications
204
- Central Dynamics Corp.
104
- Cetec Corp.
227
- Chyron Telesystems
303
- CMX
226
- Collins Div., Rockwell Int'l.
217
- Commercial Electronics
222
- Consolidated Video Systems
224
- Continental Electronics Mfg. Co.
220
- Delta Electronics
300
- Di-Tech
109
- Electronics, Missiles
& Communications
110
- Fidelipac
218
- Fuji Videotape
225
- GTE Sylvania
302
- Grass Valley Group
209
- Harris Corp.
205
- Hitachi Denshi America
228
- Innovative Television Equip.
310
- International Tapetronics Corp.
229
- Kliegl Bros.
107
- Lenco
312A
- Listec Television Equip. Corp.
305
- Micro Consultants
312
- Marconi Electronics
106

- Marti Electronics
207
- McCurdy Radio
315
- McMartin Industries
200A
- Micro-Trak Corp.
219
- Microtime
314
- Microwave Associates
200
- Mole-Richardson Co.
102
- Moseley Associates
203
- Nurad
230
- Orrox Corp.
226
- Philips Broadcast Equip.
100
- Power-Optics
304
- Revox Corp.
221
- Richmond Hill
208
- Rohde & Schwartz Sales Co.
321
- Scully/Metrotech
316

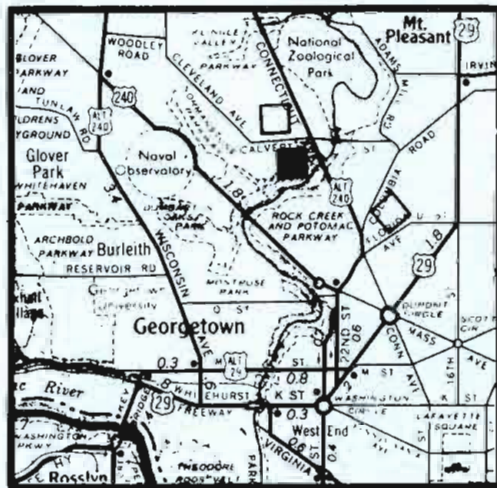


- Shure Bros.
211
- Soll
320
- Systems Marketing Corp., SONO-MAG
215
- Tektronix
214
- Teledyne Camera Systems
213
- Television Research Int'l.
307
- Telex Communications
319
- Thomson-CSF Laboratories
103
- United Research Lab Corp.
318
- Utility Tower Co.
210
- Varian
105
- Videomax
226
- Visual Electronics/Edco
Products Div.
306

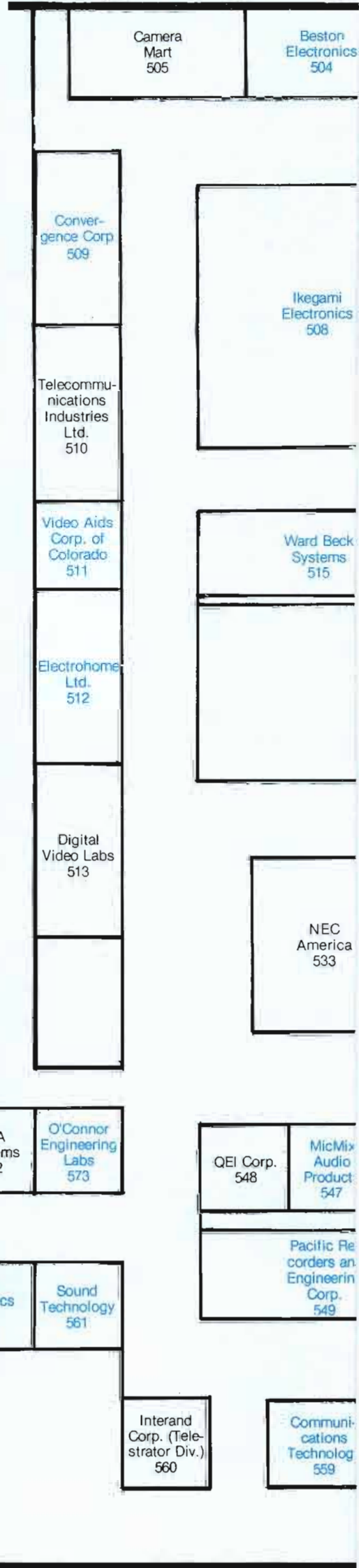


Shoreham Americana

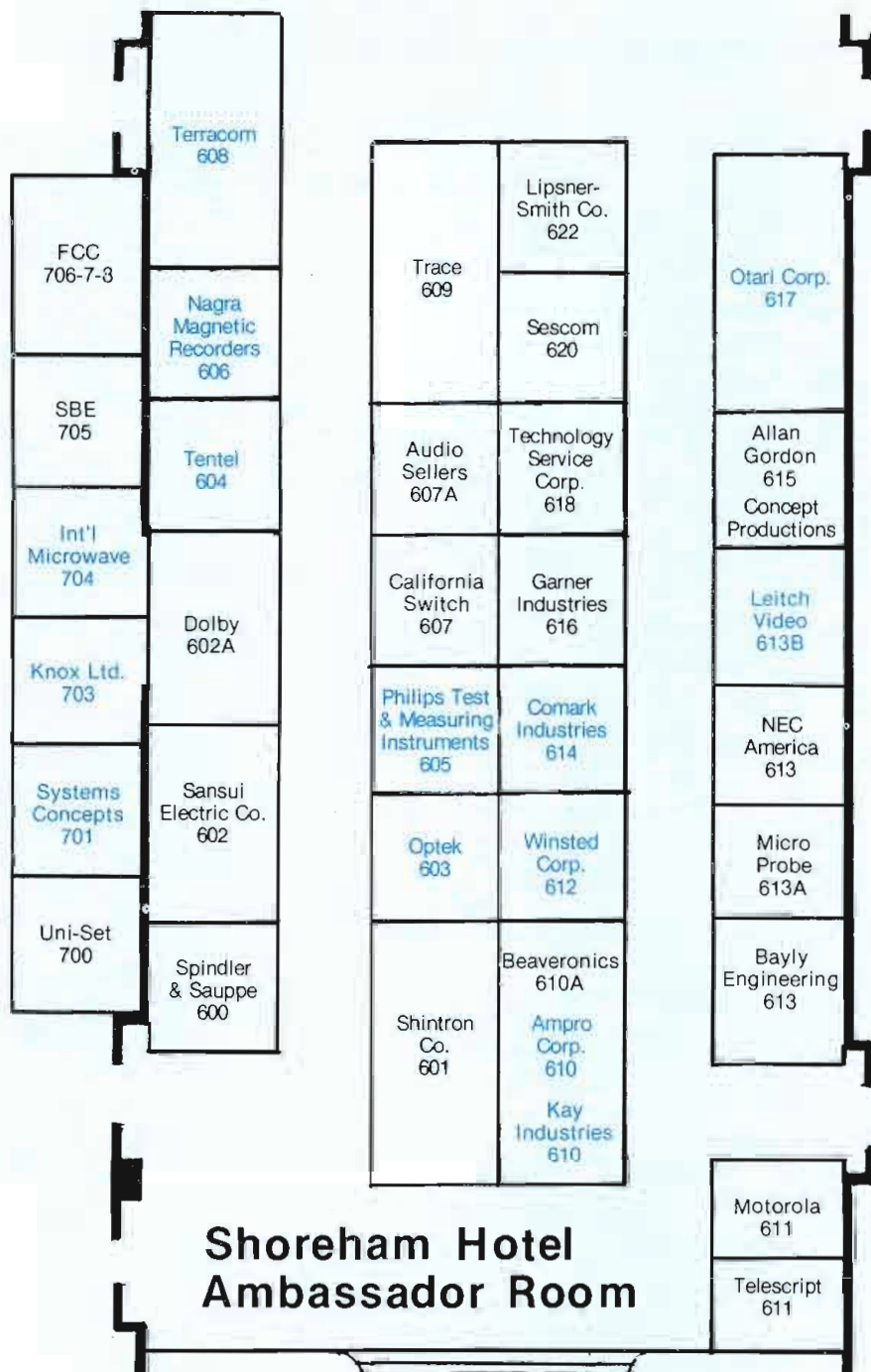
- Amcomp (Data Disc) 558
- Andrew Corp. 523
- Anixter-Mark 569
- Arvin Echo Sciences 536
- Audi-Cord Corp. 565
- Automated Processes 517
- BJA Systems 572
- Berkey-Colortran 507
- Beston Electronics 504
- Cablewave Systems 518
- Camera Mart 505
- Cinema Products Corp. 503
- Communications Technology 559
- Computer Magnetics Corp. 535
- Comrex Corp. 570
- Convergence Corp. 509
- Datatek Corp. 553
- Datatron 531
- Dielectric Communications 544
- Digital Video Labs 513
- Ducca Richardson 529
- ESE 557
- Eigen Video 563
- Electro Impulse 568
- Electro-Voice 546
- Electrohome Ltd. 512
- Farinon Electric 502
- Flash Technology 554
- Glentronics 535
- Gotham Audio Corp. 527
- IGM/Div. of NTI 538
- Ikegami Electronics 508
- Industrial Sciences 552
- Inovonics 571
- Interand Corp. (Telestrator Div.) 560
- JVC Industries 530
- Kings Electronics 555
- LPB 520
- L-W Int'l. 566



- Laird Telemedia 551
- David Lent Assoc. 571
- Lightning Elimination 526
- MCI 562A
- Merlin Engineering Works 534
- MicMix Audio Products 547
- Minneapolis Magnetics 516
- NEC America 533
- Nortronics Co. 522
- O'Connor Engineering Labs 573
- Orban Assoc., Kurt Orban Co. 539
- Pacific Recorders & Engineering Corp. 549
- Paperwork Systems 542
- Potomac Instruments 524
- QEI Corp. 548
- Ramko Research 564
- Robins Broadcast & Sound Equipment Corp. 545
- Rosco Labs 556
- Rupert Neve 541
- Scientific Atlanta 532
- Sintronic Corp. 537
- Eric Small & Assoc. 540
- Sony Corp. of America 506
- Sound Technology 561
- Stanton Magnetics 521
- Willi Studer America 543
- Taber Mfg. & Engineering Co. 525
- Telecommunications Industries Ltd. 510
- Television Equipment Assoc. 528
- Time & Frequency Technology 501
- Townsend Assoc. 519
- UMC Electronics Co. 562
- Vamco 528
- Video Aids Corp. of Colorado 511
- Ward Beck Systems 515
- Wilkinson Electronics 500







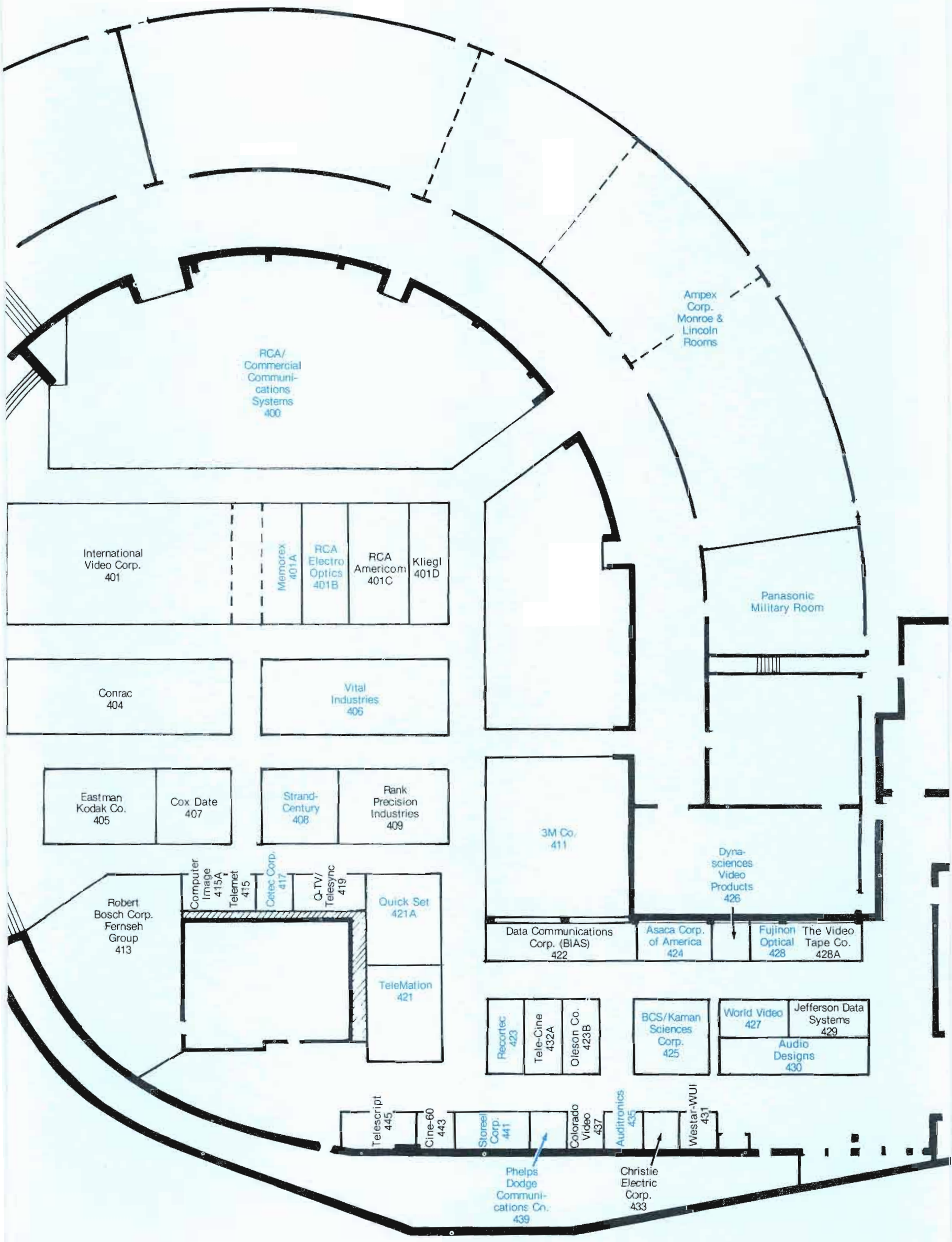
Allan Gordon 615
 Ampro Corp. 610
 Audio Sellers Inc. 607A
 Bayly Engineering 613
 Beaveronics 610A
 California Switch & Signal 607
 Comark Industries 614
 Concept Productions 615
 Dolby 602A
 FCC 706-7-8
 Garner Industries 616
 International Microwave 704
 Kay Industries 610
 Knox Ltd. 703
 Leitch Video 613B
 Lipsner-Smith Co. 622
 Micro Probe 613A
 Motorola 611

Nagra Magnetic Recorders 606
 NEC America 613
 Optek 603
 Otari Corp. 617
 Philips Test & Measuring Instruments 605
 Sansui Electric Co. 602
 Sescom 620
 Shintron Co. 601
 Society of Broadcast Engineers 705
 Spindler & Sauppe 600
 Systems Concepts 701
 Technology Service Corp. 618
 Telescript 611
 Tentel 604
 Terracom 608
 Trace 609
 Uni-Set 700
 Winsted Corp. 612



Washington Hilton

- Ampex Corp. Monroe & Lincoln Rooms
- Angenieux Corp. of America 402
- Asaca Corp. of America 424
- Audio Designs & Mfg. 430
- Auditronics 435
- Robert Bosch Corp., Fernseh Group 413
- Cetec Corp. 417
- Christie Electric Corp. 433
- Cine-60 443
- Colorado Video 437
- Computer Image 415A
- Conrac 404
- Cox Data 407
- Data Communications Corp. (BIAS) 422
- Dynair Electronics 403
- Dynasciences Video Products 426
- Eastman Kodak Co. 405
- Fujinon Optical 428
- International Video Corp. 401
- Jefferson Data Systems 429
- Kliegl Bros. 401D
- BCS/Kaman Sciences Corp. 425
- 3M Co. 411
- Memorex 401A
- Oleson Company 423B
- Panasonic Military Room
- Phelps Dodge Communications Co. 439
- Q-TV/Telesync 419
- Quick Set 421A
- RCA Americom 401C
- RCA/Commercial Communications Systems 400
- RCA Electro Optics 401B
- Rank Precision Industries 409
- Recortec 423
- SMPTe 403A
- Storeel Corp. 441
- Strand-Century 408
- Tele-Cine 423A
- TeleMation 421
- Telemet 415
- Telescript 445
- The Video Tape Co. 428A
- Vital Industries 406
- Westar-WUI 431
- World Video 427
- Dynair Electronics 403
- SMPTe 403A





Convention Agenda

Sunday

3:30 p.m.
Radio-Television General Assembly (With Engineers)

Monday

9:00 a.m. Radio Session	11:00 a.m. Television Workshops	2:00 p.m. Free time to visit exhibits and Capitol Hill
9:00 a.m. Television Session	12:30 p.m. Radio Luncheon	
11:00 a.m. Radio Workshops	12:30 p.m. Television Luncheon	

Tuesday

8:00 a.m. ENG Labor Relations Workshop (Television and Engineers)	9 a.m. Workshops Radio	12:30 p.m. Radio-Television Luncheon
8:30 a.m. Television Workshops	9:30 a.m. Television Session	2:00 p.m. Radio-Television First Amendment Seminar and free time to visit exhibits and Capitol Hill
	10:15 a.m. Radio Session	

Wednesday

8:00 a.m. Radio Report Back on Hill Visits	9:15 a.m. Radio Workshops	10:30 a.m. Closing General Session (With Engineers)
8:00 a.m. TV Report Back on Hill Visits	9:15 a.m. TvB Television Session	12 noon Adjournment

Engineering Conference Agenda

3:30 p.m.
General Assembly (With Radio-TV Delegates)

9:00 a.m. Workshop	12:30 p.m. Luncheon
10:30 a.m. Radio-Television Session	2:30 p.m. Radio-Television Session

8:00 a.m. ENG Labor Relations Workshop (With Television Delegates)	9:00 a.m. Television Session
9:00 a.m. Radio Session	12:30 p.m. Luncheon
	2:00 p.m. Free time to visit exhibits

8:00 a.m. Workshop	10:30 a.m. Closing General Session (With Radio-TV Delegates)
9:00 a.m. Radio-Television Session	12 noon Adjournment

About the only thing our new 3M D-8800 Titling System can't do is spel.



Letter spacing
Variable font sizes
Font & color selection
Underline

*Video effect simulated.

If you can spell, you can create video excitement never before possible with the new dual-channel 3M Datavision D-8800 Titling System. That's because we've combined two fast, programmable microprocessors with some innovative video engineering to produce a flexible video graphics system that'll make you look great on the tube, whatever the job.

At the 8800's control console, you can make titles and credits using up to four complete type fonts at a time, chosen from our varied and extensive library. You can

change from one font program to another letter by letter, generate letters and words in 8 different colors, and in several sizes at the touch of a button. You can even control the letter spacing!

On the 8800, not only will your words be gorgeous, you can present them just the way you want 'em, too.

You can initiate roll and crawl at several speeds and adjust both the roll and crawl masking to achieve just the 'right' look. And you can also select crawl position and roll and crawl direction. An

inter-active panel display 'walks' the operator through every move, so complicated effects are easy to make and error free.

All graphic font and title information is stored on floppy discs for quick, easy program changes and retrieval. And the 8800 features numerous custom fonts and other options, to help you create those very special images you want for your station.

If you want great video graphics, put your best font forward. Take a good look at the new 3M Datavision Model D-8800.

Try out the 8800 yourself at booth #411 during the NAB show in the Hilton Hotel.

For More Details Circle (30) on Reply Card

3M
COMPANY



HERCULES HYDRO

Weight: 8.5 lbs. (3.9 kg.)
 Wt. capacity: 50 lbs. (22.7 kg.)
 Dimensions: 6"x5"x6" (cm.: 15.2x12.7x15.2)
 Tilt: ±80° Pan: 360° Code No. 4-52810-3

Introducing the perfect go-togethers for Cine/ENG.

Ideal combination of lightweight,
 high capacity, portability.



**SAMSON
 Cine/ENG**
 Weight: 9 lbs.
 (4.2 kg.)
 Wt. capacity: 70
 lbs. (31.8 kg.)
 Max. ht.: 58"
 (147.3 cm.)
 Min. ht.: 32"
 (81.3 cm.)
 Code No.
 4-70150-4

**HERCULES
 HYDRO** fluid
 head designed
 specifically for
 Cine/ENG cam-
 eras to 50 lbs. (22.7
 kg.). Provides effort-
 less, smooth pan and
 tilt movements. Spring-
 loaded to counter bal-
 ance uneven weight. In-

dependent pan, tilt tension and lock
 controls, for pro-level performance.
 Telescoping control handle, standard.
 Dual handle operation, too.

SAMSON Cine/Eng tripod de-
 signed for use with fluid heads. Made
 completely of aluminum. Lightweight, ex-
 tremely rigid, completely adjustable. Fea-
 tures Pro Jr. mounting base, quick head con-
 nect/disconnect, telescoping legs. Can use any
 of QUICK-SET's four fluid heads.



instrument-positioning equipment
 3650 Woodhead Drive, Northbrook, Ill. 60062
 Phone: (312) 498-0700
 Telex: 72-4362

For More Details Circle (31) on Reply Card

Sheraton Park

Continued from page 32

**Philips Broadcast Equipment Corp.—
 Booth 100.** Multi-conductor studio and
 field camera, triaxial-cable studio and
 field camera, portable production color
 camera, and portable ENG/field pro-
 duction color camera.

New: Convertible color camera and
 production system, telecine camera
 chain, and broadcast transmitters.

See ad on page 43

Power-Optics, Inc.—Booth 304. Latest
 remote camera control system, and
 Scene-Sync—a device to enable a
 camera to pan and tilt when using
 chroma key techniques.

**Richmond Hill Laboratories Ltd.—
 Booth 208.** Video production switch-
 ers, quad split generators, chroma
 keyers, auxiliary transition unit, com-
 posite out background color gen.,
 video clamping amplifier, Video D.A.,
 video activated control, digital cueing
 generator, Pulse D.A., automatic
 changeover unit, and audio follow
 video switcher.

**Rohde & Schwarz Sales Co.—Booth
 321.** Broadcast modulator, color TV
 monitors, modulators, VIT analyzer
 test system, off-air TV monitors, RF
 sweep test system, and FM analyzer
 test system.

New: Color TV monitors, and FM
 analyzer test system. See ad on page 148

**Scully Recording Instruments, Div. of
 Dictaphone—Booth 316.** Pro audio
 tape recorder/reproducers, tape repro-
 ducers only, and broadcast loggers.
New: Recorder and reproducer series.
 See ads on pages 56, 58, 79

**Shure Brothers Incorporated—Booth
 211.** Microphones, mixers, circuitry,
 tone arms, disc reproducers.

Soll, Inc.—Booth 320. Design, con-
 struction and installation of complete
 broadcast facilities, and RF switching
 systems.

**Systems Marketing Corporation-Sono-
 Mag—Booth 215.** Automation system,
 logi-carts cartridge equipment, and
 every source logging.

New: Every source logging, and
 automation system.

Tektronix, Inc.—Booth 214. Color pic-
 ture monitors, precision demodulator,
 automatic corrector, sync and test
 signal generator series, signal gener-
 ator, and secam vectorscope.

New: Color picture monitor, and pre-
 cision demodulator. See ad on page 57

**Teledyne Camera Systems—Booth
 213.** Tri-optical color telefilm recorder.

**Television Research International Inc.—
 Booth 307.** Video and audio equip-
 ment, video editing, and time code
 editing.

**Telex Communications, Inc.—Booth
 319.** Tape equipment, headphones,
 and headsets.

New: Telex/Magnecord MC series of
 broadcast cartridge equipment.

See ads on pages 91, 170

**Thomson-CSF Laboratories—Booth
 103.** Vidifont, character generator sys-
 tems, color correction systems, tele-
 cine systems, triax color studio TV
 cameras, lightweight color TV camera,
 AM & FM volumax, automatic peak
 controller, mono & stereo audimax,
 automatic level controller, dynamic
 presence equalizer, and dual distribu-
 tion audio amplifier.

New: Digital noise reducer, sing and
 two-channel 950 MHz wireless micro-
 phones, and multiframe vidifont sys-
 tem. Hos. Suite: C540.

See ad on page 127

**United Research Lab. Corp.—Booth
 318.** Auto-tec tape recorders, auto-tec
 multi frequency oscillator, conversion
 amplifiers, audio operational ampli-
 fiers, and replacement parts.

New: D.A.

Utility Tower Company—Booth 210.
 Computer designed towers for every
 purpose—AM, FM, TV, CATV, micro-
 wave and two-way.

Varian Associates—Booth 223. UHF-
 TV klystrons, and power grid tubes.

**Videomax, Orrox Corporation—Booth
 226.** Video head refurbishing/rebuild-
 ing capability, high band and low
 band heads, and conversion of low
 band to high band. See ad on page 9

**Visual Electronics/Edco Products Div.—
 Booth 306.** Tape cartridge equip-
 ment, stereo phase enhancer, audio
 cassette equipment, and video switch-
 ers.

New: Cassette equipment, video
 switcher, and tape cartridge equip-
 ment. See ads on pages 178, 180



The finest multi-core studio and field camera system ever produced by Philips.

Which means the finest multi-core studio and field camera system ever produced.

In the decade since Philips re-invented color with the Plumbicon* tube, its PC-60 and PC-70 have successively stood as *the* reference standard for broadcast performance. Behind Philips leadership, that standard has steadily improved to today's ultimate—the LDK-25.

That Philips has again leapfrogged the competition can surprise no one who knows broadcast cameras...since we created Plumbicon* technology. After a decade of refinement and improvement Philips is still the *only* company that manufactures all of the critical picture determining components—computer-matched yokes, beam splitting prism, deflection circuitry and Plumbicon* tubes. The *only* company that can design each component for optimum performance of the entire camera system. These advantages, of superior Philips design and in-house component availability, offer you unsurpassed stability, picture quality and value.

Further, at Philips, we offer you options that *are* options. The LDK-25 you buy is a custom unit, equipped

with the automatic features you select...not a 'loaded' factory package.

But you can't just read about the LDK-25...you've got to experience it.

Only a demonstration can show you how our anti-comet-tail Plumbicon* tubes handle highlights up to 32x normal peak-white level without blooming or streaking—and without loss of our famous color rendition and resolution. 'Live' is the only way to learn what our Color Line-Up Equipment (CLUE) can do for ease of balance... what electronic color temperature control, auto white balance, flexible auto iris and contrast compression mean in use.

Only after you've seen it all—after you've actually handled this remarkable camera—will you understand why the Philips name is a guarantee of incomparable stability...why no one else can match our 1000-hour performance.

To get your hands on an LDK-25 or to get more information, call us today at (201) 529-5900; (201) 529-3800, or write: Broadcast Products, Philips Audio Video Systems Corp., 91 McKee Drive, Mahwah, N.J. 07430.



See LDK-25 and all the Videostars at Philips' live presentation of **INNOVISION '77**
NAB-Sheraton Park Hotel **TWO**

PHILIPS[®]
*TM-N.V. Philips

March, 1977

For Technical Data Circle (32) on Reply Card
For Demonstration Circle (33) on Reply Card

43



Shoreham Americana Exhibitors Guide

The front of the Shoreham Hotel faces the back of the Sheraton Park, so at least two of the NAB convention hotels are within walking distance. And that will help you see at least two-thirds of the exhibits without taking a taxi or bus.

The Shoreham is a deceptively simple facility. You'll have to take your time and check the floor plans to make certain you've seen all the exhibits. Even the hallways will be in use.

The information compiled here for your use was gleaned from questionnaires sent out in late December and early January. This was followed by endless telephone calls, updating booth numbers and equipment, adding to or subtracting from the listings. The results

show the information available to us at press time.

Because the convention is spread across three hotels, you'll need all the information you can get before you attend the convention. By scanning the three **BE** hotel articles, you'll have a pretty fair idea of who is going to exhibit what. Many of the manufacturers have advertisements in this issue. If you run down the list, you can check off the exhibits you'll want to visit. Then note the red advertising information line and look up the ad. This way, you can compile an exhibit visiting list. Coupled with our guide to the exhibits, you can work up a plan of attack and save your energy for the hospitality suites.

A. F. Associates—Booth 535 (in

Computer Magnetics booth). Remanufactured tape machines.

New: *AFR-1200 quad tape machines.*
[See ad on page 27](#)

Andrew Corporation—Booth 523. Helix coaxial cables, STL microwave antenna systems, earth station antennas, UHF transmitting antennas, and pressurization equipment.

[See ad on page 89](#)

Anixter Mark—Booth 569. Microwave antennas.

New: *High performance microwave antenna.* [See ad on page 156](#)

Arvin Echo—Booth 536.

[See ad on page 53](#)

Audi-Cord Corporation—Booth 565. Modu-cart cartridge reproducers, and modu-cart cartridge record-reproducers.

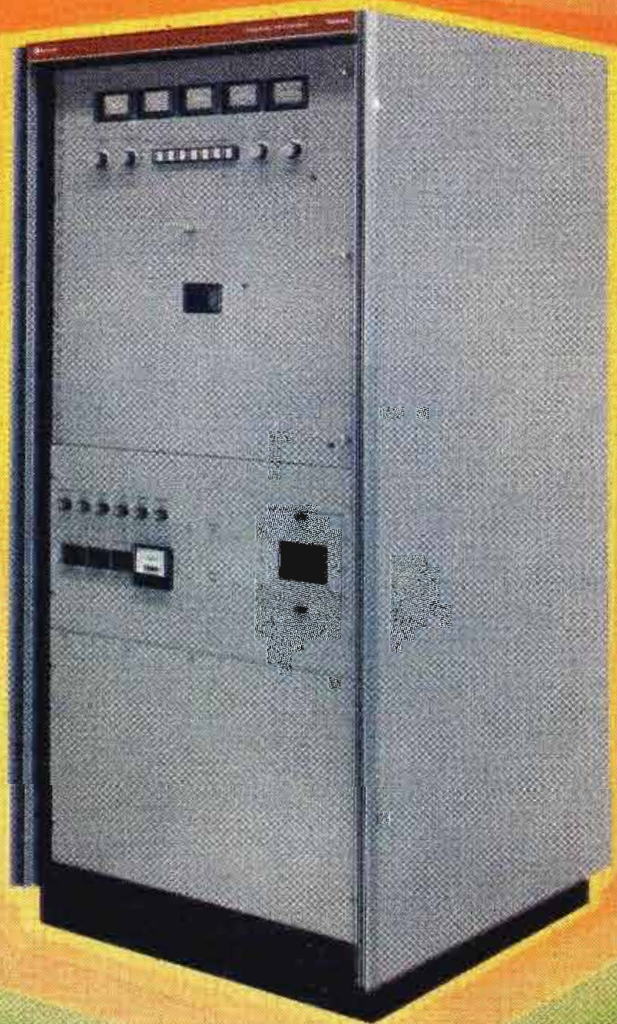
New: *Modu-cart multiple transport reproducer.* [See ad on page 175](#)

Continued on page 46

TWO NEW COLLINS SOUNDS:



THE MARK 8 & THE POWER ROCK



A new high efficiency 5-kW AM transmitter and a new high performance stereo console at lower prices . . . They're here! The new Power Rock AM transmitter with high performance, super-efficiency and a super-competitive price. And a Collins eight channel stereo console that offers superior performance at a price 50% less than our ten channel model.

The new Collins 828E Power Rock 5-kW AM transmitter: Uses switching modulation (the time-proven technique used in most high efficiency regulators) and a new high efficiency RF amplifier. This adds up to lower power bills • Features an advanced output network called Q-Taper which improves frequency response and reduces adjacent channel cross-modulation interference • Other goodies: Automatic power output and modulation control. 125% modulation capability. Built-in diagnostic aids. Plus other features that foreshadow the day of automatic transmitter operation • And it's all in a cabinet the size of a 1-kW unit!

The new Collins Mark 8 Stereo Console is an engineer's delight: All plug-in construction — switches, PC boards, attenuators and amplifiers. Plus a host of other maintenance aids • Performance that equals consoles several times its cost: 22 dB of headroom. 1/2-dB frequency response. 1/4% harmonic and intermod distortion. Big 25-W monitor amps. 5-W headphone amps. And optional machine control functions for ease of operation.

For more information on the Power Rock and the Mark 8 or any of the full line of Collins quality broadcast products, contact your local Collins Broadcast salesman. Or Broadcast Marketing, Collins Commercial Telecommunications Division, Rockwell International, Dallas, Texas 75207. Phone: (214) 690-5574 or 5424.



Rockwell International

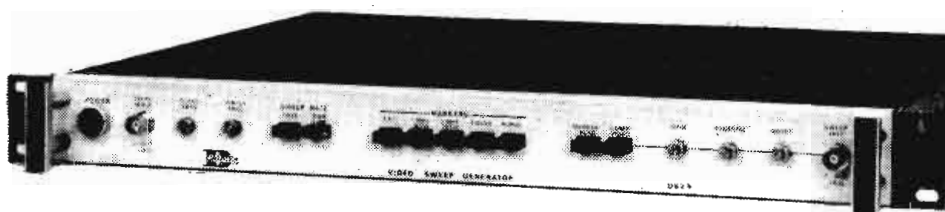
...where science gets down to business

See them at NAB Park Sheraton Hotel
For More Details Circle (34) on Reply Card

THE BETTER WAY

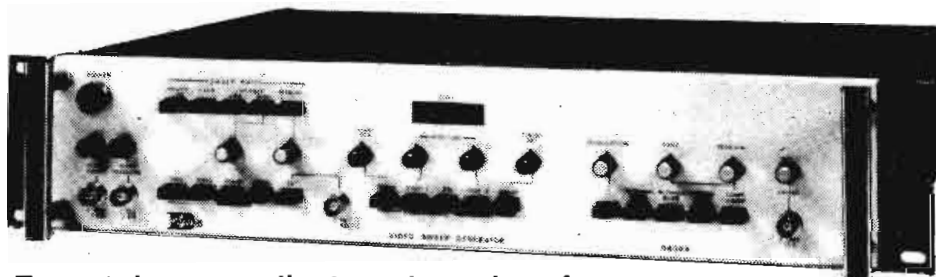
DATATEK TV VIDEO SWEEP GENERATORS

DESIGNED FOR TELEVISION



For use as a station test signal—Model D-629

This Datatek Video Sweep Generator provides sync and blanking inputs to generate a composite video sweep signal synchronous with station pulses. It is used to route video sweep throughout the plant to monitor system frequency response. The D-629 includes blanked markers selectable at 1MHz and 5 MHz intervals, and a separate marker for color sub-carrier.



For equipment adjustments and performance measurements—Model D-630A

The Model D-630A Video Sweep Generator is ideally suited for measuring and optimizing station video equipment. It includes comprehensive marker facilities with frequency readout, fixed and variable sweep rates, CW mode and internal as well as external sync and blanking facilities.

For further information call or write:

D
DATATEK
CORP.,

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

Shoreham Americana

Continued from page 44

Audio Designs & Mfg.—Booth 550. Custom audio console, stock audio console, distribution amplifiers, patch-bays, program amplifiers, noise suppressors, limiters, and spectrum analyzers.

New: Electronic pre-select for custom consoles. See ads on pages 31, 99

Automated Processes Inc.—Booth 509. Audio broadcast consoles (mono-stereo-quad), audio production consoles, tape synchronizers, audio equalizers, full line of audio modules, audio cross-point switchers, and audio communications systems.

New: Full line of audio amplifiers, VU meter amplifiers, and automation programmers for audio consoles.

Beucart Division, UMC Electronics Co.—Booth 562. Cartridge tape machines, splice finders, bulk erasers, audio heads, and motors.

New: Economy cartridge machine line, and sports remote console cartridge machine. See ads on pages 28, 154

BEI—Beston Electronics, Inc.—Booth 504. High speed automatic light controls for large and small image film chains, pulse cross generator, and character generator.

New: Low cost titler. See ad on page 128

Berkey Colortran—Booth 507. Sun-lites, fresnels, memory lighting control, suspension equipment, gelatran (60 colors), and dimmers.

New: 60 color gelatran color media, fresnels, compact dimmers, and memory II. See ad on page 67

BJA Systems, Inc.—Booth 572. Chromaton 14 video animator, chromaton 135 colorizer, and natural coloring process.

New: Natural coloring process.

Cablewave Systems Inc.—Booth 518. Transmission line systems, elliptical waveguide systems, AM sampling line systems, dehydrators and associated pressurization equipment, and parabolic antennas.

New: Transmission line.

See ad on page 65

The Camera Mart Inc.—Booth 505. Video cameras, aux. base station, VTR units, time base correctors, zoom lenses, tripods, video products, video cart, and monitors.

Cinema Products Corp.—Booth 503. Steadicam with video camera, news-film cameras, fluid head tripods, and quartz lighting kits.

New: Steadicam with video camera.

Continued on page 50

Amperex announces a new family of Plumbicon® tubes with 37% less lag*

When we first introduced the Plumbicon, its obvious superiority made it seem like the "ultimate" TV pickup tube. But in the dozen years since then we have produced a steady stream of advances in technology that have vastly improved its performance.

Now, with the new XQ1410 family of Plumbicons, we bring you the next step forward in pickup tubes for broadcast color: Internal bias lighting—resulting in a dramatic reduction in lag that conquers even the toughest low-key lighting conditions.

No more color fringing...vastly reduced picture smear...even better dynamic resolution than before—and all with the traditional Plumbicon's spectacular color performance.

Bias lighting has been offered before...as in our XQ1080, available for the past four years...but never in a fully integrated line of variable- and fixed-bias light tubes. The XQ1410 family is physically and electrically interchangeable with our industry-standard XQ1020 family. Only a minor field change is required to permit adjustment of bias light intensity if you use variable-bias tubes. (We supply complete instructions, of course.)

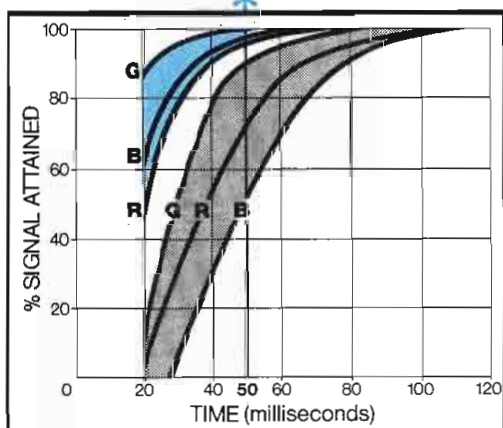
With bias lighting, the Plumbicon's near-zero dark current rises to a few nanoamperes to modify the target's beam-acceptance characteristics. The effect is to sharply decrease both rise time (signal buildup lag) and decay lag in all three channels. As shown below, the result of optimizing all three bias currents, in a "typical" camera, is a 37% reduction in lag.

Since the bias light intensity can be externally adjusted in each of the XQ1410 tubes...luminance (XQ1410L), red channel (XQ1410R), green channel (XQ1410G), and blue channel (XQ1410B)...all channels can be matched within the camera for identical lag characteristics, thus optimizing overall camera performance at levels never before achievable. The result: A new plateau in the quality of broadcast color. You'll have to see it to believe it.

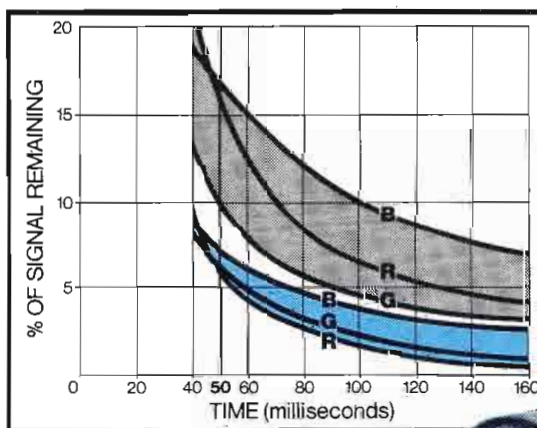
For detailed information on our latest advance in the technology of the Plumbicon...the pickup tube used by 90% of all TV broadcasters...write or telephone: Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

IMPROVEMENT IN XQ1410 RISE TIME LAG PERFORMANCE with bias-light-induced dark current

At 50 ms, average % signal attained rises from 71.7% to 98.5%—a 37% overall improvement in rise time lag performance. Selecting optimum dark currents (e.g. Red = 4nA, Blue = 8nA, Green = 3nA) reduces spread in % signal attained from 39.5% to 3%—a 13X improvement in "incremental rise time lag."



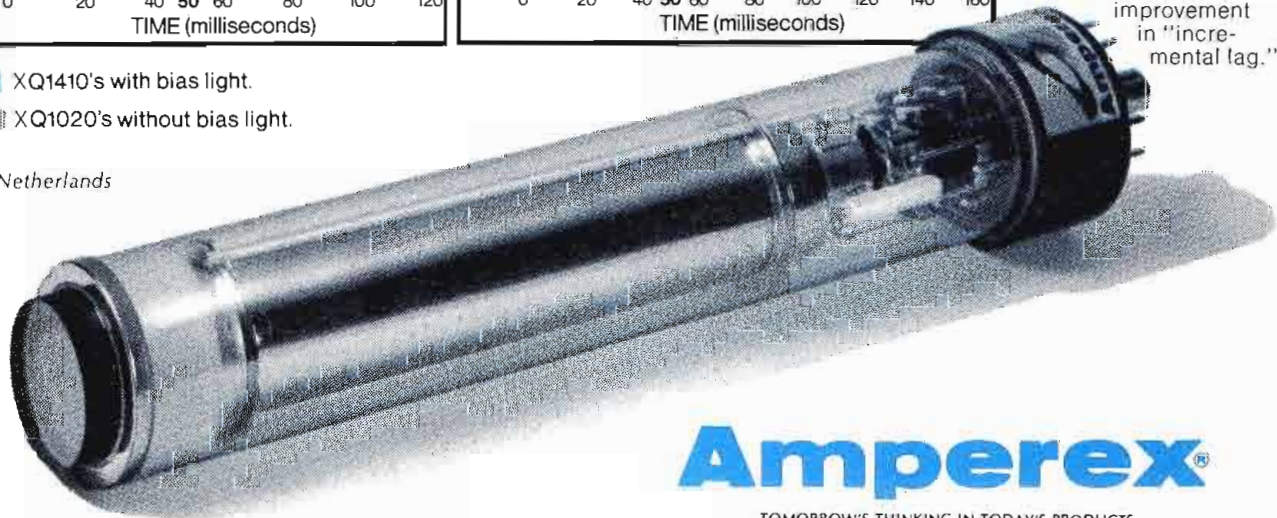
■ XQ1410's with bias light.
□ XQ1020's without bias light.



REDUCTION IN XQ1410 DECAY LAG with bias-light-induced dark current

At 50 ms, average % signal remaining falls from 15% to 7%—a 50% overall reduction in decay lag. Same optimum dark currents reduce spread in % signal remaining from 7% to 0.8%—a 9X improvement in "incremental lag."

© Reg. T.M. of N.V. Philips of the Netherlands



Amperex®

TOMORROW'S THINKING IN TODAY'S PRODUCTS

A NORTH AMERICAN PHILIPS COMPANY

For further details and applications information, send for Bulletin No. 31.

March, 1977

For More Details Circle (36) on Reply Card

47

Kevin O'Connell, WQXI, Atlanta says:



"The keyboard configuration allows eyes-off, hands-on "Touch System" control. And the RECORD key's double spaced so I won't hit it by mistake."



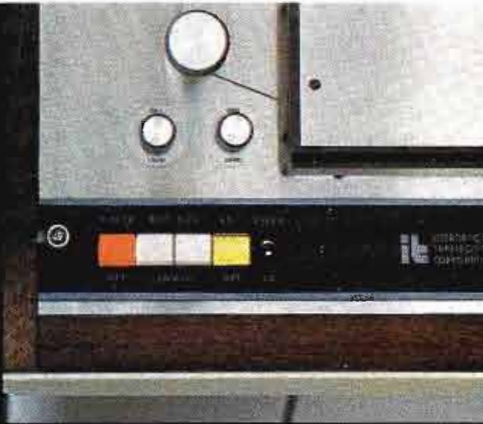
"Fastest editing machine I've ever used! I can use a grease pencil. The split gate opens for perfect visibility without lifting the tape."



"Differential braking stops reels smoothly, without slack or risk of tape damage. And the reels are held gently so I can move reels manually to locate a final point!"

**"Starts instantaneously! The 850.
And it's super-rugged, with a half inch thick hardened aluminum deck.
Warp proof! You just can't damage an 850!"**

"I.T.C. designed it for me!"



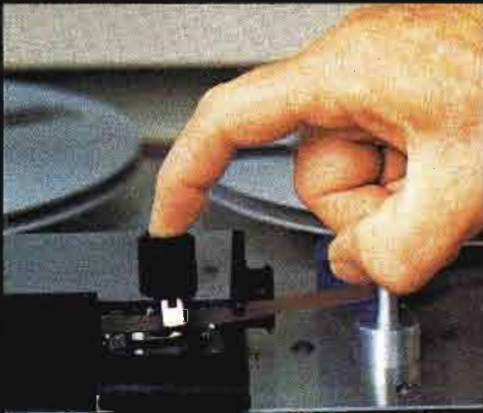
"When I mix reels I just flip a switch to compensate for the different hub sizes. And because the calibrated level control 'clicks' when I move it out and back into position I can always return to my calibrated setting. Easily."



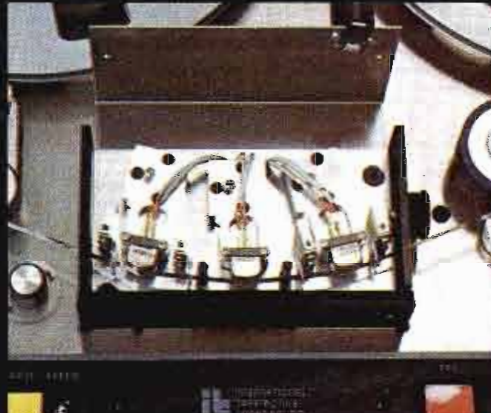
"When I touch FAST, the gate opens automatically and lifts the tape from the head. Or, I can open the gate manually. Manual positioning, or 'gating', lets me monitor the tape in high speed modes without risking damage to meter, amplifiers or speakers."



"Dumping tape in the edit mode is fast, easy, foolproof. Moving the tension arm down turns the take-up reel off. I can discard tape, listening as I go."



"There's also a fool-proof push button tape marker. Or, I can crease-mark the tape against a disc positioned for this purpose."



"The hinged lid lifts back for access to the entire head assembly."



"This new high-friction polyurethane roller pulls the tape with less pressure. Less wow and flutter."



"The Playback/Record Synchronizer lets me record on one channel and listen to another, in complete synchronization."



"The 4-position Meter Mode switch allows visual comparison of recording input and playback output so I can create virtually distortion-free recordings."

**CALL TOLL-FREE:
800-447-0414**

In Alaska, Hawaii or Illinois
call collect: (309) 828-1381

Ask about our attractive lease-
purchase and trade-in plans.



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

Marketed exclusively in Canada by McCurdy Radio Industries Ltd., Toronto
For More Details Circle (37) on Reply Card

GOODBYE, TRIPOD.

Hydro-Ped takes over

Suddenly the tripod is completely out-dated. It had to happen. The cumbersome, awkward, insecure mount had to go. In its place is the O'Connor 102B Hydro-Ped, a completely new concept in camera mounts. 4 times more rigid in torsion (panning) and 4 times more rigid in moment of mounting plate (tilting) than a comparable tripod. Levels hydraulically on any terrain.



Column raises or lowers smoothly by hydraulic pressure, to counterbalance camera weight. Height-adjustable from 30" to 60". Folds instantly to 10" x 30" for easy, safe handling. Strong magnesium construction; wt. 29 lbs. Handles up to 100 lbs. Stop cursing your tripod. Start enjoying your Hydro-Ped.

See us at NAB
Booth 573, Shoreham Americana

Carries up to 100 lbs.

HYDRO-PED

O'Connor
ENGINEERING LAB INC.

O'Connor Engineering Laboratories, Inc.
100 Kalmus Dr., Costa Mesa, Calif. 92626

Send catalogs on () Hydro-Ped. () Fluid Head for camera weighing _____ lbs.

Name _____

Firm _____ Title _____

Address _____

City _____ State _____ Zip _____

Shoreham Americana

Continued from page 46

Communications Technology, Inc.—Booth 559. Video-audio routing switcher, 20x10 5-level routing switcher, 15x12 video-audio routing switcher, 16x10 video-audio routing switcher, 48x10 audio routing switcher, ENG assignment switcher, 11x3 production switcher, and 11x5 production switcher.

New: Routing switcher, ENG assignment switcher, and production switcher. See ad on page 20

Computer Magnetics Corporation—Booth 535. Video disc, video quad heads, audio heads, auto equalizer, and velocity error corrector.

New: Velocity error corrector.

See ad on pages 160-161

Comrex Corporation—Booth 570. Remote broadcast cue systems, wireless microphone systems, TV aural monitors, remote pickup transmitters and receivers, and speech processing equipment.

Convergence Corporation—Booth 517. "Joystick" editing control system, "Joystick" search module, program computer, LED digital tape timers.

See ad on pages 24-25

Datatek Corp.—Booth 553. Video-audio switchers, Video and Pulse D.A.'S, Audio D.A.'s, TV transmitter color phase equalizers, video waveform correctors, video sweep generators, and envelope delay meas. sets.

New: Video sweep generator.

See ad on page 46

Datron—Booth 531. Time code generators, ENG video editors, digital dissolver, time code readers, and character generators. See ad on page 63

David Lint Associates—Booth 571. Recorder/reproducer, in-cassette duplicator, processor and replacement electronics, broadcast cartridges, cassettes and software packaging, heads, audio and high speed duplicating, and electro sound automatic splicer.

New: Quality control reproducer and electro sound automatic splicer.

Digital Video Laboratories, Inc.—Booth 513.

Dielectric Communications—Booth 544. RF loads and Wattmeters, waveguide and accessories, RF switches, strobe guidance systems, and high power passive components.

Duca-Richardson Corp.—Booth 529.

New: Video production switching systems.

Eigen Video—Booth 563. Slow-motion

Continued on page 52

Still manually monitoring VITs?



mi has the AUTOMATIC answer whether your system is NTSC, PAL or SECAM

Adaptable to all national VIT waveforms including NTC #7 and FCC, the **mi** 2914 Insertion Signal Analyzer has proven performance with broadcasters and common carriers throughout the world. For unattended operations the Analyzer interfaces directly with telemetry control systems. Combine the **mi** 2914 with the optional Limits Comparator, **mi** 2915, and the **mi** 2917 Data Selector for a complete monitoring, measuring and alarm system. You can control or print out at a local or remote terminal, and, our print-out is now available in

English, French or American. As a stand alone unit, the **mi** automatic VITS Analyzer replaces Waveform Monitors, Vectorscopes, Color Gain and Delay test sets and Random Noise Measuring sets. Even the most complex VIT measurement is performed at the push of a button and the result displayed with digital accuracy on the front panel meter.

So if you are still manually monitoring VITS . . . we have the immediate solution . . . contact **mi** today!

SEE US AT BOOTH NO. 106 NAB

mi **MARCONI INSTRUMENTS**
DIVISION OF MARCONI ELECTRONICS INC.

100 Stonehurst Court, Northvale, New Jersey 07647 • (201) 767-7520 • TWX: 710-991-9752
For More Details Circle (39) on Reply Card

WTOO WTEL CKCY KLOE-TV
 WKAG WRSC WLOB WNNR
 WPOR
 WOKK
 WLBR
 WDLB
 WDAR
 WKAG WYVA
 WOTR WKBO CJYR
 KYAK WBOK WIBX WHP WEEL



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

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

See us at NAB Booth 520, Shoreham Americana
 For More Details Circle (40) on Reply Card

NEW!

**Remote Controlled
 Production Switcher**

Model 7400 gives you

- High Reliability
- Quality Construction & Components
- 2-Piece Design for Easier Maintenance,
 Greater Layout Flexibility
- Economy

and...

- 23 Wipe Patterns
- 12 Inputs Including Black Burst
- Computer-
 Compatible Control Logic
- 100% Vertical Interval Switching
- Key, Color Mat, Mix, Soft Wipe, Spotlight & Mask Key
- Program/Preview Cut Bar
- Optional Circle Pattern with
 Joystick Positioner
- NTSC, PAL, or PAL-M Versions

Call or write for specifications and price. Distributor inquiries solicited.

DYNASCIENCES | **video products**

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

A SUBSIDIARY OF **Whittaker**
 CORPORATION

For More Details Circle (41) on Reply Card

Shoreham Americana

Continued from page 50

disc recorder.

New: Slow-motion disc recorder.

Electrohome Ltd.—Booth 512. Mono-
 chrome monitors, and color monitor.

New: Color monitor. See ad on page 10

Electro Impulse, Inc.—Booth 568.
 Dummy loads.

New: Dummy loads.

Electro Voice, Inc.—Booth 546. Pro-
 fessional microphones and monitor
 loudspeakers. See ad on page 105

ESE—Booth 557. Digital clocks, digi-
 tal timers, time programmers, time
 calculators, timer/source interface,
 master clocks and slaves, and time
 code reader.

New: Clock/timer with memory, time
 code reader, handheld time calculator,
 console mount slaves, and timer/
 source interface.

See ads on pages 121, 155, 157, 159

Farinon Electric—Booth 502. Portable
 microwave for ENG, fixed microwave
 for STL and intercity relay, and acces-
 sory equipment.

New: Amplifier for portable microwave
 transmitters. See ad on page 71

**Flash Technology Corp., of America—
 Booth 554.** High intensity tower lights.

New: Signal isolator for use with hot
 towers, and new combination red/
 white top light. See ad on page 54

**Glentronix Ltd.—Booth 535 (in Com-
 puter Magnetics booth).** Switchers-
 production, audio-video routing, mas-
 ter control console, clock drivers, time
 code generator, reader, character
 generator, and color frame calculator.

New: ACR-25 fault analyzer.

See ad on page 154

Gotham Audio Corp.—Booth 527.

Condenser microphones, flutter
 meters, harmonic distortion meters,
 noise reduction systems, audio cable,
 miniature input transformers, tape
 recorders, broadcast turntable sys-
 tems, rumble meters, monitor loud-
 speaker systems, peak reading,
 video monitor projected, audio meters.

New: Noise reduction system, 3d har-
 monic distortion meter, peak reading,
 video monitor projected, audio level
 meters, and rumble meter.

IGM/NTI—Booth 538. Rampart control
 system, PAL logging system, insta-
 cart, and go-cart.

New: Cartridge playback unit, and
 computer control system.

**Ikegami Electronics (U.S.A.), Inc.—
 Booth 508.** High quality computerized
 studio camera, announcer booth cam-

Continued on page 54

Arvin/Echo's EFS-1 Discassette® Recorder Never Forgets a Face

Arvin/Echo's frame-stor™ recorder has been remembering faces all over the globe, from the 1976 World Olympics to the Hollywood glitter of the Merv Griffin Show. It remembered faces at the Presidential Inauguration, The Kentucky Derby, The Indianapolis 500, The Barbara Walters/Harry Reasoner Show, and on and on and on. The EFS-1 is a regular on major networks in the United States and Canada . . . an accepted member of the broadcast elite.

Perhaps part of the reason for such rapid rise to fame is its versatile remote random access controller . . . our ticket to the world of automation!

**or a Name
or a Number**

Another reason may be its low price . . . under \$15,000. And talk about dollars and sense . . . the real cost-saving factor of the EFS-1 unit is its DISCASSETTE Record, which electronically stores 400 slides—200 on-line— at only \$75, less than 20¢ a slide.

Service, product reliability, compact size and light weight—fact is, the reasons for owning an EFS-1 are as long as its memory!

ARVIN/ECHO™

ECHO SCIENCE CORPORATION
an ARVIN SYSTEMS, INC. company
485 E. Middlefield Road, Mt. View, California 94043
Tel: (415) 961-7145 TWX: 910-379-6499

DISCASSETTE® is a registered Trademark of ARVIN SYSTEMS, INC.



For More Details Circle (42) on Reply Card

Shoreham Americana

Continued from page 52

era, 14" high resolution color monitor, 20" color monitor, one pc. type portable camera, and two pc. type portable camera.

New: Triax operation one pc. type portable camera, triax operation two pc. type portable camera, low cost studio camera, and 20" color monitor with white band. [See ad on pages 12-13](#)

Industrial Sciences, Inc.—Booth 552. Routing switcher systems, production switchers.

New: Television audio consoles.

Inovonics—Booth 571 (in David Lint booth). Audio signal processing devices, and tape recorder placement electronics for updating and improving old machines.

New: Multiband audio processor, and noise suppressor. [See ad on page 85](#)

Interand Corporation—Telestrator Division—Booth 560. Telestrators.

New: Star+Probe —CCTV response and teaching systems.

JVC Industries—Booth 530. Professional 3/4 inch portable and editing VCRs.

New: Hand-held ENG color camera.

Kings Electronics Co., Inc.—Booth 555. Triaxial quick disconnect connectors, video switches, video plugs and jacks, audio plugs and jacks, and cable assemblies.

Kirkpatrick Industrial Plastic Co.—Booth 567.

Knox Ltd.—Booth 703. Character generator

New: External add-on memory.

[See ad on page 172](#)

Laird Telemedia Inc.—Booth 551. Optical multiplexers, dissolve slide projectors, character generators, and time/date generators.

New: Dissolve slide projectors, character generators, and time/date generators. [See ad on page 167](#)

Lightning Elimination Associates—Booth 510A. Lightning dissipation arrays, line surge eliminators, transient eliminators, and lightning warning systems.

New: Line surge eliminators, and transient eliminators.

LPB, Incorporated—Booth 520. Audio consoles, preamplifiers, compressor/limiters, studio furniture, low power AM transmitters, turntable and arms, distribution amplifiers, studio systems and accessories, and educational FM transmitters and transmission equipment. [See ad on page 52](#)

L-W International—Booth 566. Television film chain projector, and TV broadcast projector. [See ad on page 32](#)

Merlin Engineering Works, Inc.—Booth 534. Custom quad VTRs, quad VTR accessories, and quad VTR high band color conversion kits.

New: Quad duplicator system.

MICMIX Audio Products, Inc.—Booth 547. Reverberation chambers.

New: Master-room reverbs, master audio meter, audio delay, and effects gen. [See ad on page 179](#)

Minneapolis Magnetics, Inc.—Booth 516. Replacement audio heads for professional recorders.

New: Replacement heads for cartridge machines. [See ad on page 150](#)

Nortronics Company, Inc.—Booth 522. Magnetic tape heads, and tape recorder maintenance accessories.

New: Professional lapping kit, and replacement heads.

O'Connor Engineering Laboratories, Inc.—Booth 573. Fluid camera heads, lightweight hydraulic pedestals, tripods, fluid zoom controls, and camera support accessories.

New: Fluid head. [See ad on page 50](#)

Continued on page 56

YOU'RE BEGINNING TO SEE THE LIGHT!

A HIGH INTENSITY LIGHTING SYSTEM offering

- Reduced Weight and Windage
- Easier, Lower Cost Installation
- Improved Reliability and Serviceability
- Fully FAA Approved

was Demanded at the 1975 NAB Show.

At the 1976 NAB Show, FLASH TECHNOLOGY introduced the FTB-205 ElectroFlash Beacon System, **DESIGNED and MANUFACTURED** to these requirements.

Now, of 110 reliable ElectroFlash Systems in operation, **FIVE** FTB-205 systems mark and protect America's **NEWEST BROADCAST TOWERS.** * **FIVE** more towers with ElectroFlash protection are operating in **CANADA.** *

These numbers do not include the ElectroFlash Systems on Microwave communications towers or the **TWO "HOT"** tower systems, one on a 1/2 megawatt radio navigation radiator and the other on a combination AM radiator-FM tower. *

TIME TO REPAINT YOUR TOWER? TWO of the ElectroFlash Systems soon to be "turned on" will replace surface paint and night lighting on older towers! *

Why the FTB-205 ElectroFlash Beacon System from FTCA? Simple! When you add considerations such as:

- Superior Design
- High Quality Construction
- Lower Installation Cost
- Proven Reliability
- Long Life
- Outstanding Warranty Coverage to other exclusive features, the results are benefits obtainable only with the FTB-205 ElectroFlash System.

MARK and PROTECT YOUR TOWER with CONFIDENCE!

SPECIFY the FTB-205 ElectroFlash System!

* for system locations and station calls or for additional information on the marking of your tower, see us at **BOOTH 554, SHOREHAM AMERICANA**, during the 1977 NAB Show

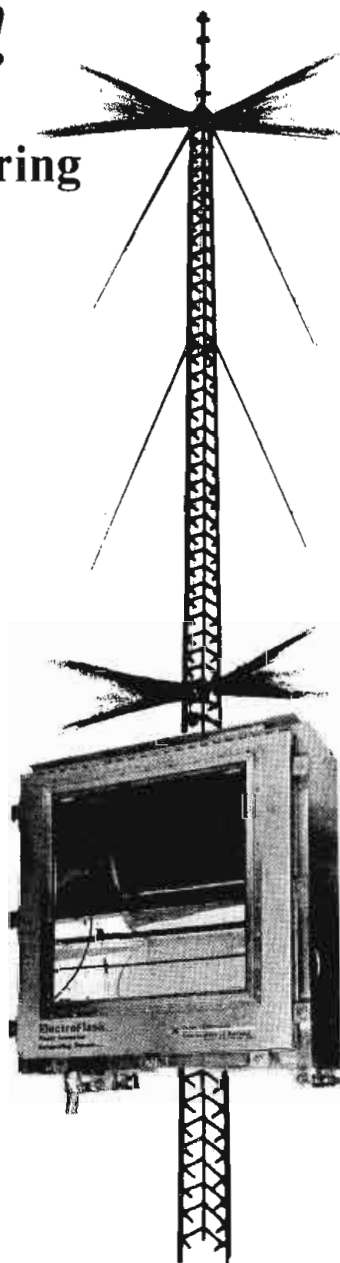


FLASH TECHNOLOGY

CORPORATION of AMERICA

111 LOCK STREET, NASHUA, NEW HAMPSHIRE 03060

TEL. (603) 883-0521

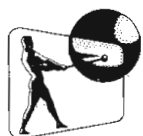




Sitting Pretty in Virginia.

Rank Audio Visual have just delivered their first Broadcasting Audio Console in the U.S.A. to W.L.E.E., Richmond, Virginia.

If you'd like to know more about the Broadcasting equipment available from Rank Audio Visual, please contact the **Collins Radio Group**, Dallas, Texas or visit the Rank Organisation's **stand 409** at the **Washington NAB**



Rank Audio Visual Limited, England.

Collins Radio Group, Dallas, Texas 75207. (214) 690-5310



Rockwell International

For More Details Circle (44) on Reply Card

www.americanradiohistory.com

Shoreham Americana

Continued from page 54

Orban Associates—Booth 540. Optimod-FM. See ad on page 82

Orban Associates (Parasound)—Booth 539. Optimod 8000, parametric equalizer, de-esser, reverb, stereo limiter/compressor, and stereo synthesizer.

New: stereo limiter/compressor, and reverb. See ad on page 82

Pacific Recorders & Engineering—Booth 549. Fully operable production system, MCI tape recorders, fully operable on-air broadcast console,

multimeter broadcast limiter, and the digitimer 2 series clocks.

New: The multimax AGC gain reduction unit, and on-air broadcast console. See ad on page 86

Paperwork Systems—Booth 542. Broadcast computer systems, and cable TV computer systems.

New: Computer systems, and 200-line-per-minute printer.

Potomac Instruments—Booth 524. AM antenna monitor, and AM and VHF field strength meters.

New: Automatic distortion, wow & flutter, and phase and ratio audio test set. See ad on page 151

Recording quality that speaks for itself

Scully's versatile 280B/284B series offers professional recording features, including constant tension and pitch control... but total performance tells the real story; the reliability and quality that have made us the leading supplier of professional recorders.

Scully speaks for itself through more than 200 sales and service dealers worldwide. For full information, contact Scully Recording Instruments, Division of Dictaphone Corp., 475 Ellis Street, Mountain View, California 94043 (415) 968-8389 TLX 34-5524

▶ Scully Recording Instruments



For More Details Circle (45) on Reply Card

QEI Corporation—Booth 548. AM monitor, AM RF amplifier, FM monitor, FM RF amplifier, stereo monitor, VHF-TV monitor, FM exciter, 10W FM transmitter, stereo generator, SCA generator, AM peak limiter, FM peak limiter, AGC amplifier, and composite STL system.

Radio Programming and Management—Booth 526.

Ramko—Booth 564. D. A. Audio, mic amps, line amps, equalizers, studio monitor amp, and audio crosspoint switchers.

New: 8 new audio consoles. See ad on page 81

Robins Broadcast & Sound Equipment Corp.—Booth 545. Broadcast console, TV console, distribution amp, portable mixing console, reverberation, pacing ambicon, linear attenuators, and amplifier modules.

New: Broadcast modules. See ad on page 18

Rosco Laboratories Inc.—Booth 556. Tough heat stable color media, front and rear screen projection material, and complete line of HMI lighting equipment.

Rupert Neve Inc.—Booth 541. TV sound production console.
New: Comprehensive radio console.

Scientific Atlanta, Inc.—Booth 532. Receivers and earth station antennas.
New: Video receiver.

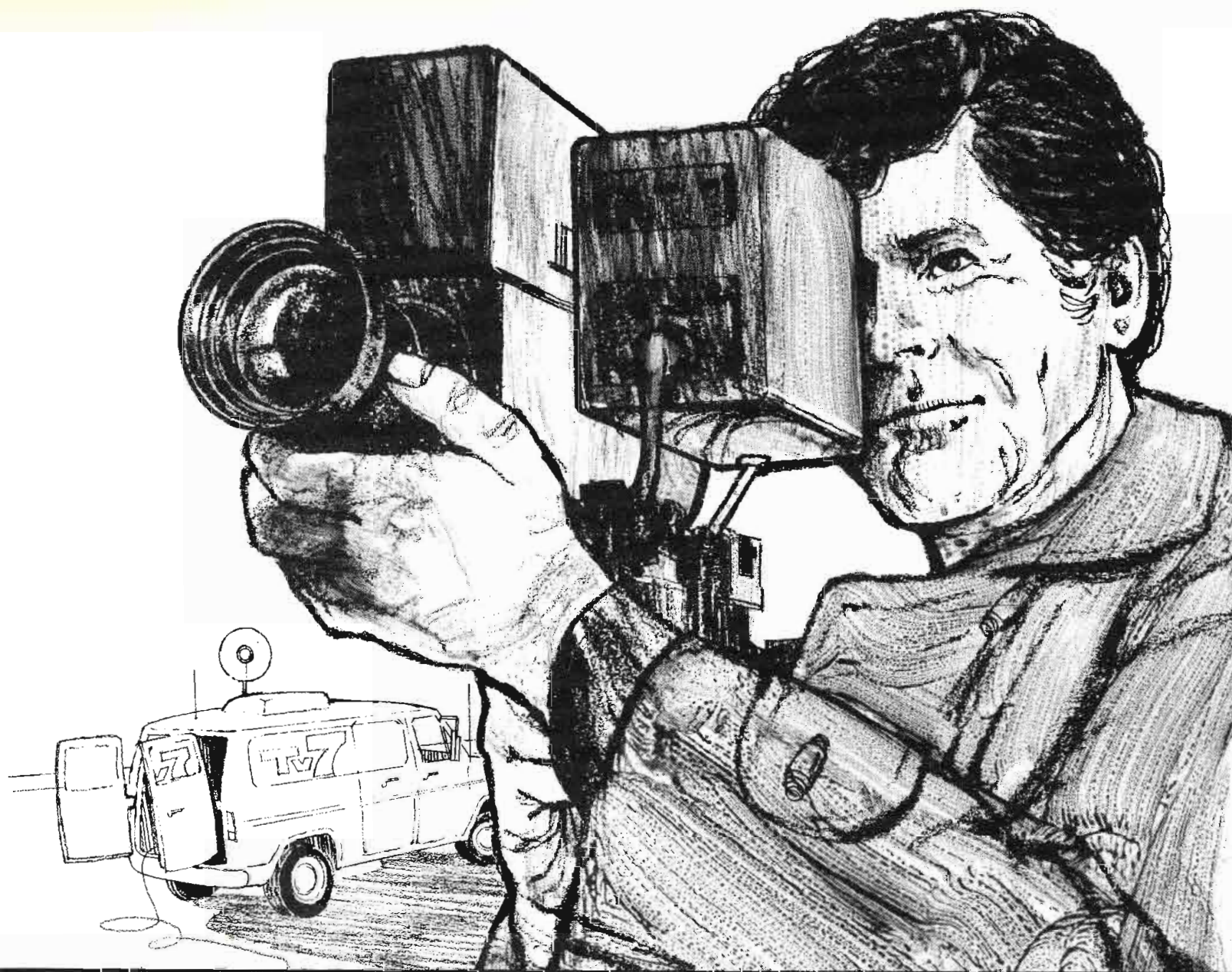
Sintronic Corporation—Booth 537. 1000 Watt AM transmitter, 1000, 3000, and 25,000 Watt FM transmitters, and FM VSWR protector.
New: 1000 Watt solid state AM transmitter. See ad on page 78

Eric Small & Associates—Booth 540. ATS equipment, towerlight monitor, and peak program meter.
New: ATS equipment, towerlight monitor, and peak program meter. See ad on page 82

Sony Broadcast—Booth 506. 1" high band production recorders, 1" high band portable recorders, ENG recorders, ENG editing systems, time base corrector, portable production and ENG cameras, monitors and SMPTE code gen. and readers.
New: Will introduce products in every category. See ad on pages 72-73

Sound Technology—Booth 561. Distortion analyzers, audio generators, and FM stereo generators.
See ad on page 21

Stanton Magnetics Inc.—Booth 521. Cartridge, headphones, gyropoise turntable, and stylus wear gauge.
New: Headphones with isolation ear
Continued on page 58



Sync and Test Signals... part of the ENG picture

There are several good reasons for including a 1470 Series Generator in your ENG specifications.

- Full NTSC sync generator
- Genlock to helical-scan VTR's
- Test signals
- Economy
- Low power consumption
- Compact

Would you like to see one of these "ENG" generators? Call your nearest Tektronix Television Field Engineer. For a data sheet use the reader's service number on this page.

Tektronix[®]
COMMITTED TO EXCELLENCE

For Technical Data Circle (46) on Reply Card
For Demonstration Circle (47) on Reply Card

Shoreham Americana

Continued from page 56
cushions, and stylus wear gauge.

See ad on page 103

Willi Studer America, Inc.—Booth 543.

System Concepts, Inc.—Booth 701.
Character generator.

New: Character generator.

See ad on page 29

Taber Manufacturing & Engineering Co.—Booth 525. See ad on page 94

Telecommunications Industries Limited—Booth 510. Test charts, slides, films and transparencies, and spherical transparency illuminator.

New: ENG two-chart system, flesh

tone reference, electronic cinematography test charts.

Television Equipment Assoc.—Booth 528. Headsets, headphones, video delays, pulse delays, video filters, automatic video equalization, chroma corrector, portable test signal generator, sportscaster headset, and color monitor comparator.

New: TV line selector, tape evaluator cleanser, portable audio mixer, camera tube test channel, intercom systems, and wireless mic. See ad on page 106

Time and Frequency Technology, Inc.—Booth 501. Transmitter remote control, FM tuneable modulation monitor,

AM tuneable modulation monitor, and TV modulation and frequency monitor.

New: Transmitter remote control and FM modulation monitor.

See ad on page 76

Townsend Associates, Inc.—Booth 519. UHF Klystron transmitters to 220 kiloWatts, UHF IF modulated exciters to 10 Watts, and power increase kits for UHF transmitters.

New: VHF IF modulated exciters to 60 Watts, and 20 Watt UHF amplifiers.

See ad on page 92

Vamco Engineering—Booth 528. Complete line of digital tape timers, including 2" timers, 1" helical, and ¾" cassette.

New: Digital tape timer that fits in helical ENG machine replacing the old mechanical counter, and 12x1 audio video routing switcher.

See ad on page 164

Video Aids Corp. of Colorado—Booth 511. Color sync generators, cross-pulse generators, video line isolators, burst-phase meters, horizontal-phase meters, VIRS inserter, horizontal-phase meters, inserters, VITS inserter, party lines, editor-programmers, and helical gen-lock sync generators.

New: Black-burst generators, NTSC multi-test generator, ENG/EFP color sync generators, VITS inserter, NTSC multi-test generator, editor-programmer, and VIRS inserter.

See ad on page 140

Ward Beck Systems Inc.—Booth 515. Recording consoles, TV audio consoles, radio consoles, TV intercom systems, distribution amplifiers, monitor amplifiers, and extended range VU meters.

New: Modular compressor, modular noise gate, and effects filter.

See ad on Inside Back Cover

Wilkinson Electronics, Inc.—Booth 500. 2.5 and 5 kW AM transmitters, 1.5 and 20 kW FM transmitters, FM exciters and stereo generator, silicon rectifier stacks, AC line surge protector, AGC amplifier, limiting amplifier, AM modulation monitor, audio consoles, turntable preamplifier, and FM rebroadcast receiver. See ad on page 152

Ambassador Room

Ampro Corporation—Booth 610.

See ad on page 101

Audio Sellers Inc.—Booth 607A. Radio stations sales production libraries.

New: Music production library—"Music Explo."

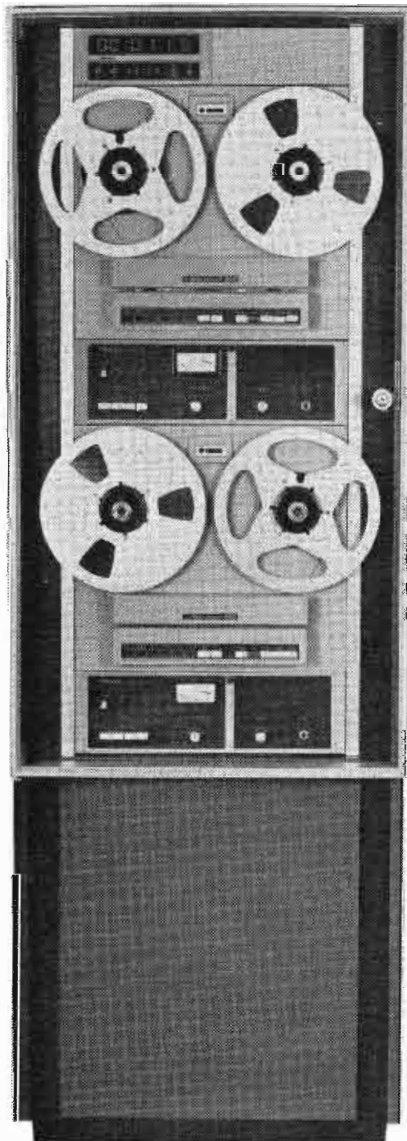
Bogner Broadcast Equipment—Booth 614 (in Comark booth). ENG antennas.

See ad on page 102

California Switch & Signal—Booth 607. Jack panels, multiswitches™,

Continued on page 60

We Sell Protection. It's Called the 400 Logger.



Dictaphone's 400 Logging Recorder gives you a precise record of the exact words — at the exact time they were broadcast. That's why the 400 is standard equipment at major radio and television networks worldwide. Extremely slow speed and automatic reversing let you pack twice as many words on an inch of tape as any other logger. And the 400's performance is unequalled. The features speak for themselves:

- Dual system automatically transfers signal when tape runs out.
- 1, 2 or 4-channels.
- Separate or simul-

taneous monitoring of each track.

- 4400 Time Code Generator optional for encoding time without dedicating a track.

Sales, service and replacement parts are available from over 200 distributors worldwide.

Get full protection, by getting the facts on the 400 Logging Recorder. Available only through Scully franchised dealers. Scully Recording Instruments, Division of Dictaphone, 475 Ellis St., Mountain View, California 94043, (415) 968-8389 TLX 34-5524

▶ Scully
Recording Instruments

For More Details Circle (48) on Reply Card

20-10000 mm.*

Whether you're the producer, director, cameraman or video man, field remote isn't getting any easier. Neither is big studio work.

Assignments are tougher. Production standards, higher. And schedules, shorter than ever. As you can see, we've been listening: our new PV25x20B is proof. A single, rugged 22Kg unit that packs a lot of performance into a compact 546mm-long package.

Consider: A master-lens range of 20-500mm, with built-in 1 1/2 and 2x servo-operated extenders, to give you complete flexibility with excellent relative apertures (1.8 @ 20-297mm; 2.7 @ 30-445; 3.6 @ 40-594 and 6.0 @ 1000). A short M.O.D. of 2.5m. Zero barrel distortion and vanishingly low pincushion. Plus manual/plug-in servo operation. And much, much more.

All at the kind of reasonable price that's helped make Canon the fastest-growing professional lens line in the world.

Canon®

For more information, please call or write:

Canon U.S.A. Inc. Head Office, 10 Nevada Drive, Lake Success, N.Y. 11040 (516) 488-6700
123 Pauldrano Avenue East, Costa Mesa, Ca. 92626 (312) 833-3070
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

*PV25x20B is 20-1000mm in 25mm format.
P25x27B is 27-1350mm in 30mm format.

TV ZOOM LENS PV25x20B 20-500mm 1:1.8

For More Details Circle (49) on Reply Card

Operations Center



This is the operation center of the new World Video CR 6220 12" Color Video Monitor. All controls are here, at your fingertips. All features such as pulse cross and underscan are standard. We have no extra cost options hidden in small print.

Behind this control panel lies a rugged chassis, with modular circuitry designed for high quality display of your signals with no automatic this and that to disguise errors.

Behind this CR 6220 is ten years of World Video experience and a staff dedicated to give you an honest value for your dollar, and to service your needs and the equipment we build.



WORLD VIDEO, INC.

P. O. BOX 117, BOYERTOWN, PA. 19512
PHONE 215-367-6055

**NAB Convention
Booth 427, Washington Hilton**

For More Details Circle (200) on Reply Card

Shoreham Americana Ambassador Room

Continued from page 58

microphone connectors, and audio cable identification collars.

Comark Industries—Booth 614. Demodulators, peak power meter, directional couplers.

New: Microprocessor based remote control. [See ad on page 176](#)

Concept Productions—Booth 615.

Dolby Labs—Booth 602A. Dolby FM broadcast unit, and consumer receivers.

Drake Chenault—Booth 613.

Garner Industries—Booth 616. Reel-to-reel high speed tape duplicator, and bulk type eraser (conveyor belt type).

Kay Industries Inc.—Booth 610.

New: Phase converter (alternate three-phase power source)

[See ad on page 26](#)

Leitch Video Inc.—Booth 613. Master and slave synchronizing pulse generators, video test generators, video processing amplifiers, video and pulse distribution amplifiers, video source synchronizers, automatic changeovers, and genlock video switchers.

New: Color black assignment switcher, precision impulse clock, PAL Synchronizing pulse generator, and remote synchronizing code system.

[See ad on page 135](#)

Lipsner-Smith Corp./Research Technology Inc.—Booth 622. Ultrasonic film cleaners, film inspection machines, and built-in previewers.

New: Pulsar-IC with previewer.

Micro Probe—Booth 613A.

Nagra Magnetic Recorders Inc.—Booth 606. Non-sync broadcast recorder, non-sync stereo broadcast recorder, miniature broadcast recorder, synchronous recorder, synchronous stereo recorder, intermediate non-sync. recorder, intermediate synchronous recorder, 10½" NAB adapter, small size high powered monitor loudspeaker amplifier.

New: Non-sync. broadcast recorder.

[See ads on pages 104, 148](#)

Optek Inc.—Booth 603. Automatic bulk tape degusser, and visual transmitter demodulator.

New: U-matic cassette degusser.

[See ads on pages 169, 172](#)

Otari Corp.—Booth 617. Automation system tape reproducer, tape record-

ers, including portable, console, and rack mounting units, and high-speed open reel tape duplicator.

New: ½" and ¼" tape recorder.

[See ad on page 93](#)

Philips Test & Measuring Instruments, Inc.—Booth 605. IF modulator, digital pattern generator, subcarrier gen., encoder, RF converters, demodulator, VITS generator, and VITS analyzer.

New: Video test signal generator.

[See ad on page 97](#)

Sansui Electronics Corporation—Booth 602. Stereo and quad receivers and preamps, and turntables.

New: 4-channel receiver.

Sescom, Inc.—Booth 620. Audio transformers, audio modules, mic-splitters, mic-snakes, microphones, mic-cables, and cable testers.

New: Presidential new bridge, active direct boxes, and mic-line driver.

Shintron Co., Inc.—Booth 601. Production switchers, and video typewriter.

New: Broadcast production switcher.

Spindler & Sauppe, Inc.—Booth 600. Producer 32 slide projector.

New: Producer 32 slide projector.

System Concepts, Inc.—Booth 701.

New: TV production titlers (character generators). [See ad on page 29](#)

Technology Service Corporation—Booth 606. Weather radar.

New: Weather radar-TV converter, and electronic overlay unit.

Telescript, Inc.—Booth 611. Monitor prompting systems, and telegraphics.

New: The "lever principle"—an innovation of monitor/prompter mounting TV cameras.

Tentel—Booth 604. Tape tension gauge.

New: CCTV and broadcasting troubleshooting instruments.

[See ad on page 150](#)

Terracom, A Division of Conic Corporation—Booth 608. Microwave STL systems, ENG and TSL systems, satellite receivers, and earth station systems.

New: Miniwave portable transmitter and programmable receiver.

[See ad on page 141](#)

Trace, Inc.—Booth 609.

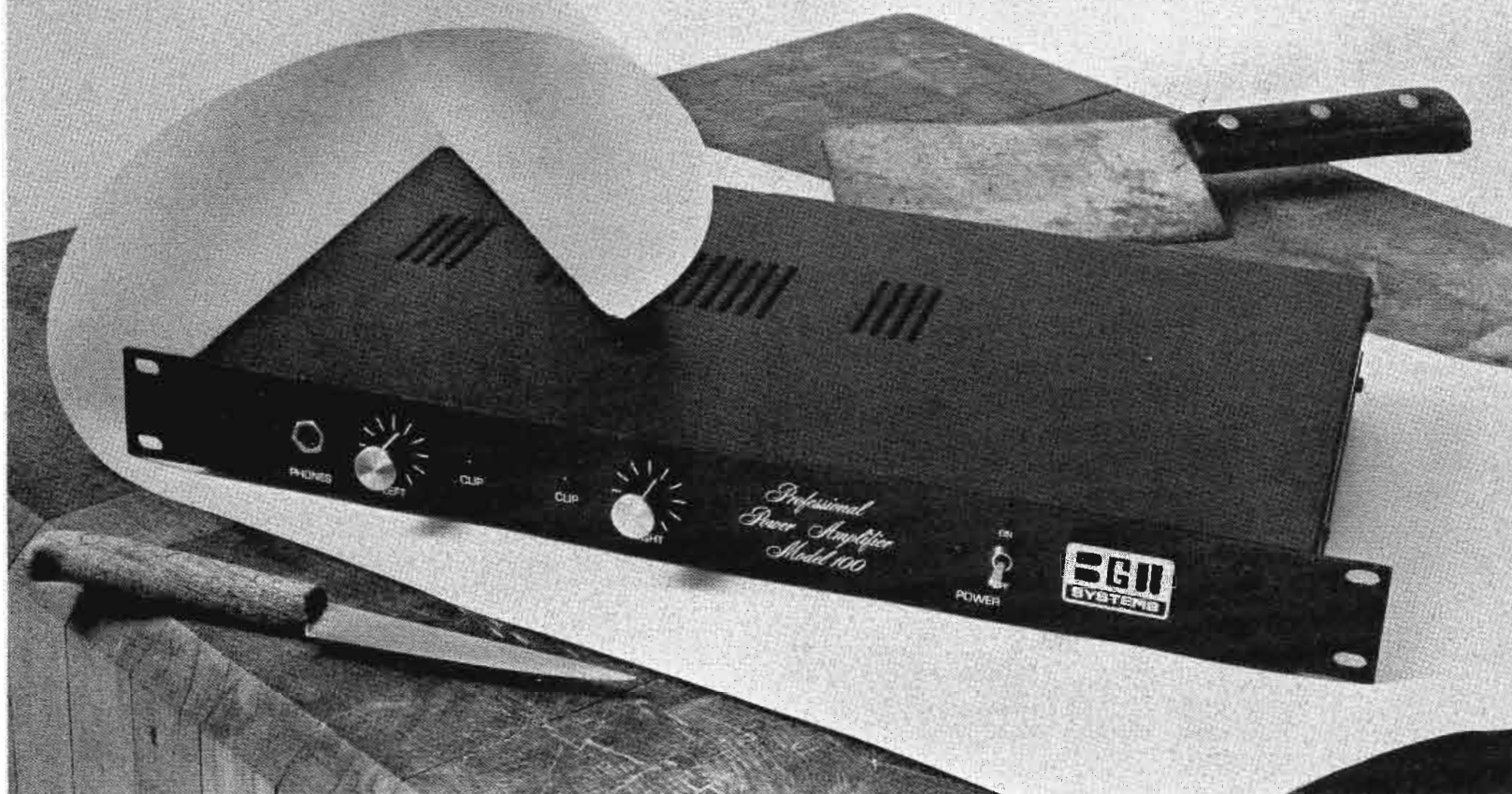
New: VIP, broadcast interface.

The Winstead Corporation—Booth 612. Editing consoles, video tape storage systems, tape, film and programming trucks, mobile cabinets, and storage system planning and design.

New: Editing consoles.

[See ad on page 156](#)

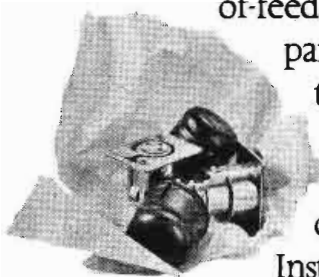
BGW PRIME



BGW is about to whet your appetite with their new Model 100 Stereo Power Amp.

The Model 100 will drive the most difficult loads you can throw at it. Electrostatic headphones and reactive speakers are driven flawlessly due to the 100's unique design. No form of current-limiting is used whatsoever. A precision monitor amp for any application, the modular construction of the 100 means one integrated amplifier circuit board with the biggest heat-sink we could package in 1-3/4" of vertical rack space: 340 square inches of efficient sink. No more thermal shutdowns.

There's a sophisticated "loss-of-feedback" circuit with front panel L.E.D.'s. Also unique to the 100, the L.E.D.'s are driven by a one-shot circuit for precise clipping indication.

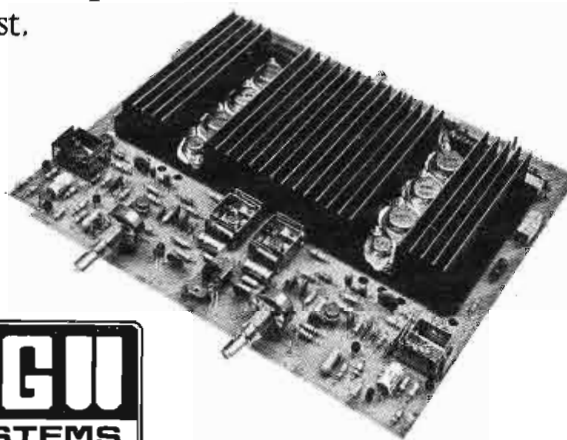


Instantaneous peaks, which

get by most amps, are stretched out in our L.E.D. circuit so you can see them.

On the inputs, you can get optional Cannon XLR's and plug-in transformers...and into 8 ohms you get 33 watts per channel, or 80 watts mono. Into 4 you get a meaty 44. The I M distortion is an incredibly low .01%.

It's about time somebody like BGW would mete with the competition. Check out the Model 100. It's just one of six professional prime cuts...of course, all above the rest.



BGW Systems 13130 South Yukon Ave., Hawthorne, Ca 90250 (213) 973-8090
 In Canada: Omnimedia Corp., 10245 Cote de Liesse, Dorval, Quebec H9P 1A3 (514) 636-9971
 Worldwide Export Agents: Telesco International Corp., One Dupont Street South,
 Plainview, L.I., New York, (516) 433-6210

For More Details Circle (50) on Reply Card



Washington Hilton Exhibitors Guide

The Washington Hilton is the newest addition to the NAB-Washington hotel group. And, it's a much newer facility. As each NAB slips up on us, it's painfully obvious that the convention is outgrowing cities we've become accustomed to using.

In this, as in our other two hotel articles, we're featuring the equipment lineups of exhibitors who answered our questionnaires and our phone calls before press time. Normally, this would be no great ordeal. But several companies opted for struggling with prototypes and curtains for at-the-show surprise introductions. Your editor can never remember being sworn to secrecy by so many manufacturers before a major convention.

And while our key to this issue is to provide pre-convention information, I'll just have to admit ahead

of time that the surprise factor will make this convention one of the best ever. Also, we've heard from many manufacturers who were left standing in line when the last square foot of floor space was gone. Many of them will be exhibiting their equipment in hospitality suites. The key to finding them will be to check the hospitality boards in each hotel.

In another section of this issue, we've laid out the floor plans of each hotel's exhibit area. Additional copies of that section will be available at the convention.

You'll note that each exhibitor's information includes a booth number, equipment to be exhibited, and equipment introduced for the first time. The red line that follows the lineup is reserved for advertisers as an ad finding guide.

Ampex Corporation—Lincoln and Monroe Rooms. See ad on page 7

Asaca Corporation—Booth 424. Portable color TV camera, 1" 4 heads VTR. **New:** Portable color TV camera (no backpack), envelope delay measurement, and chroma noise meter. See ad on page 155

Angenieux Corporation of America—Booth 402. Complete 42x continuous zoom for studio environments, ultimate high quality zoom lens, extreme wide angle zoom lens for studio environment.

New: Complete 42x continuous zoom for field/remote applications, ENG zoom optics system, and portable TV camera zoom optics system. See ad on page 129

Auditronics, Inc.—Booth 435. Audio production/recording consoles. **New:** Television audio production console. See ad on page 134

Continued on page 64

Be a double winner



**a Datatron
\$7,600*
TEMPO 76
Editor**

NAB Convention, Booth 531, Shoreham Hotel

It's easy to be a winner twice.

First, by stopping at our booth and taking a close look at several Tempo 76 Editors in operation.

Second, by entering your name in the drawing (at any time during the show) which will be held at noon on March 30th for the system on display. You need not be present to win.

You'll have a chance to actually use the Tempo 76 at the show; try it out, put it to the test. We know you'll be impressed with its speed, accuracy, expandability and versatility. The Tempo 76 offers you two editing technol-

ogies for the price of one in a single package—the only editor to do so. You can start with Control Track then convert to SMPTE at any time without obsoleting your initial investment.

Remember: Booth 531, Shoreham Hotel, a chance to be a double winner.

*Includes Tempo76 Editor and electronic package to operate two VTRs for Control Track or SMPTE Time Code editing. Interfacing for either system available at a nominal charge. To be eligible, winner must now be employed in broadcast, industrial or educational TV.

Datatron, Inc.

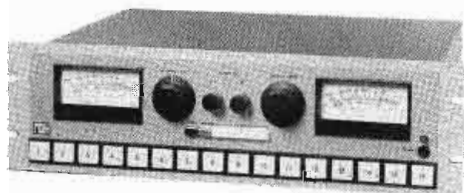
EDITING SYSTEMS DIVISION

1562 Reynolds Avenue • Irvine, CA 92714 • (714) 540-9330 • TWX 910-595-1589 • Cable RELIABLE
Eastern Regional Office: 505 White Plains Road • Tarrytown, NY 10591 • (914) 631-4060

For More Details Circle (51) on Reply Card

Roh introduces the Model 190

to bridge the
switcher-monitor
gap!



Model 190
Bridging switcher/Line Monitor

Key features which make the 190 unusually flexible:

- 8 or 16 input, single or dual channel capability
- Isolated bridging inputs with mixing capability
- Illuminated, non-interlocked input selection
- Input/output line meter has selectable sensitivity
- Optional DC remote control of input switching function
- Separate control of line and speaker/headphone outputs
- Single channel units incorporate a monitor speaker
- Completely self-contained, plug in modular construction

For more information call
Jim Godwin at Roh:
(404) 449-0873



**ROH
CORPORATION**
107 Technology Park
Norcross, GA 30071

Washington Hilton

Continued from page 62

BCS/Kaman Sciences Corporation—Booth 425. Traffic/accounting system for radio and TV with interface to automatic switchers, traffic/accounting system for TV, and in-house radio traffic and accounting system.

See ad on page 122.

Bosch/Fernesh—Booth 413. 1" video tape recorder, studio camera, handheld camera, battery handheld camera, and color monitors.

New: Handheld camera.

Cetec/Jampro (Division of Cetec Corporation)—Booth 417. Circular polarized TV antenna.

Christie Electric Corporation—Booth 433. ENG chargers, and ENG battery packs.

Cine 60 Inc.—Booth 443. ENG/EFP battery powerbelts and battery powerpaks, ENG/EFP shoulder pods and snaplock camera mounts, ENG/EFP soft lite sun-guns & sun-gun kits, and 115 V motor driven blower air-cooled quartz lights.

New: Battery belts, and portable solar generator for powering low current drain 12 V systems.

Colorado Video Inc.—Booth 437. Slow scan TV, synthetic color, and special effects.

Computer Image Corporation—Booth 415A.

Conrac Division/Conrac Corporation—Booth 404. Professional color and monochrome monitors.

Cox Data Services—Booth 407.

Data Communications Corp. (BIAS)—Booth 422. Broadcast industry automation system.

New: Automatic switching interface.

Dynair Electronics, Inc.—Booth 403. Video switcher, audio switcher, demodulator, remote control panels, chroma keyers, Video D.A., Audio D.A., and modulators.

New: Audio D.A. See ad on page 83

Dynasciences Video Products—Booth 426. Image enhancers, downstream chroma keyer, switcher /S.E.G., video processing system, and image stabilization. See ad on page 52

Eastman Kodak Company—Booth 405. Video news film, high speed, and VN print film.

Fujinon Optical Inc.—Booth 428. Broadcast television zoom lenses,

ENG zoom and fixed lenses.

New: Lenses with built-in extenders.

See ad on page 111

International Video Corp.—Booth 401. Videotape recorders, and color cameras.

New: 1" portable VTR. Hos. Suite: 2101.

Jefferson Data Systems—Booth 429. Complete broadcast computer system for radio and television. Serves large and small markets, and offers sales, traffic, management reporting and complete general accounting.

New: Small market radio/TV computer system.

Kliegl Bros.—Booth 431. Q-level 2000 lighting control system, portable dimming system, 2 kw softlite, 4 kw softlite, TV lighting fixtures, and 5A portable lighting kit.

New: Memory lighting control system, and portable dimming system.

3M Company, Magnetic Audio/Video Products Division—Booth 411. quadruplex and helical scan videotapes, video cartridges, video cassettes, and recording tape.

3M Company, Mincom Division—Booth 411. Microprocessor character generators, microprocessor routing switchers, switching automation, production switchers, image enhancers, and random-access memory for character generators.

New: Microprocessor character generator, microprocessor switcher, in-line image enhancer, and 300-page random-access cartridge memory.

See ad on page 41

Memorex Corporation—Booth 401A. 2" quadruplex video tape, 2" IVC, 1" 500 oersted videotape, 1/2" 500 oersted videotape, 1 and 1/2" 300 oersted videotape, 3/4" video cassette, and bulk audio cassettes.

New: 1" and 1/2" oersted videotape.

See ad on page 15

The Oleson Company—Booth 423A. Curtain cycloramas, and curtain tracks.

New: Special effects projection equipment.

Phelps Dodge Communications Co.—Booth 439. FM antennas, transmission line, filters, and directional couplers.

See ad on page 165

Q-TV/Telesync—Booth 419. Video prompter systems, console transport, and conveyor transport.

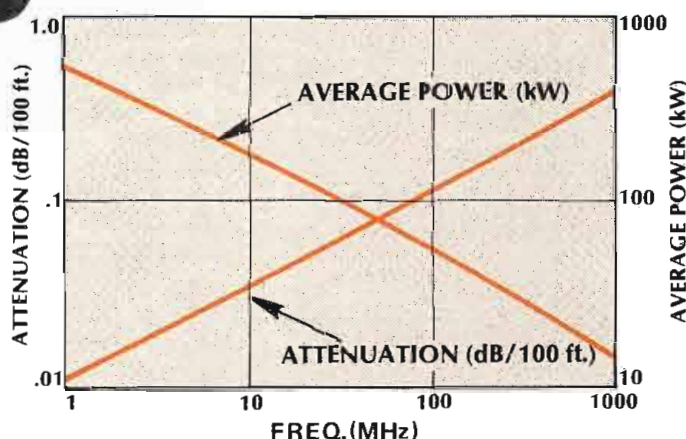
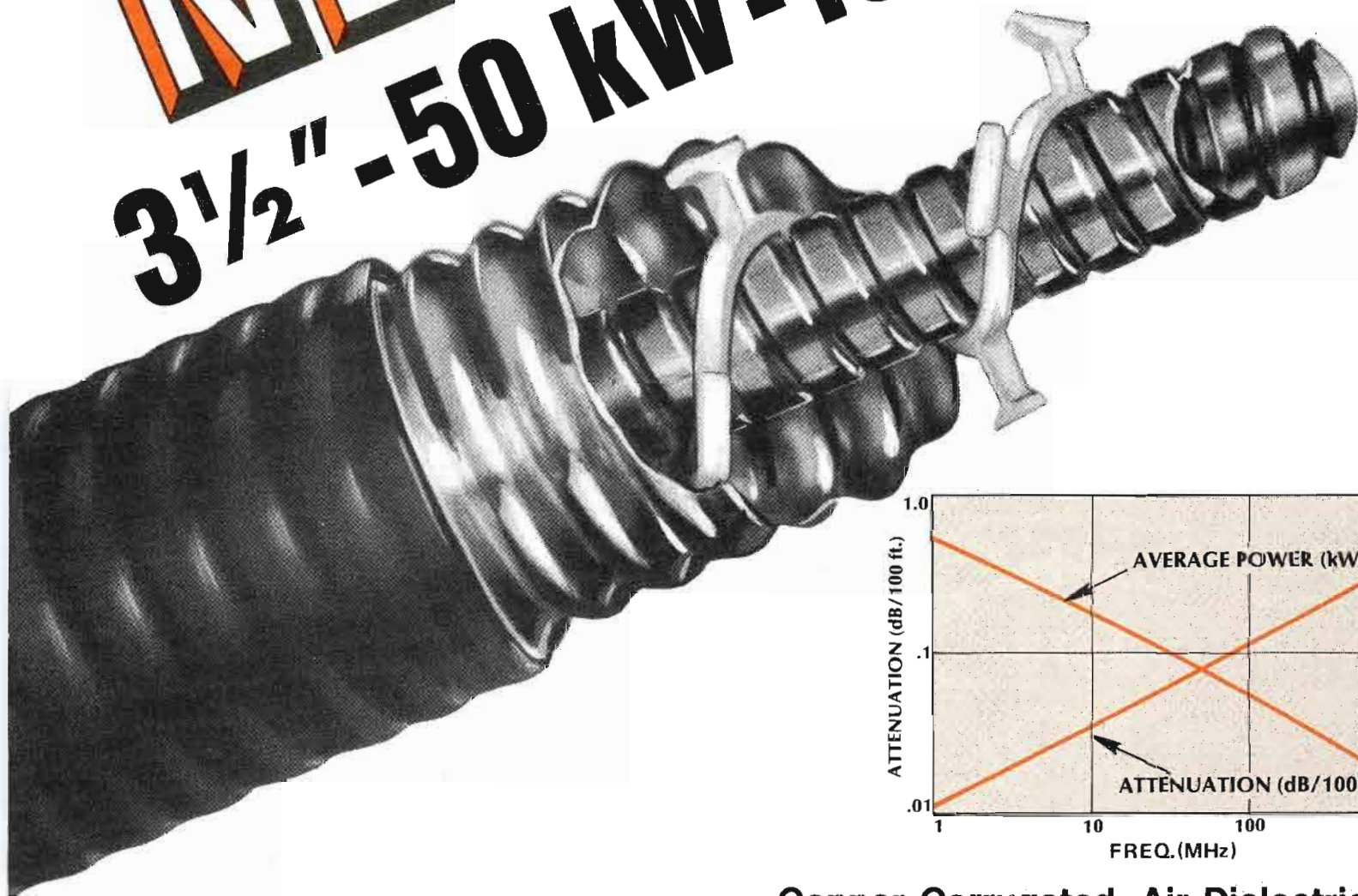
Quick-Set, Inc.—Booth 421-A. Fluid heads, ENG/Cine tripod, tripods, pedestals, dollies, cam heads, cradle heads, and friction heads.

See ad on page 42

Continued on page 66

NEW coaxial cable

3 1/2" - 50 kW - 100 MHz



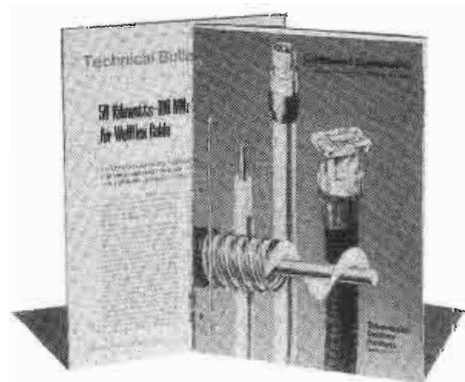
Copper Corrugated, Air Dielectric for High Power – Low Loss Applications, Specifically – FM Broadcasting and AM, VHF/UHF TV Antenna Feeders

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

SPECIFICATIONS:

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

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



Cablewave Systems

Cablewave Systems Inc.

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

Washington Hilton

Continued from page 64

RCA American Communications Inc.—Booth 401C. Audio and video services for the broadcast industry.

RCA/Commercial Communications Systems Div.—Booth 400 and 400A. See ad on page 162-163

RCA Electro Optics—Booth 401B. BC camera tube series, including 16 tubes. See ad on page 69

Rank Precision Industries, Inc.—Booth 409. Video camera lens, zoom lens,

color separation optics for TV cameras, audio sound mixing system, and flying spot telecine film chain.

New: Zoom lens, and portable camera lens.

Recortec, Inc.—Booth 423. Video tape evaluator, video tape timer, video spot assembler, and helical scan 1" VTR.

New: Time code enhancer and video tape addresser. See ad on page 130

Spin Physics, Inc.—Booth 405. Refurbishing service for Mark X quad panels and installation of hot-pressed ferrite core heads.

New: Refurbishing high band quad panels, and core heads.

Storeel Corporation—Booth 441. Room stretchers, set-up trucks, and mobile steel storage cabinets. See ad on page 30

Strand Century Inc.—Booth 408. Day-light fixtures, pole-operated fresnels, and portable lighting kits.

New: Manual control system with expandable memory and dimmers control grid lighting. See ad on page 138

Technics by Panasonic—Military Suite. Open reel tape recorders, professional cassette recorders, control centers, power amplifiers, equalizers, turntables, and studio monitor speakers.

New: 10½" 3-speed open reel recorder with isolated loop transport, 2 piece rack mounting professional 3 head cassette recorder with capstan drive, and line of 3 linear phase studio monitor loudspeakers.

Tele-cine Inc.—Booth 423A. Television zoom lenses, accessory optics, lens drive systems, and remote camera positioning heads.

New: Lens for ENG camera and field lens.

TeleMation, Inc.—Booth 421. Multi-font character generator, black burst generator, camera, sync generator, audio/video distribution switcher, bar dot generator, election reporting system, video and audio switchers, Video D.A.'s, Pulse D.A.'s, Audio D.A.'s, audio monitor amplifier, and subcarrier D.A. See ad on page 139

Telemet Co.—Booth 415. Modulators, demodulators, routing switcher, sideband analyzer, video test signal generator, audio monitor, cable equalization equipment, monoscope generator, envelop delay test set, synchronous detector, NTSC chroma keyer decoder, differential phase and gain system, and video signal conditioner.

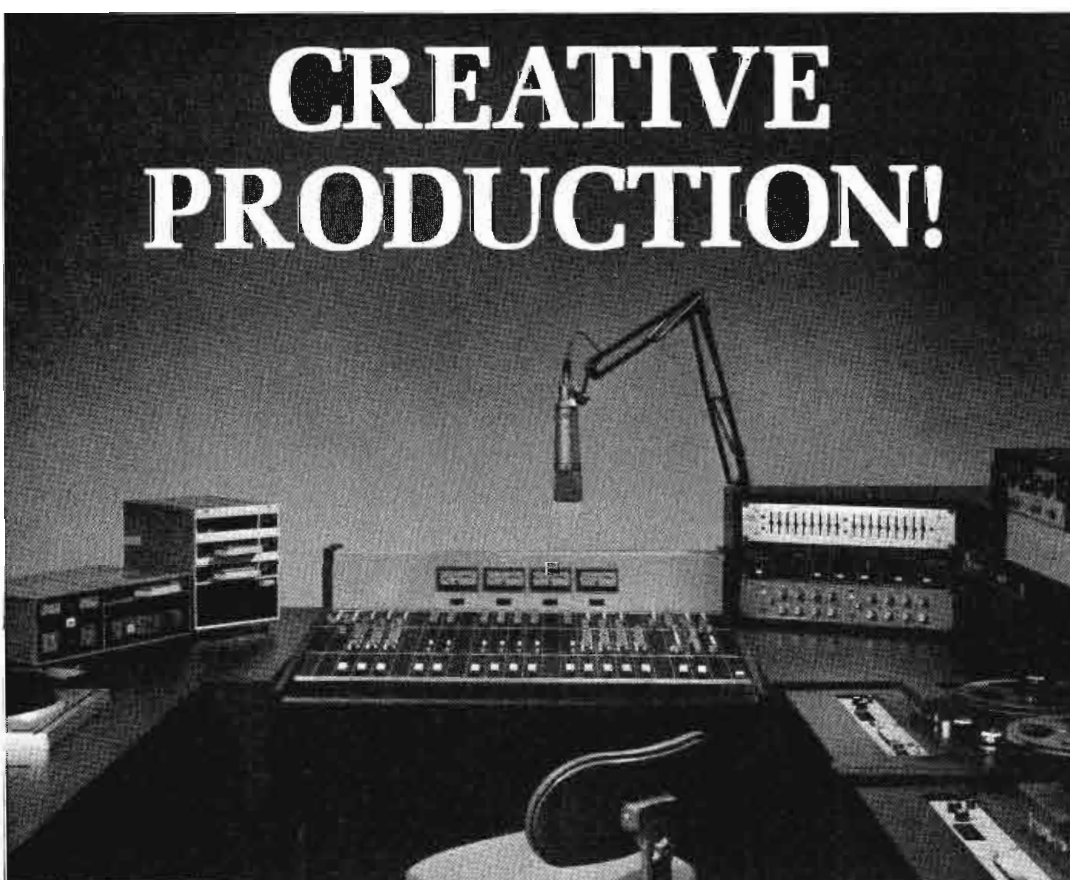
New; Sideband/spectrum analyzer, and production switcher.

Vital Industries Inc.—Booth 406. Production super/switcher, master control switcher, routing switcher, D.A., total station automation, and editing switcher.

New: New sync generator and frame synchronizer. See ad on Back Cover

World Video, Inc.—Booth 427. Professional rack mount color monitors, portable ENG color monitor, dual rack mount color monitors, utility color monitors and pulse cross monitors.

New: Rack mount color monitor, and high resolution color monitor. See ad on page 60



CREATIVE PRODUCTION!

THIS 4-CHANNEL AUDITRONICS STEREO PRODUCTION SYSTEM IS COMPLETE, WIRED, AND READY TO PRODUCE!

When the emphasis is on creative programming and production, choose a system that's flexible, plus mentally and physically effortless to operate . . . a console from Auditronics in a system from Pacific Recorders and Engineering.

The Auditronics console is completely modular and can be tailored to meet your specific requirements. This is the type of system that provides the contemporary broadcaster and programmer with the facilities he needs to be competitive.

See this FULLY OPERABLE PRODUCTION SYSTEM in the Pacific Recorders NAB booth #549, Shoreham Americana.



PACIFIC RECORDERS AND ENGINEERING CORPORATION
11100 ROSELLE ST., SAN DIEGO, CALIFORNIA 92121
TELEPHONE (714) 453-3255 TELEX 695008

For More Details Circle (54) on Reply Card

BROADCAST ENGINEERING

LIGHTING

**YOU
NEED
IT?**

**WE
HAVE
IT!**

*To: President
From: Marketing
We've got too much
new gear for a full page...
How about this?*

MR

LOCATION AND STUDIO LIGHTS
LIGHTING CONTROL • DIMMING
DISTRIBUTION EQUIPMENT • SUSPENSION

For more information write department BE377

Berkey Colortran[®]

1015 Chestnut Street, Burbank,
California 91502, Tel. 213 843-1200



P.O. Box 5, Burrell Way, Thetford
Norfolk IP24 3RB, U.K., Tel. Thetford 2484

NAB Product Review

A few months ago there didn't seem to be much happening in the way of new products being rushed to completion before the NAB convention. Then the crunch hit, and as it turns out, a high percentage of those exhibiting will be showing new products. ATS probably will come under fire because of its recent passage, but excitement will continue over ENG equipment.

At this point it isn't safe to say that any major equipment will escape change.

While this issue of **Broadcast Engineering** contains three articles on who is showing what, not all manufacturers were able to get space on the exhibit floor, even though three hotels will be used this time. **Several manufacturers will be exhibiting only in their hospitality suites. This will offer a great hands-on opportunity for those who drop by, so be sure to check the suite numbers in the hotel lobbies.**

You can look for a few new TBCs, including something in the lower cost line. Video switchers will jump ahead again. And, there will be new cameras to pan. Another change to look for is in new editing capabilities for ENG equipment.

Meanwhile, if you turn to the articles describing what's new, you'll see a number of companies listing new equipment that will be exhibited at the show. As always, there is a certain amount of secrecy surrounding the new products coming out of some companies. Check the ads and the hotel articles. Then next month we'll be back with items unveiled for the first time at the NAB convention.

Modular Studio/Portable Color Camera

Commercial Electronics Inc. will introduce a modular camera system, the CEI-300. This color TV camera system takes advantage of the modular approach. By changing modules, the basic camera can be used as a studio camera or as a

hand-held camera for ENG applications.

Other modules will change the camera to remotely controlled, hand-held; hand-held portable with studio system capabilities; studio system with portable system capabilities; self-contained studio camera; or studio camera with remote CCU.

Another unique option of the CEI-300 is the choice of 2/3" or 1" tubes.

For More Details Circle (150) on Reply Card

ENG Antenna Controller

Time and Frequency Technology's TFT X-10 system gives complete remote control of ENG microwave receiving antenna via voice-grade phone lines. An antenna can be located wherever it is convenient. From the studio any one of four quadrants and any one of four polarizations can be chosen by pushing a button on the front panel of the instrument.

Each of the ten control channels in the X-10 also has an LED status feedback indicator. This gives visual verification that command is activated at the remote point.

The X-10 system uses all digital data transmission techniques, and both control and status data are updated every 300 milliseconds. Data integrity is maintained by a system of "double scan/compare" logic. In this system, each digital word is sent twice to the remote unit, and both words are compared, bit for bit, in parallel. Control and/or status holding registers are then updated only if every bit matches.

The X-10 consists of two units, one for control point and one for the remote point. Each unit takes up 3½ inches of rack space.

For More Details Circle (151) on Reply Card

Videotape Recorders

A new series of videotape recorders that provides continuity to

the standard IVC one-inch format, while introducing completely new performance specifications that exceed current IVC one-inch as well as Japanese three-quarter-inch videotape recorders, has been announced by **International Video Corporation.**

Ronald H. Fried, IVC President and Chief Executive Officer, said the new IVC-1070 ChromaCon series videotape recorder incorporates the basic recording format used in all IVC one-inch videotape recorders produced since 1966, but has a totally new video and audio signal system.

Signal-to-noise ratio has been increased to 47 dB. Visible moiré has been eliminated. Differential phase and gain errors have been substantially reduced. Both audio channels deliver 50 dB. The new video and audio specifications permit multi-generation dubs of up to five generations without significant degradation of picture quality or color accuracy—more generations than any competitive VTR, Fried said.

"We have called the new concept ChromaCon 10, and extended it to existing IVC recorders by making it available in kit form. ChromaCon employs sophisticated new video circuitry that delivers a high luminance signal-to-noise ratio and excellent chroma linearity. The IVC-1070 produces pictures that are subjectively equal to high band equipment," Fried said.

"In developing the ChromaCon 10 concept, our goal was to retain the loyalty of the thousands of IVC one-inch owners as well as appeal to a whole new segment of teleproduction users," Fried said.

The new recorder has applications in electronic field production, off-line editing and studio mastering, industrial, educational, government as well as broadcast markets.

Special attention has been given to the IVC-1070's audio system. One channel has been designed for

Continued on page 70

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

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

* Serial numbers and tube type data available on request

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

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

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

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

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



RCA

New Products

Continued from page 68

audio-only edits. Two line and two microphone inputs can be mixed simultaneously in both audio channels.

The new IVC-1070 offers a newly designed deck with a fully remoteable control panel, a new tape tension control, a fully framed capstan servo, instant video confidence, and improved electronic assemble and insert editing. All tape motion controls and editing functions are C-MOS logic compatible and fully remoteable. An electronic tape time display has built-in memory.

Existing IVC one-inch libraries can be played back on the IVC-1070 with full bandwidth output and used with digital timebase correctors or outboard heterodyne color processors. Tapes produced on the IVC-1070 in the ChromaCon mode can be played back on existing IVC one-inch machines equipped with ChromaCon kits. A switch on the 1070 permits production of tapes that will replay on the non-ChromaCon models.

For More Details Circle (152) on Reply Card

Audio Consoles

Ramko Research will be unveiling eight new audio consoles at NAB. The new DC-38 series will carry a four-year warranty and will contain many advanced features that until now have not been available to broadcasters.

All mixers and switchers are guaranteed for a minimum of 29 operations. Legends on all switches are changeable. Back lighted panel displays showing input and output status are standard. Displays are easily modified by user to show graphics, numbers or other desirable messages. Up to 12 mixers are included with four inputs each, and rotary or slide attenuators. Dual channel outputs, gain selectable inputs and solid state meters are also standard features.

In addition, Ramko will be displaying their new remote control DC-12 audio console. All audio electronics are located in a rack configuration and are controlled remotely from the mixer control panel or other information generating systems.

For More Details Circle (153) on Reply Card

Color TV Camera

Hitachi introduces a new color TV camera, the FP-1010, featuring 2/3-inch three tube which offers a choice of either the newly developed Sativon or Plumbicon, vidicon. The camera is self-contained for versatility and mobility.

Provision of tiltable seven-inch viewfinder of high brightness, high resolution is mounted. The seven-inch viewfinder features adjust color balance, pedestal and lens iris by built-in check circuit.

A color bar generator circuit is provided in the camera for color-tone adjustment of color monitors and color matching of more than one camera in multi-system operation. Combined use of optical (color-temp. filter disc) and electronic (RGB gain balance control) methods makes very delicate color temperature compensation possible within the wide range of between 3000° K to 8000° K. ND filter is also built-in.

For More Details Circle (154) on Reply Card

Continued on page 158

The Ultimate in Wireless Microphone Systems

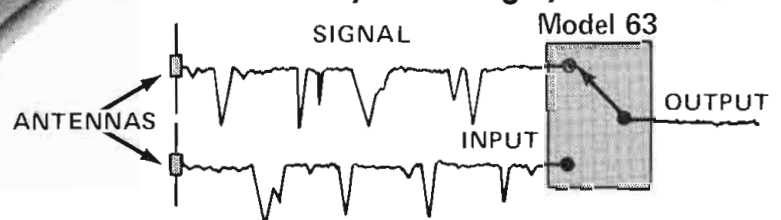
Vega's new Model 63 Diversity Receiving System virtually eliminates problem noise and signal drop-outs that are occasionally encountered when a wireless microphone system is used on a set, in studios, and in theatres. Moreover, because excellent soundtracks can be obtained from fully concealed wireless mics, much of the tedious dialogue looping on taped programs is no longer necessary. When used with any of Vega's fine wireless transmitters, the audio is like a hardwired connection. Of course, Vega's Diversity Receiving System will improve the performance of any brand VHF wireless mic. It's no surprise that the Model 63 Diversity Receiving System is being used by all major network studios. Try one, and see what it can do for you.



Vega

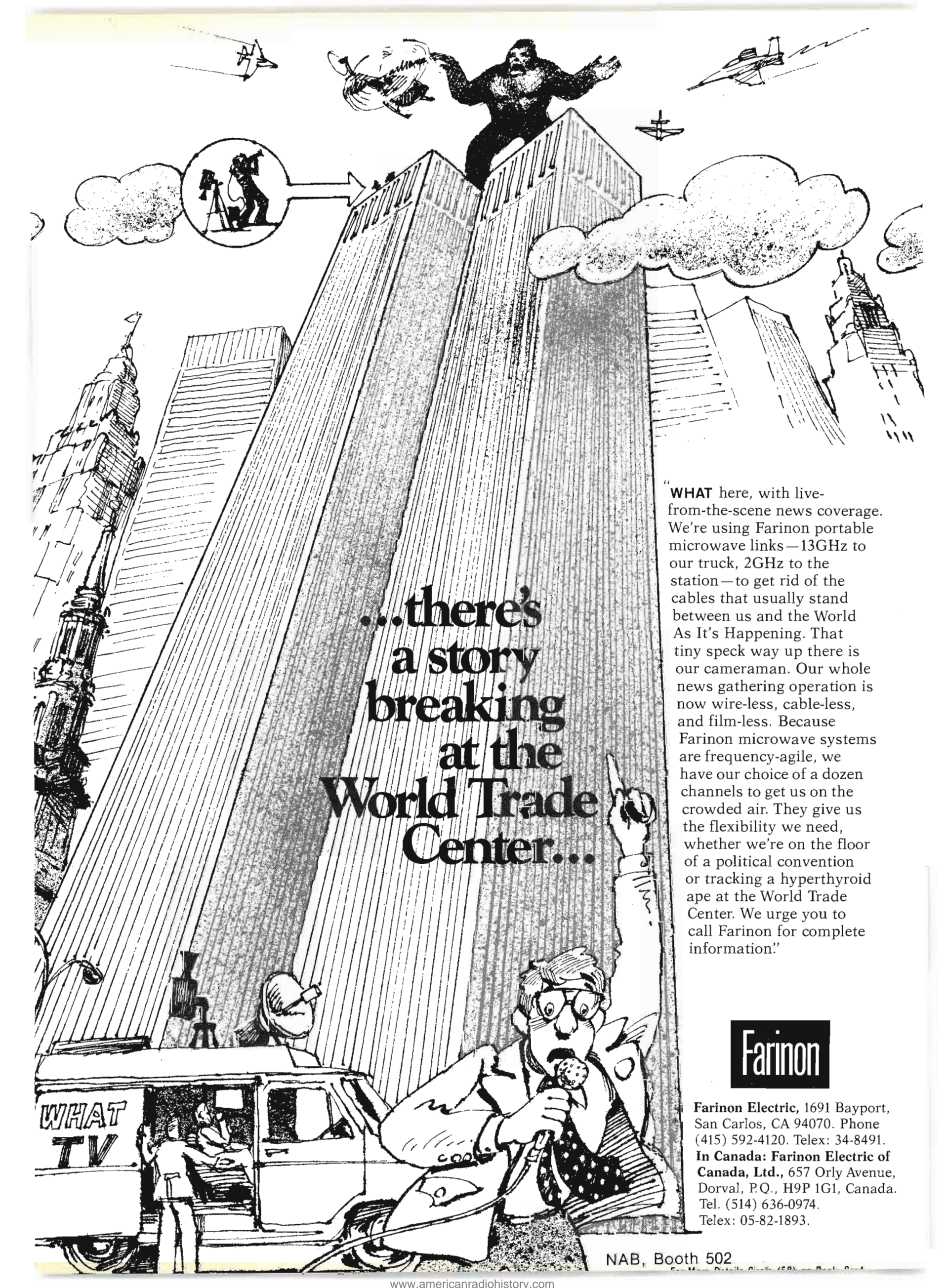
a division of Cetec Corporation
9900 Baldwin Place, El Monte, CA 91731 • (213) 442-0782 • TWX. 910-587-3539

How the Diversity Receiving System works



The Model 63 Diversity automatically switches electronically to the strongest signal, i.e. eliminating signal dropouts.

For More Details Circle (57) on Reply Card



**...there's
a story
breaking
at the
World Trade
Center...**

"WHAT here, with live-from-the-scene news coverage. We're using Farinon portable microwave links—13GHz to our truck, 2GHz to the station—to get rid of the cables that usually stand between us and the World As It's Happening. That tiny speck way up there is our cameraman. Our whole news gathering operation is now wire-less, cable-less, and film-less. Because Farinon microwave systems are frequency-agile, we have our choice of a dozen channels to get us on the crowded air. They give us the flexibility we need, whether we're on the floor of a political convention or tracking a hyperthyroid ape at the World Trade Center. We urge you to call Farinon for complete information."

Farinon

Farinon Electric, 1691 Bayport,
San Carlos, CA 94070. Phone
(415) 592-4120. Telex: 34-8491.
**In Canada: Farinon Electric of
Canada, Ltd.**, 657 Orly Avenue,
Dorval, P.O., H9P 1G1, Canada.
Tel. (514) 636-0974.
Telex: 05-82-1893.

NAB, Booth 502



If you think you had problems getting into our booth last year, wait until this year.

You remember.

The Sony Broadcast booth, at last year's NAB Show. Where we proved our commitment to the broadcast industry. And the broadcast industry proved how many people could be crushed into sixteen hundred feet of exhibit space.

This year, things are going to be different.

They're going to be worse.

We're showing even more. Which will attract even bigger crowds. Because of space limitations at the show, we couldn't build a bigger booth. But if you're tough enough to push through the mob, what you see will make you forget those elbows in your ribs.

We can't give all our secrets away. We can, however, let you in on a few of the reasons why Sony Broadcast is going to make such an impact.

1. We'll have the production version of our new 1" high band video recorder, the BVH-1000. Last year, we introduced this model in prototype; this year we've added a lot more features to the production version. And our BVH-1000 is still the most outstanding development on the broadcast scene.

2. You might also be interested in

seeing the BVH-1000's little sister. A fully compatible, battery operated, portable 1" high band video recorder for professional production in the field.

3. Camera buffs will see some eye-openers, too. We plan to exhibit two new color cameras in addition to our current field production BVP-100. What makes the Sony Broadcast approach unique is that all three of our cameras utilize different technologies. So broadcasters can work within different budgets.

4. If the use of SMPTE code hasn't been flexible enough to suit you, check out the Sony Broadcast breakthrough in this area. It's something really new.

5. And, of course, we plan to hang onto our preeminent position in the world of electronic news gathering. If you're into EJ, ENG, or EFP, you're into Sony Broadcast. And we've got some very, very exciting things to show you.

That's all we can reveal for now. At the Sony Broadcast booth in the Shoreham Hotel on March 27-30, we'll give you the whole story.

If you have to fight your way in, we apologize.

But that's the price we pay for being where the action is.

Sony Broadcast

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

Sony® is a registered trade mark of Sony Corporation of America.

For More Details Circle (59) on Reply Card

ATS: We've Got It, But What Do We Do With It?

By Robert A. Jones Consulting Engineer, La Grange, Illinois, and consultant to *Broadcast Engineering* magazine.

For some time now we have been hearing about ATS. What it can do, how it will help, and even what it won't do for our broadcast industry. But most of these stories have dealt with news releases and FCC Public Notices, rather than in-depth analyses of the basics.

Let me begin by a quick review of where we stand today concerning regulations. First, there is the FCC Docket (20403) that was recently granted by the FCC and became effective on February 14, 1977. This was predicated upon a petition filed by the NAB, way back in February of 1973. But actually, the basic approach to ATS began as far back as 1953! Yes, that's true.

You old-timers will recall that it was in 1952 that the FCC first broke the precedent established by the Communications Act of 1934 and relaxed the rule that a First Class operator had to be in charge of each transmitter and physically at the transmitter site, and allowed remote control of unattended operation of stations. They also relaxed operator requirements such that each AM station of less than 10 kW-ND, or FM station of less than 10 kW, need have only **one** First Class operator. All other transmitter operators could be the holders of restricted radio telephone permits.

In 1958, the FCC increased the remote control rules to allow unattended operation to all stations, regardless of transmitter power or type of antenna. Licensed operators were still necessary even though the remote control merely transferred the control point from one point to another.

The requirements of operating were relaxed further in October of 1963 when the FCC changed the rules to allow AM stations employing non-directional antennas and FM stations, each having power up to 10 kW, to use contract engines in lieu of full-time employed engineers. This allowed a station for the first time to operate completely with Third Class radio-telephone operators. In January of 1976 the

obtaining of Third Class licenses was eased by issuing Provisional Licenses. This was the first time an operator did not have to travel to an FCC testing point to take the test. It was, of course, good for only a year, and could not be renewed. While I do not wish to detract from the ability or the talent of some of these Provisionals, it does point up the fact that the FCC once again recognized the further technological advances made in the design of transmitters over the years. Nevertheless, it still remains that the FCC has used a piece-meal approach to correct its rules to accommodate and recognize the advances in technology.

Notice Of Inquiry

The first effort by the FCC specifically directed toward automatic transmission occurred in March of 1968. The FCC on the 27th issued a notice of inquiry in Docket 18109. This was precipitated by a petition on the part of Collins Radio Company. It is of interest to recall the Collins definition for an automatic transmitter. "An automatic transmitter is self-monitoring and self-adjusting of the essential operating parameters."

In Docket 18109, the FCC stated their purpose was to discover what applicable electronic techniques could be incorporated into broadcast systems. The end result was their hope to eliminate the need for repetitive log keeping as well as to do away with the need for transmitter supervision. The FCC did not propose to eliminate operators, since this would be a significant departure from the age old concept as well as the requirements of the Communications Act.

The FCC sought nine basic answers, or areas of inquiry. First was the relationship between technical automation and program automation. Second the question of the feasibility of modifying existing FM transmitters to the standards suggested by Collins Radio Company. Third was how the implementation of ATS would affect the

type-acceptance of transmitters. Fourth was the question of how the frequency and the power should be controlled. Fifth was the need for standards on what would constitute the rules for automatic shutdown of the system. Sixth was the question of what modulation controls should be imposed. Seventh is the question of what sort of automatic logging should be required. Eighth is how would a station employing ATS be able to comply with the EBS rules. And the final area of inquiry was how would ATS affect those FM stations using FM stereo?

Nothing much resulted from this initial inquiry, although it did start the thinking on ATS.

Docket 18930

In July of 1970, the FCC was studying operator rule changes in connection with Sections 73.93 and 73.265. Part of Docket 18930 was an inquiry by the FCC as to what time frame would equipment manufacturers need to be ready to produce fully automatic AM and FM transmitters? While considerable opinions were submitted, nothing of a concrete nature resulted. Hence, two years later when the FCC issued its decision in Docket 18930, they said, "The replies to the notice of inquiry including comments on automatic transmitters did not contain sufficient information or opinions upon which any Rule Making action could be considered at this time." This effectively killed ATS at that time.

NAB Petition

In 1973 the NAB engineering advisory committee compiled an update and supported a petition by the NAB to reopen the FCC inquiry into ATS. They quoted the FCC in Docket 18930 as stating that it was difficult to believe that the automation of the transmitters themselves could pose any major engineering problems, but rather the question they felt was would the equipment manufacturers be able to offer automatic transmitters or

APPENDIX B

(Summary of New ATS Rules)

conversion kits for existing transmitters, at prices which will make them economically attractive to station owners? The question of economics has to be balanced against a licensee's anticipated reduction in transmitter surveillance expenses.

The FCC was asked to set three requirements for ATS. These were control of power output, control of frequency, and control of modulation. The NAB further suggested that stations choosing to operate by ATS should be free of record keeping, since compliance with the FCC's technical criteria must be a design feature of any ATS system.

In general, what was said is that any automatic transmission system should be designed to electronically determine its compliance with the FCC technical rules, including self-checking of percent modulation and carrier frequency, as well as having the ability to automatically compensate or correct for excessive deviations in modulation and power output.

There were other comments filed in support of the NAB petition by RCA and by the Electronics Industry Association. The end result brings us to Docket 20403.

Docket 20403

Finally in April, 1975, the FCC issued a new notice of inquiry into automatic transmission systems. This time station owners and manufacturers did not sit on their hands as they did in 1968 and 1970 and many comments were received. Of these the most extensive were those submitted by Ed Herlihy of KTLA-TV and some Canadian unattended operator tests by Harris Corp. Possibly one of the most perceptive comments was one which said that the moment is at hand for the broadcast industry to come of age.

I think the reply comments of CBS were very good. They pointed out that the concept of automatic transmission systems will not involve the elimination of any of the currently required control or monitoring functions, but merely in-

volves the substitution of automatic electronic control for present manual controls. This, CBS stated, would produce greater consistency, reliability and precision of operation than is attainable with existing manually operated equipment.

Finally, in March of last year, the FCC came out with its "Notice of Proposed Rule Making." Comments and reply comments were filed by many parties, networks,

engineers and manufacturers. Of the 36 some parties who commented, only one was opposed.

The FCC in this Notice had hoped to obtain substantive and specific recommendations by broadcasters, the industry associations and professional consultants. They had expected to find detailed engineering and operational information that would help move

Continued...

73.140 Use of Automatic Transmission Systems (ATS)

- (A) All non-directional AM's are eligible
- (B) Application will be by informed requests to Washington, D.C.
- (C) Log entries in 73.113 (A) (i) (iv) need not be made, in lieu of 73.93 (A), (C) and (D) restricted operators may be used, inspection of the transmitters are monthly
- (D) A station must comply with Subpart "G"
- (E) Transmitters must be manually activated each day

73.142 ATS Facilities

- (A) No type acceptance required
- (B) The system must be equipped to: monitor power output, adjust power output, detect peak modulation
- (D) Must have an automatic clock to change power, etc.
- (E) ATS must terminate in accordance with 73.144
- (F) ATS must provide alarms in accordance with 73.146
- (G) Alternate transmitter can be used with ATS
- (H) Modulation must be sampled continuously
- (I) ATS must have a method of testing itself

73.144 Fail-Safe for ATS

- (A) Transmissions must terminate if power exceeds $\pm 105\%$ for more than three minutes, overmodulation for three minutes, failure of the clock, failure of any of the circuits
- (B) Manual operation may continue if for any reason (A) fails
- (C) ATS cannot be reused until it is repaired

73.146 ATS Monitoring and Alarm Points

- (A) Must have one or more monitoring points
- (B) ATS has to have the following controls or alarms; means to turn power off and on, off-air monitor, alarms as specified
- (F) Employee at the monitoring and alarm point is not restricted in his duties
- (G) Employee must be familiar with his ATS duties as well as EBS
- (H) Licenses must be posted

73.340, 73.342, 73.344 and 73.346 are similar but pertain to FM stations

73.540, 73.542, 73.544 and 73.546 are for noncommercial FM stations

ATS (Continued)

them along toward the goal of automatic transmitters. But for the most part, comments were in general terms assuring that ATS is a viable concept (with which the FCC already agrees). However, most of the comments received by the FCC, or so they contend, failed to come to grips with or elaborate on, the specific problems which may have occurred to commentors as a result of more careful assessment of the practical applications inherent

in ATS.

In view of this poor response, the FCC staff felt that the responsibility of developing adequate professional criteria fell primarily on them. They then devised a framework for automatic transmission systems, which was included as Appendix B to the April 1976 notice.

Rule Making Appendix

Let me summarize briefly the points raised by the FCC staff. 1) All AM, FM and TV stations may use ATS. 2) ATS will be optional, as a third method of operating. 3)

Until Paragraph 318 of the Communications Act is amended, operators will still be required. 4) The station operator may be assigned other duties, and must be an employee of the licensee. 5) Stations fully complying with the ATS rules will not be required to have a First Class radiotelephone licensed operator. 6) The output power shall be determined by the direct method. Presumably for FM and TV this would be a measure of any reflected power change. 7) Existing transmitters may be retrofitted with a black box. 8) ATS must monitor or control; power output, modulation, loss of audio, time, tower lights, directional antenna parameters, alarms, change of power at sunset, or switching to an auxiliary transmitter. 9) The fail-safe should shut down the transmitter in the event of: excessive power, loss of control from alarm center, failure of clock, over modulation, substantial antenna failure, a failure of any part of the ATS system. 10) Daytime stations or S.H. stations will need a time clock to perform switching modes.

11) ATS must have circuits to adjust and maintain power output. 12) ATS must have features that will allow testing and calibration. 13) ATS may incorporate the ability to switch between main transmitters and auxiliary transmitters, but if so, the auxiliary must also comply with ATS Rules. 14) ATS must be able to control percent modulation. 15) Excessive power output between 90 percent and 105 percent will cause an alarm. If 80 percent to 110 percent, it would terminate immediately the transmitter. 16) All ATS alarms and resets can be accomplished only at the transmitter site. 17) Optional ATS features will be: automatic logging, indicators showing cause of alarm, etc. 18) ATS systems may have a control switch to override in case of emergency operation. 19) AM stations will need to remeasure their antenna or common point impedance. 20) Directional stations employing ATS must provide alarms for excessive ratio or phase angle deviations.

21) ATS alarms must be capable of out-of-tolerance conditions of the pilot carrier or SCA of an FM station. 22) Tower lights may be

Continued...

Considering ATS? Ask the TFT experts.

At TFT, we saw ATS coming long ago. And we've been planning for it. In fact, for the past two years, our modulation monitors have had built-in ATS provisions as options. Similarly, we made our all-digital, modular remote control system fully adaptable for ATS operation. What's more, we'll soon be introducing additional cost-effective instruments that will make the implementation of ATS easy and practical.

The result? We have a lot of information you should have. Its all in our ATS Fact Kit — FCC rule interpretations, system block diagrams, equipment requirements, costs, and more. It's yours for the asking. Just complete and send in the coupon, contact your TFT representative or call us. ATS is here and we can help.

TFT TIME AND FREQUENCY TECHNOLOGY, INC.
3000 OLCOTT STREET, SANTA CLARA, CA 95051 (408) 246-6365 TWX No. 910-338-0584

SEND TO: Time & Frequency Technology, Inc.
3000 Olcott Street, Santa Clara, CA 95051

Please send me my free ATS Fact Kit.

My plans are: immediate future

Call me at _____

My station is: AM FM AM/FM

Name _____ Title _____

Station Call Letters _____

Address _____

City _____

State _____ Zip _____

For More Details Circle (60) on Reply Card

BROADCAST ENGINEERING



***It's incredible!
See it at NAB**

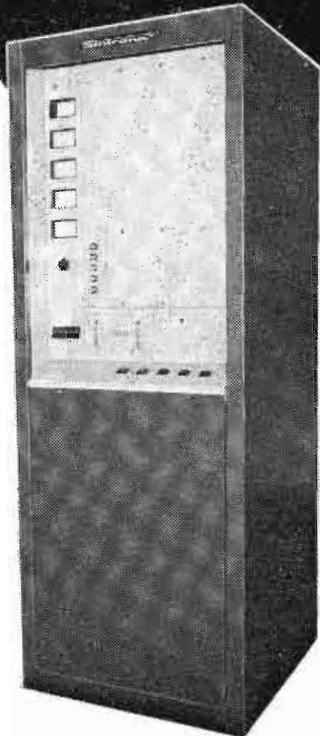
MICROTIME

For More Details Circle (61) on Reply Card

Sintronic

*the classic choice
for all
power levels*

**AM...1KW-50KW
FM...10W-50KW**



**"See it
at
NAB -
Booth
#537
Shoreham
Hotel"**

TAM-1K-B ALL SOLID STATE 1KW AM TRANSMITTER

- Only 16 PA Transistors
- Only 8 Modulator Transistors
- Plug-in Modular Construction
- Synthesized RF Exciter
- Color Coded Wiring
- Single or 3 Phase Power
- Complete Metering
- 125% Positive Modulation

Sintronic Transmitters have been installed in over 27 countries. For over 10 years, they have performed optimally under severe environmental conditions. All Sintronic Transmitters are conservatively designed and constructed. Quality components are used throughout.

Sintronic manufactures a complete line of AM and FM broadcast transmitters to satisfy every broadcast requirement. Detailed information and comprehensive product brochures on request.

Sintronic Corporation is a subsidiary of
Singer Products Co., Inc.
Integrity and dependability since 1937.

Sintronic

CORPORATION

Main Office and Plant:
705 Haverford Ave., Bryn Mawr, Pa. 19010
(215) 525-3700

Administrative & Export Offices:
One World Trade Center, Suite 2365, N.Y., N.Y. 10048
(212) 432-1400

ATS

(Continued)

equipped with alarms in lieu of daily inspections. 23) All ATS stations need be inspected monthly by a First Class operator. 24) Inspection and maintenance logs will be required. 25) Although no transmitter readings will be required, logs must be kept of hours of operation, alarm signals, EBS alerts, emergencies, FAA notices, etc. 26) All other standards pertaining to transmitters will be maintained, such as annual audio proofs, etc.

Let's take a look now at what the FCC finally did or did not do in its first report and order in Docket 20403.

First, ATS is presently limited to the facilities of FM stations or to AM stations using non-directional antennas. TV stations as well as those AM stations who employ directional antennas will be dealt with later, the FCC said; hopefully within the next 12 months.

Stations who wish to use ATS for a portion of the broadcast day and then manual operation for the remainder of the day can so operate.

No type acceptance is required. Each licensee is free to choose, make, or install any type of equipment he may desire. In so doing he has the responsibility that the continued operation of the equipment will meet the objectives of providing a reliable and effective broadcast signal. Stations may install ATS equipment without prior notification or authorization. Upon completion of all testing, the licensee will submit to the FCC a request to use the ATS. This need be signed by the owner of the station, and shall include a certification by the chief or consultant who did the work, that the ATS equipment is installed, tested, and fully meets the rules for ATS operation. Full ATS can commence immediately upon receipt of ATS authorization from the FCC.

Transmitter inspections are reduced from weekly to monthly inspections. While no meter readings need be logged daily a log is required of the signatures of the employees on duty at the monitoring and alarm point and the station hours. In other words, at all times

attendance of the station is required by an operator holding at least a restricted radiotelephone operator permit. He needs to turn the station off and on, monitor the ATS alarms for malfunctions, keep a log of operating hours or interruptions as well as notify maintenance personnel when a problem occurs.

The Rule on operating power is the same as proposed, 80-105 percent. Rather than requiring the ATS system to monitor changes in the antenna resistance, the FCC decided it would be more realistic for licensees to continue routine inspection of antenna system characteristics. The ATS system can be hooked up to monitor either the power output by the direct method or the indirect method. This is also true for FM stations.

In controlling modulation the FCC has finally defined what constitutes "peaks of frequent recurrence." For the purpose of ATS "peaks of frequency recurrence are defined as modulation of more than 10 bursts exceeding the specified modulation level within any one minute period. All peaks that occur within a single 5-millisecond interval will be considered to be one burst. The only other requirement imposed was if the modulation level becomes excessively low for a period of more than three minutes, an alarm must sound.

Parameters need not be monitored as frequently as is modulation, so, output power must be observed at least once each minute, with modulation being observed on a continuous basis.

It should be obvious that an EBS monitor will be required to be installed at the monitoring and alarm point.

Although the technology for implementation of ATS has been available for many years, the present FCC Rules do not particularly encourage its use. In fact, the present operator and log keeping rules may actually discourage the use of new technology. Licensees will be allowed to install those portions of ATS that may be desirable, even if they do not wish to go all the way, if it thereby relieves them of certain existing operating procedures. Whether the new ATS Rules will actually result

Continued...

Would you believe it? A Scully at \$1200!


The newest from Scully! It's the 255 Reproducer,* providing 'round the clock quality for automated broadcast stations...and at only \$1995, meet the new Scully 250 Recorder/Reproducer.*

The 250 and 255 professional performance specs mean you get the most for your money...dependable Scully performance and quality, built in, at very affordable prices.

See them. Hear them. You'll appreciate the value—from Scully, the leading supplier of broadcast recorders.

Sales, service and replacement parts are available worldwide from over 200 distributors. Contact Scully Recording Instruments, Division of Dictaphone Corp., 475B Ellis Street, Mountain View, California 94043 (415) 968-8389 TLX 34-5524.

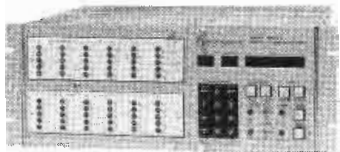
 **Scully**
Recording Instruments

 **See them
at the NAB Show,
Booth No. 316**

For More Details Circle (63) on Reply Card

Remote Control

"NEW" TCS-1 TELECONTROL SYSTEM



"NEW" DCS-2A DIGITAL CONTROL SYSTEM

DRS-1A DIGITAL CONTROL SYSTEM

TRC-15A REMOTE CONTROL SYSTEM

THE LATEST IN TRANSMITTER REMOTE CONTROL SYSTEMS

See them in booth 203, Sheraton Park Hotel during NAB... or contact us for details.



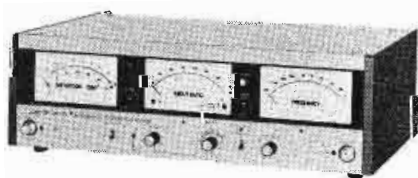
**MOSELEY
ASSOCIATES, INC.**

SANTA BARBARA RESEARCH PARK

111 CASTILIAN DRIVE • GOLETA, CA 93017
Telephone (805) 968-9621
Telex 658448/Cable: MOSELEY

**RADIOMETER
COPENHAGEN**

automatic distortion analyzer



A unique instrument providing automatic simultaneous measurement and recording of distortion and amplitude response vs frequency.

- Low distortion sweep generator.
- Automatic distortion meter.
- Automatic frequency response.
- Outputs for automatic recording.

Contact us for complete information.



THE LONDON COMPANY
811 SHARON DRIVE
CLEVELAND, OHIO 44145
Tel. (216) 871-8900

221A

ATS

(Continued)

in many licensees applying to install ATS, only time will tell. It is nevertheless the sincere hope of the Commission that licensees will be encouraged to improve their operations by using these new options to the extent they desire.

In connection with Section 318 of the Communications Act of 1934, the FCC will request legislative amendments which will be successful. In the meantime there is no reason to believe that all the operator functions required can be met by a restricted radiotelephone operator. Until Congress does amend the Act, we will never truly have an unattended fully automatic broadcast station.

Possibly one of the most perceptive suggestions made by the FCC in this Docket was the one that type acceptance will not be required. Why? Since the continuously advancing technology would otherwise require continuous amending of the ATS "hardware" rules. Flexibility must be allowed for manufacturers to upgrade their "black boxes." All a licensee will ever need to do is to be careful that the equipment be purchased or home-built does comply with the final ATS standards. At the time such ATS equipment shall be installed, a performance report will have to be prepared by the chief of the station's consultant, and retained on file.

One area of great concern is whether a minor overpower or a minor over modulation should cause an ATS system to shut down. Certainly a minor overpower condition will not cause serious interference to another radio station. If existing standards are to be maintained some rules had to be established. Therefore an alarm will be set off if the power exceeded +105 percent of the authorized values. It is proposed that a three-hour delay be provided before automatic turn-off. This presumably would permit the operator who received the alarm, to contact the station's maintenance operator to take corrective action. The problem here is the one that a momentary overload to the operator at the alarm point would seem the same as a continuous overload! The

FCC also states that a +110 percent overpower would cause the station to immediately shut down. This certainly is good if the trouble is due to a component part failure, or other mechanical breakdown.

But suppose the problem is one most operators are familiar with—ice on the antenna. Whether it is AM or FM the impact of ice can cause the VSWR or the antenna impedance to change which could "fool" an ATS alarm system into thinking a +110 percent change had occurred when in fact it may not have. I realize that no system can predict the difference between real trouble and imaginary trouble, as a live operator can do. Probably, in situations like this, any station owner would be best to put a live operator in control of the station. The FCC hopes to circumvent this by installing an ATS system which would have a device that would indicate the net difference in the indication of power flowing toward the antenna and the power reflected back from the antenna to the transmitter. Their thought being premised on the concept that such a device will not give erroneous indications during periods when weather conditions may be abnormal. This is, no doubt, why the FCC allows a broadcaster to use either direct or indirect measurement of power.

The final area of consideration is modulation alarms. In regard to undermodulation, one of the original proposals, no minimum level shall be required. However, a lack of modulation should cause an alarm to sound. Unless the operator or owner is asleep, no station I know of would allow five minutes to elapse before taking some action. For the FCC to require undermodulation is to assume that unattended stations will also be unattended, too!

The FCC stated clearly that they have retained the concept that licensees using ATS must serve the public interest by providing a service at least equal in quality and reliability to that provided under the old rules. The licensee has, the FCC says, an obligation to avoid an increase incidence of interruptions to service and should continue to have an adequate preventive and remedial maintenance program.

Continued...



PREMIER SHOWING
N.A.B. CONVENTION
 See Us At Booth 564
 SHOREHAM AMERICANA HOTEL

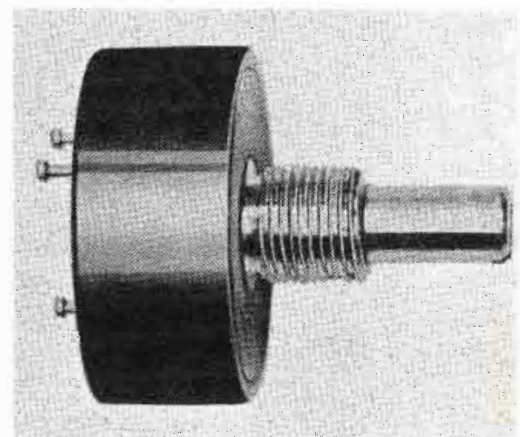
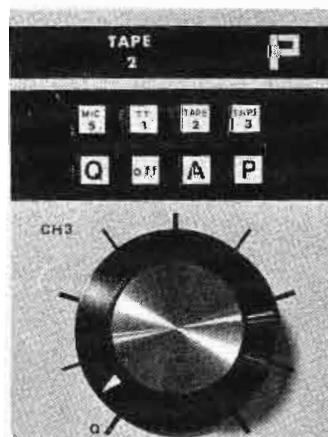
The most advanced trouble-free broadcast console in history!

20 MILLION OPERATIONS guaranteed for switches and pots. New input status indicators. Up to 12 mixers, dual channel. 4 inputs per mixer. Slide or rotary attenuators.

PLUS THESE EXCLUSIVE FEATURES: Silent computer-grade switches; Solid state 'VU' meters; Zero tracking error on stereo models; DC control

of all audio functions; Plug-in I.C.'s throughout; Patch panel cue and monitor mute; RF Suppression through individual tuned circuits; plug-in amp modules; Patch panel input gain select; Equalizer and special effects interconnects; Equipment remote control.

AN UNCONDITIONAL 4 YEAR WARRANTY on all Series 38 Consoles.



RAMKO RESEARCH

11355-A Folsom Blvd. / Rancho Cordova, California / 95670
 (916) 635-3600

ATS (Continued)

ATS became effective on February 14, 1977. ATS is coming and you should be prepared for it. The real question is what will it cost. To date, none of the manufacturers to whom I've spoken will even venture a guess on what an ATS System will add to today's cost of a transmitter. Let's look at what the increased cost of transmitters will have to offset.

The savings will come in transmitter log keeping, both in time required to physically enter readings, retain logs, and eventually destroy them, plus the cost of printing such logs, plus the savings in hiring employees as transmitter operators. How do we put prices on these items? Let's try.

A typical AM station has a log that is filled in every three hours by the operator on duty and requires 60 seconds to do it. In a twelve-hour day this would save five minutes of time. If the operator gets paid \$5.00/hour this would be a saving of 42 cents per day or over 365 days a total of \$153.30 per year. If we assume the logs no

longer used cost two cents each, this would add \$7.30 more per year to the savings. Thus a typical AM station could be expected to save about \$160.60 per year. This is predicated upon the fact that almost all small stations use combo-operators. In which case nobody would be laid off.

Let's look at a bigger station which has a fulltime chief and several operators. In addition to the above savings, the station would save the cost of time required by the chief in reviewing the logs. In this case I could project a saving of about \$525 per year.

The only stations to which significant savings could be expected are large stations or some TV stations where operators are specifically employed to keep logs. In these stations it could be a saving of from \$5,000 to \$2,000 depending on whether the employee let go is part-time or full-time, plus what local pay scales would dictate.

It would appear that the advantages in cost savings from installing ATS will really only benefit the big stations. Yet the technological advantages would be most

helpful to those who will not be economically motivated to avail themselves of it.

In conclusion, let me quote from Chairman Richard E. Wiley's separate statement in Docket 20403.

"In my opinion, the Commission's approval of ATS marks the beginning of what, hopefully, will be a new regulatory philosophy for the FCC, one which focuses more on the end product desired (in this case, the technical integrity of a station's signal) and less, much less, on complex rules and procedures to achieve that objective. Our action today permits licensees themselves, rather than the government, to select the best means of maintaining the technical compliance of the station in his or her particular circumstances. The broadcaster will be held accountable for the bottom-line integrity of the signal and not for observance of numerous and detailed regulations. This is a philosophy with which I am in profound agreement and one that I believe can be applied in other areas beyond technical operation."

I can only add my amen to the chairman's thoughts. □

Optimod delivers!

OPTIMOD-FM is an FM signal processing system that delivers a brighter, cleaner, louder sound. And that can deliver lots of things to you: dollars from quality or coverage-conscious advertisers... greater effective coverage because of your louder signal... increases in quarter-hour maintenance because OPTIMOD-FM's clean sound virtually eliminates listener fatigue... and state-of-the-art audio that stands up to the quality of major group and network stations, enough of whom have already bought OPTIMOD-FM to establish it as the new industry standard.

OPTIMOD-FM breaks through the performance limitations of conventional equipment by combining compressor, limiter, and stereo generator in a single package. It's fully FCC-approved, and works ideally with almost any FM exciter or STL. Delivery is fast... and your engineering staff will love the quick, easy installation.

At \$3195, OPTIMOD-FM is the most cost-effective way we know to improve your air sound. Available through selected dealers. Call us toll-free (800) 227-4068*... we'll help you arrange a very special delivery.

See it live in booth 539-Shoreham Hotel

orban / broadcast

Eric Small & Associates, Marketing and Sales Agent
680 Beach Street, Suite 315, San Francisco, CA 94109 (415) 441-0666

* In California (415) 441-0666

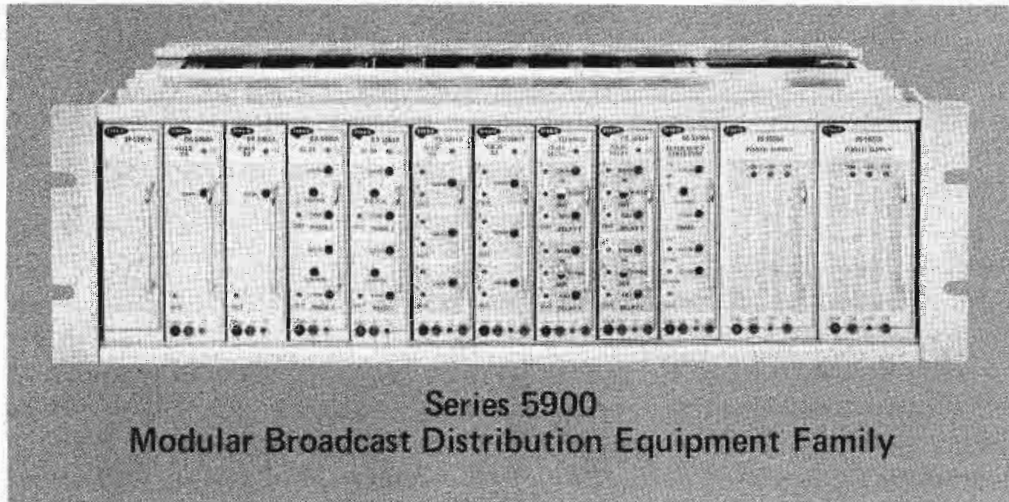


Orban/Broadcast products are manufactured by Orban Associates, San Francisco, CA

For More Details Circle (66) on Reply Card

A NEW addition to the FAMILY

Model AD-5980A Audio Distribution Amplifier



Series 5900
Modular Broadcast Distribution Equipment Family

MEET SOME OF THE RELATIVES

- **DA-5960A Video Distribution Amplifier** module provides six DC coupled outputs from one differential high-impedance looping input. Frequency response flat ± 0.1 dB to 10 MHz, less than 0.1° differential phase and 0.2% differential gain.
- **DA-5966A Sub-Carrier Distribution Amplifier** module, provides regeneration and distribution of NTSC or PAL sub-carrier through six DC coupled outputs from one high-impedance looping input. Outputs are divided into two groups of three with independent phase and level front panel controls for each group. Phase is adjustable over a 0 to 360° range.
- **PD-5941A Regenerative Pulse Distribution Amplifier** module provides six DC coupled outputs from one high-impedance looping input. Outputs divided into three groups of two outputs with independent level controls for each group.
- **PD-5942A Regenerative Pulse Delay Distribution Amplifier** module provides six DC coupled outputs from one high-impedance looping input. Delay is adjustable over 0.35 to 4 microsecond range. Outputs are divided into two groups of three with independent delay and level front panel controls for each group.



The AD-5980A Audio Distribution Amplifier adds audio distribution to the Series 5900 family. Six outputs are derived from one high-impedance bridging input with 60-dB common mode rejection. Features include +24-dBm output for plenty of headroom, flat response to 20 kHz, -80 dB s/n, +22-dB gain, and 0.15% maximum distortion.

The DYN AIR Series 5900 Modular Broadcast Distribution equipment is state-of-the-art in design, tops in reliability, and offers performance expected by the broadcaster.

Write or call for additional information and for the name of the broadcast dealer in your area who handles this family of products.

New Location

DYN AIR ELECTRONICS, INC.

5275 MARKET STREET, SAN DIEGO, CA. 92114
TEL.: (714) 263-7711 TWX.: (910) 335-2040

DYN AIR

The Dawn Of AM Stereo

By Ron Whittaker

The handwriting is on the wall and it seems fairly clear—AM stereo is coming!

Many broadcasters still label the concept a “gimmick,” but, as you will recall, quite a few people said the same thing about FM stereo in 1961. Interestingly enough, however, when you examine all the evidence, AM stereo is more “right” for today than FM stereo was for the early 60’s.

One of the reasons that some people are inclined to view AM stereo as mostly a gimmick is that they **believe** the quality of the AM broadcast process is decidedly inferior to FM; and since stereo is a kind of “quality dimension” in sound reproduction, the AM process has two strikes against it from the very beginning. And, doesn’t everyone listen to AM through three-inch speakers anyway?

AM vs. FM

Frequency Response

To start with, let’s examine some of the advantages that an AM system would have...and would not have. In the frequency response department, AM is often sold short. There are actually commercial AM stations that broadcast a flat frequency response from 50 to 15,000 Hz. Several of the clear-channel stations are flat to 10,000 Hz. It is a commonly-held myth that AM stations cannot legally transmit audio frequencies higher than 7,500 Hz.

The FCC **does** require that you check your transmitter capability from 100 to 7,500 Hz, but this does not mean that you are necessarily limited to that range. Depending upon the specific co-channel problems that you have in your area, you would very possibly be able to extend your frequency response to at least 10,000 Hz. The secret is in the design of your transmitter and in pushing your high-frequency cut-

Continued...

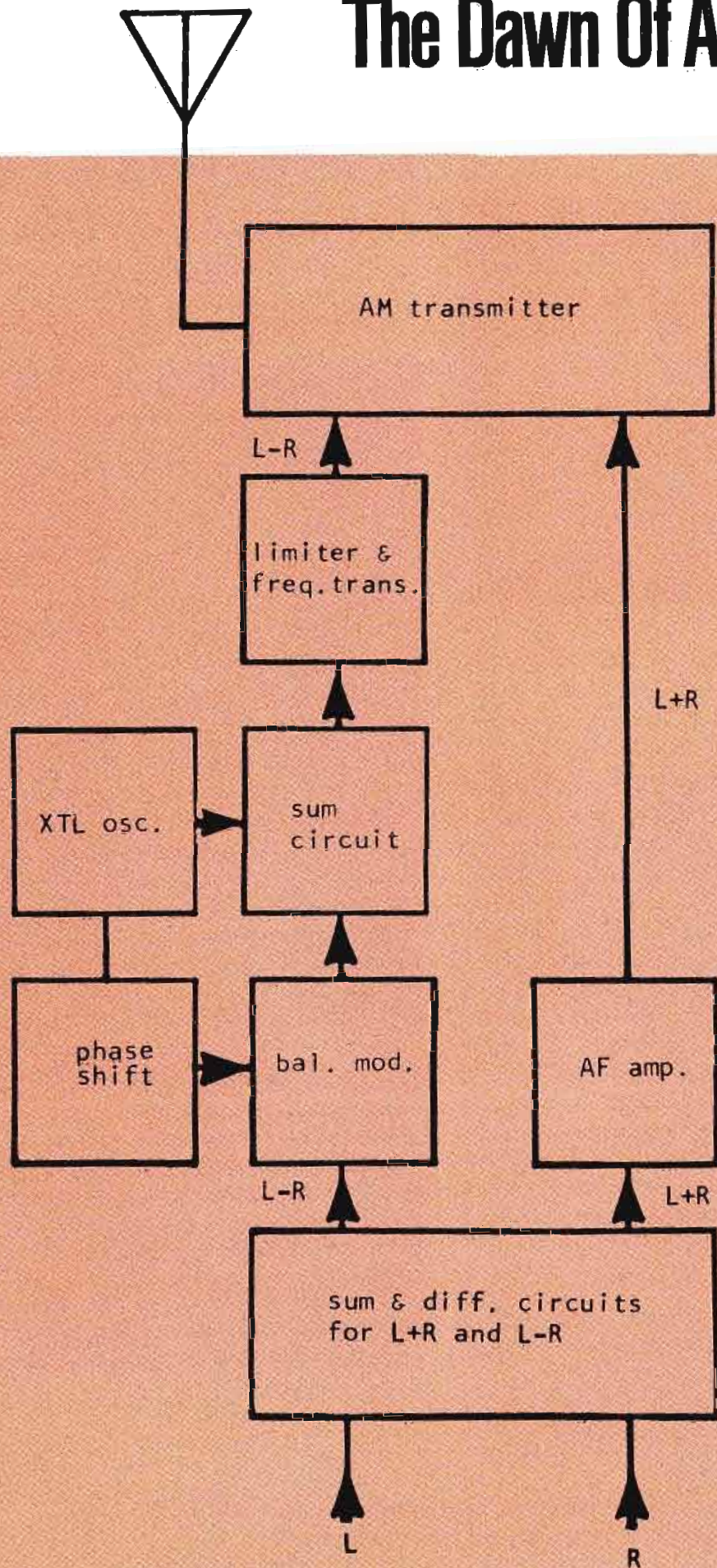


Figure 1. The Kahn stereo system is shown in this block diagram. Basically, the system involves the use of a stereo adapter on a standard AM transmitter. The upper sideband is modulated by right-hand stereo information and the lower sideband the left-hand information. The system is based on the production of a phase-modulated wave to drive a transmitter. This results in the amplitude modulation of a phase-modulated RF signal.

Maximize your modulation with Inovonics

At Inovonics, we've designed a Multiband Audio Processor for AM and FM broadcast use that is capable of increasing average carrier modulation to a figure approaching theoretical maximum. Yet, it contains program peaks within prescribed limits without clipping.

Model 230 is equipped with eight independent bands of averaging compression with attack and release timing optimized for each. Individual Threshold and Compression Ratio adjustments allow response shaping to complement specific programming formats. Other features include gated expansion to prevent "pumping", program-controlled phase inversion and adjustable limiting symmetry for AM, and a separate frequency-selective limiter with both 75- and 25-micro-second curves for FM.

Also new from Inovonics

- Model 376, a dual-channel tape reproduce amplifier offering uncompromising

performance and reliability to virtually any tape or film reproduce head.

- Model 241 DYNEX a program-controlled filter/expander that provides an effective means of suppressing residual background noise in audio reproduction systems.

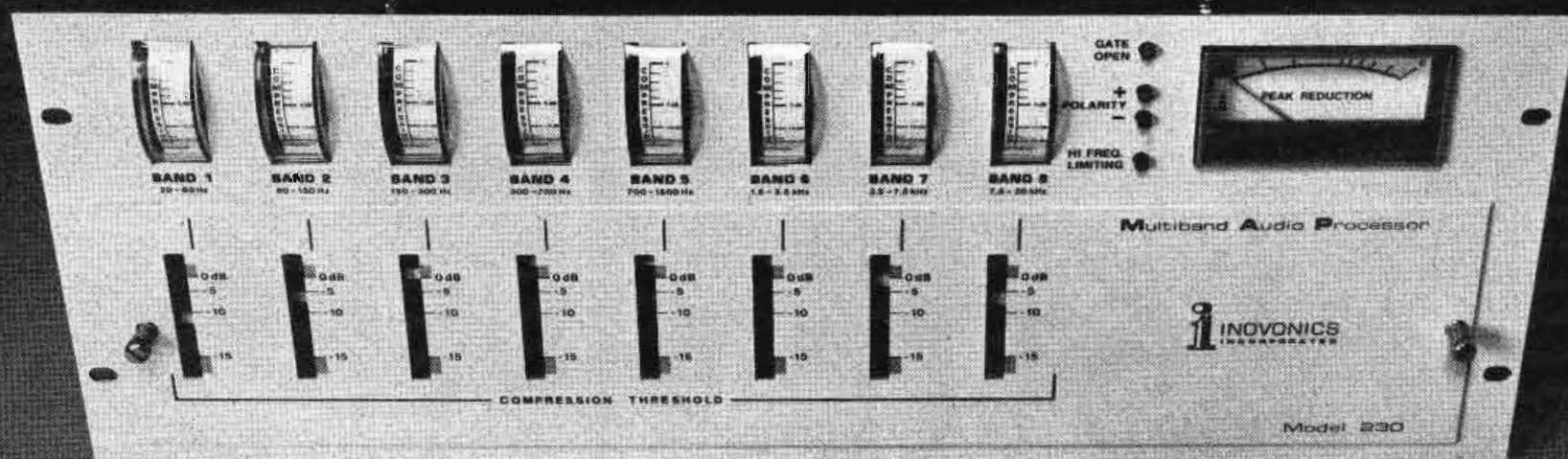
They're all new and they're all from Inovonics — the company that brought you Model 375, the ultimate in a self-contained magnetic recording electronics package. We've prepared a new catalog that gives you all the details on our newly expanded line of electronic equipment. For a free copy, write or call us today.



INOVONICS
INCORPORATED

503-B Vandell Way
Campbell, CA 95008
(408) 374-8300

SEE AND HEAR US AT THE NAB!
Booth 571 — Shoreham



AM Stereo

(Continued)

off point to the limit of the co-channel interference realities for your particular location.

Some of the older plate-modulated transmitters are pretty poor on both ends of the frequency range, but this doesn't mean that with the proper transmitting equip-

ment and average spectrum conditions that you couldn't transmit a signal that was flat from 50 to 10,000 Hz, which (when you really get down to it) is adequate for most hi-fi needs.

Relative Dynamic Range

In dynamic range (the range capability in dB's from loud to soft)

FM technically has an advantage over AM. Because FM is inherently a quieter process, it is capable of a greater signal-to-noise ratio.

The interesting thing about this, however, is that a great percentage of AM stations—maybe the majority—are compressing their audio range to achieve a greater average modulation. This, they believe, gives

Continued...

AM Stereo Fires Up

The FCC authorized WKDC, Elmhurst, Illinois, to start testing AM stereo using the Motorola system on October 1, 1976. Due to restrictions placed on us by the FCC, we were not permitted to announce or advertise this. Now that the initial testing of the Motorola system has been completed at WKDC, here is our account of what happened. As a broadcaster with 42 years in the business, I can say that I was very enthused with what we heard on the air.

Testing in the experimental hours and working after midnight does not always bring out the best in men. Every frequency of the tone generator was used many times—first on one channel and then the other. Comprehensive testing of all handmade equipment was done (it seemed as though we'd never get there), and we did have some malfunctions. The expertise of Norm Parker and Frank Hilbert of Motorola, working together with four other Motorola representatives, resolved the problems.

The cooperation of the FCC was superb. It certainly underscored their interest in AM stereo. We were granted experimentation provisions because we are a low-powered station on 1530 kHz, a two-tower directional, and located in the high RF area of Chicago. (WKDC is in Elmhurst, 16 miles due west of Chicago's loop.) When this station was built in 1974 all new equipment was installed, and everything except the transmitter and final audio equipment was stereo. WKDC had "The Faith."

On The Air Stereo

Along about the middle of December we were ready. The Motorola System performed splendidly. We broadcast music after midnight for several nights to get out all of the last minute bugs. Then a special request was made to the FCC to permit WKDC to transmit daytime AM stereo. This was granted immediately.

After midnight and during the early morning of Tuesday, December 21, WKDC broadcast special music that had been pre-selected for its broad spectrum range, and we were being received on a Motorola AM stereo receiver. This was off-the-air reception through the use of a six-foot criss-cross Motorola-built directional AM stereo antenna with a coax lead-in to the receiver. WKDC engaged Potter-

Moore Sound of Elmwood Park in Chicago to record off-the-air from a tap on the AM stereo receiver for the nighttime skywave broadcast. At 12:19 p.m. on the 21st of December, the same stereo broadcast was made so that nighttime reception could be compared to the regular daytime transmission of WKDC on the same day.

A Teac deck was used with a high resolution Sony amplifier. I told Len Potter that we desired as flat a response as possible on the tape with positively no embellishments of any kind, and that all nighttime settings were the same as the daytime settings. The recording of the nighttime broadcast did produce some sky-wave interference—which was expected. However, the daytime broadcast was absolutely startling.

We made an announcement so our listeners would be informed while we shut down transmission (daytime) to make the necessary changes at the transmitter (a Sparta 701B) to accommodate the stereo broadcast. We came back on the air in a few minutes with stereo; we eliminated one channel and then the other. The phone lines were busy with listeners who said that reception was wonderful (on their mono receivers). Listeners said they could hear the channel separation very well. Of course they wanted to know if we were always going to transmit AM stereo.

What's Ahead

Motorola is now working to build their first "pilot unit." They feel that the laboratory experimentation period is over. They project that their equipment will be ready to field test for the National AM-Stereophonic Field Testing in Washington in April or May.

It is our hope that what Motorola did with AM stereo at WKDC will fit into the FCC engineering requirements and that all of us will be in AM stereo before the end of 1977.

Every effort will be made for WKDC to demonstrate the first known AM stereo off-the-air nighttime and daytime recording at the NAB Convention. We want you to hear what we have heard and share this new dimension in broadcasting with you. WKDC will be there. Look for us.

Frank Blotter
President

**NAB
BOOTH 300
Sheraton Park**

DELTA ELECTRONICS

NEW

OIB-3 OPERATING IMPEDANCE BRIDGE — The new OIB-3 features direct reading of 'R' to 1000 Ohms and 'X' to 900 Ohms. The OIB-3 also contains an integral rf amplifier.

NEW

TCA-N-EX AND TCA-N-EXR SERIES RF AMMETERS — Equipped with output provisions for direct attachment of remote reading meters. Complies fully with new FCC regulations for remote metering.

NEW

Several new products including the AMC-1 Automatic Modulation Control Unit for ATS will be on display at the NAB Show — Please drop by.

Antenna Monitoring

AAM-1 ANALOG ANTENNA MONITOR — FCC type approved. Provides accurate true ratio and phase readings. Easy to interface with existing control systems. AAMH-1 provides hardwired remote control of AAM-1.

DAM-1 DIGITAL ANTENNA MONITOR — FCC type approved. Provides digital readout of amplitude, ratio and phase. Also available: DAMA-1 Base Current Adapter for remote digital readout of antenna base currents; DAMX-1 to extend capacity of DAM-1 up to 12 towers.

Transmitter/Antenna Remote Control

TMCS-1 TRANSMITTER/ANTENNA REMOTE CONTROL SYSTEM — Provides digital readout and control of the DAM-1 and transmitter over a single voice channel. Other systems available: DAMR-1/DAML-1 for digital readout and control of the DAM-1 only; DAMH-1 for use where the remote control point is close enough to the monitor to permit hardwired inter-connection.

Measurement/Test Instruments

OIB-1 OPERATING IMPEDANCE BRIDGE — For antenna system measurements under transmitter power. May also be used as a conventional bridge.



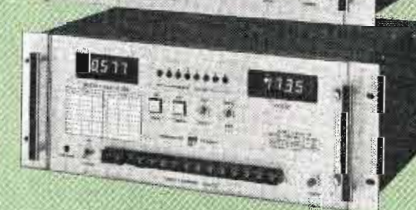
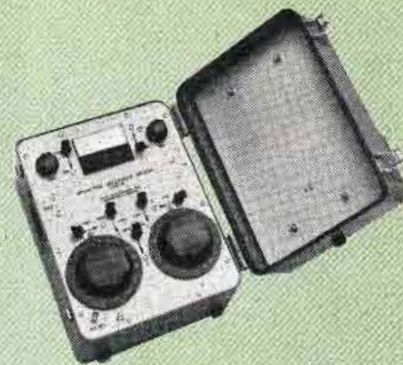
RG-1B RECEIVER/GENERATOR — Two-watt signal generator with a tracking detector. Built-in rechargeable battery power supply for full portability in making low power impedance measurements. For use with OIB-1 or other RF bridges.

CPB-1 COMMON POINT IMPEDANCE BRIDGE — Monitors common point impedance continuously. Designed for permanent installation.

Other Products

TCT-() TOROIDAL CURRENT TRANSFORMER — Provides accurate, stable R.F. samples for phase and amplitude measurements. Available in three sensitivities. Also available: TCTR-1 Compensated Rectifier Circuit to provide DC voltage for remote current measurement when used with TCT-().

MJ-50 METER JACK — A make-before-break in line jack assembly that permits "hot" insertion of OIB-1 Bridge or Ammeters.



DELTA ELECTRONICS



5534 PORT ROYAL ROAD
SPRINGFIELD, VIRGINIA 22151
TELEPHONE: 703/321-9845 TWX: 710-831-0620

For More Details Circle (68) on Reply Card

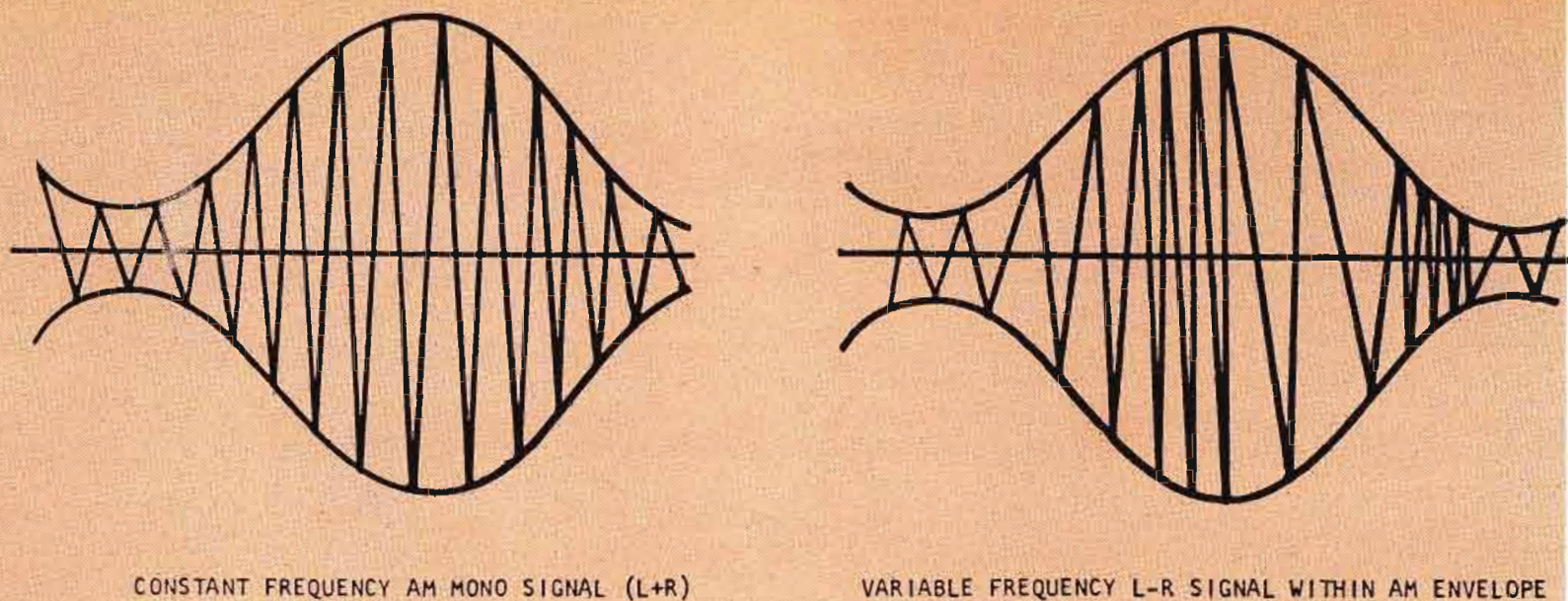


Figure 2. A monophonic AM signal and a stereo-modulated carrier are shown. RCA said the channel bandwidth should be at least 12 to 15 kHz to accommodate the significant sidebands arising from this composite modulation stereo system. In the illustration at the right, the variable frequency is carrying L-R information and the AM envelope L + R information.

AM Stereo

(Continued)

them a greater competitive advantage, since loud stations supposedly are more attractive to listeners tuning across a dial. A number of FM stations have also started compressing; and when you add to this the fact that the record companies are compressing dynamic range in some of their music, you end up with significant restriction on an important dimension in sound quality. The exceptions here are the stations—many of which are classical music FM stations—which consider compression a type of audio “distortion.” So you can draw your own conclusions about dynamic range. But, from at least one viewpoint, it is a disadvantage.

A DX Advantage For AM

Because of the RF frequency range used for FM broadcasting, it is basically a line-of-sight process. This means that FM stereo has a limited range of 60 to 80 miles (100 to 130 km) under favorable conditions. Class A stereo stations, with their power and antenna height restrictions, are far more limited in their coverage.

AM, on the other hand, because of the effect of ionospheric refraction, can go hundreds of miles at night, depending upon the frequency, power, state of the ionosphere, etc. Many of the 75 or so clear-

channel stations can be heard throughout the country each night.

FM stereo has a definite disadvantage when it comes to distance. In addition to the restrictions inherent in a basically line-of-sight service, the stereo signal very quickly loses signal-to-noise quality with distance. The switch from FM mono to FM stereo alone results in a 23 dB reduction in signal-to-noise, which equals a 200-to-1 effective power loss. The AM stereo signal would—depending in part upon what system is selected—hold its signal-to-noise quality over much greater distances from a transmitter. Extensive stereo AM testing has confirmed that excellent sky wave reception is possible hundreds of miles from a transmitter. Since FM stereo broadcasts have never been able to achieve great distances, this has meant that for many rural areas of the country stereo broadcast reception has never been possible.

FM stereo has some other shortcomings which AM stereo would not have. Anyone who has tried to listen to an FM stereo station while driving in a big city knows of the major problems with multipath reception. The “swish” and “picket fence” effects as you drive among tall buildings play havoc with FM stereo reception. But given a reasonable AM station signal

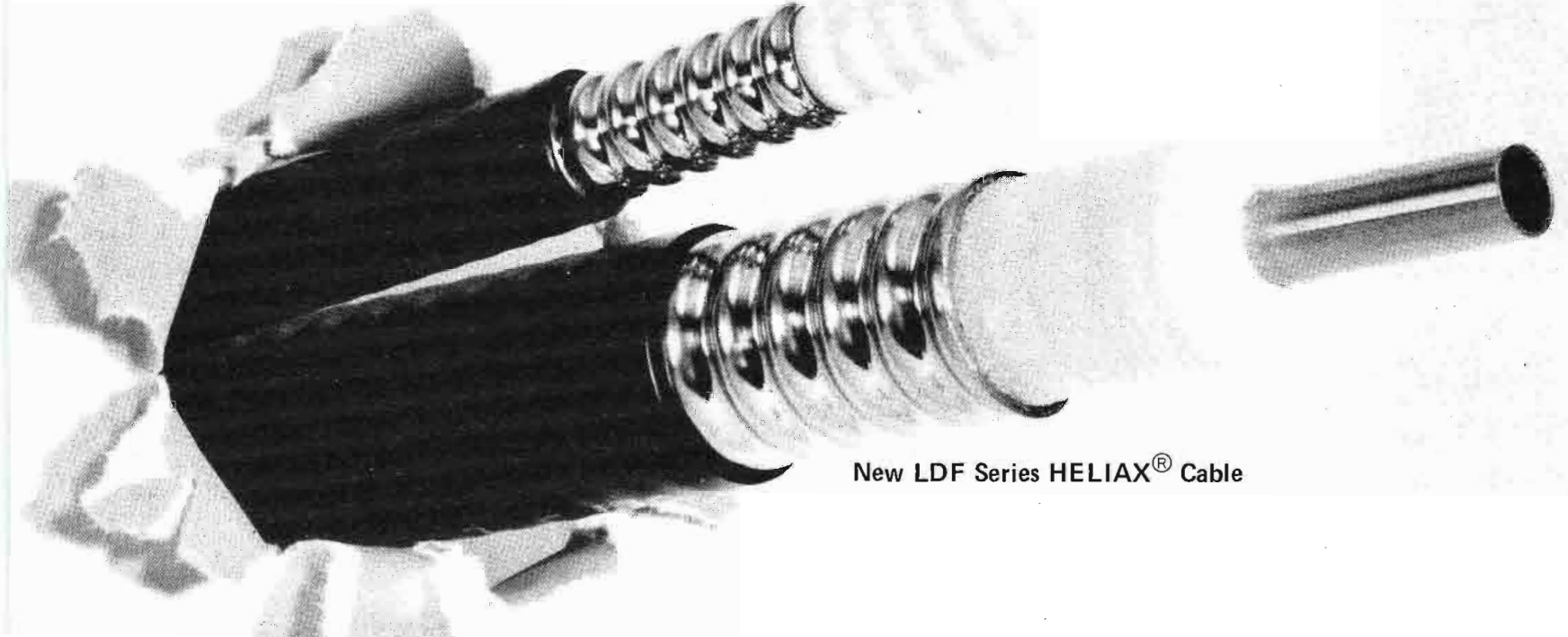
strength to start with, and a respectable AGC section on your AM radio, this problem doesn't exist with AM. This would be a big plus for the major market. AM'ers—the same AM'ers who have seen their share of home audiences continually eroded by FM stereo stations in the past decade. (In some major markets, stereo FM stations are now top in the ratings with home listeners. This is especially true in the “youth market” where stereo hi-fi has for some time been an accepted status “must.”)

Another plus for an AM stereo system lies in the simplicity of the AM demodulation process. With most any of the proposed AM stereo systems a simple, inexpensive IC could effectively do the demodulation job. AM stereo receivers should be simpler, cheaper and more stable than FM stereo receivers. The public, therefore, might be more likely to purchase AM stereo receivers than the more expensive FM stereo receivers—or be more willing to pay a few dollars more for an AM stereo rather than an AM mono radio.

The major weakness of the AM process lies in its comparative vulnerability to interference. Co-channel interference is about ten times the problem with an AM signal than it is with FM. With AM, a

Continued...

LOW LOSS CABLE BREAKTHROUGH



New LDF Series HELIAX® Cable



ANDREW

Lower loss, improved moisture barrier, plus all the traditional advantages of HELIAX foam-dielectric cable. New low density foam dielectric reduces attenuation, almost to that of air-dielectric cables. Annular corrugations provide a more positive longitudinal moisture block.

Connectors have been improved too. New features include self-flaring assembly, superior electrical contact, high resistance to pull-off and twist-off, moisture seals, and low VSWR through cable cut-off frequency.

Two sizes, 1/2" and 7/8" are available now for immediate shipment. For further information contact your Andrew Sales Engineer or ask for Bulletin 1160.

ANDREW CORPORATION

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

ANDREW ANTENNA COMPANY LTD.

606 Beech St., Whitby, Ontario, Canada L1N 5S2
Telephone: (416) 668-3348

ANDREW ANTENNAS

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

ANDREW ANTENNAS

171 Henty St., Reservoir, Victoria, Australia 3073
Telephone: (03) 460-1544

ANDREW ANTENAS LTDA.

Av Victor Andrew, 585, Caixa Postal 600, 18100 Sorocaba-
SP-Brasil Telephone: (0152) 28900

For More Details Circle (69) on Reply Card

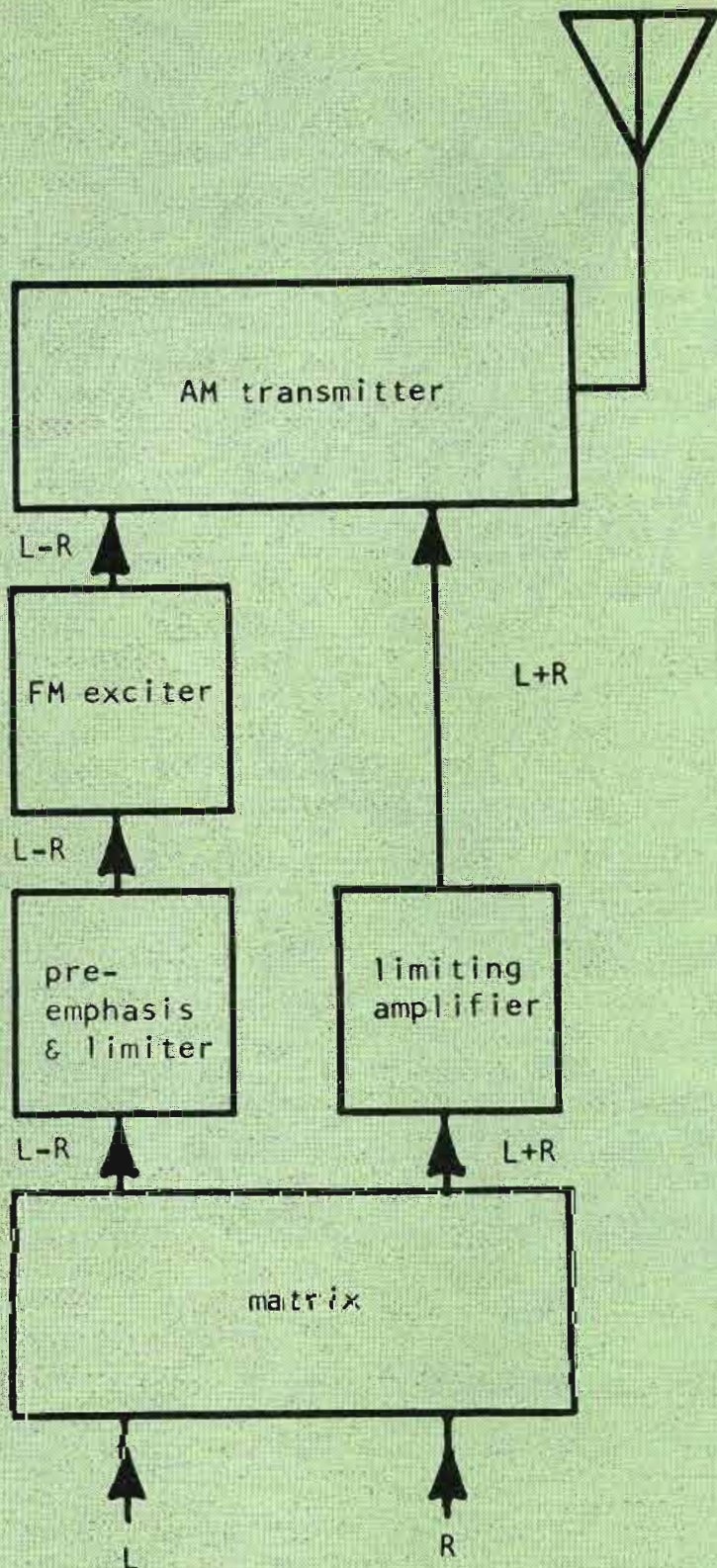


Figure 3. This simplified block diagram illustrates a compatible AM stereo transmitter system. RCA's "AM-FM" system for AM stereo was experimentally demonstrated more than 15 years ago.

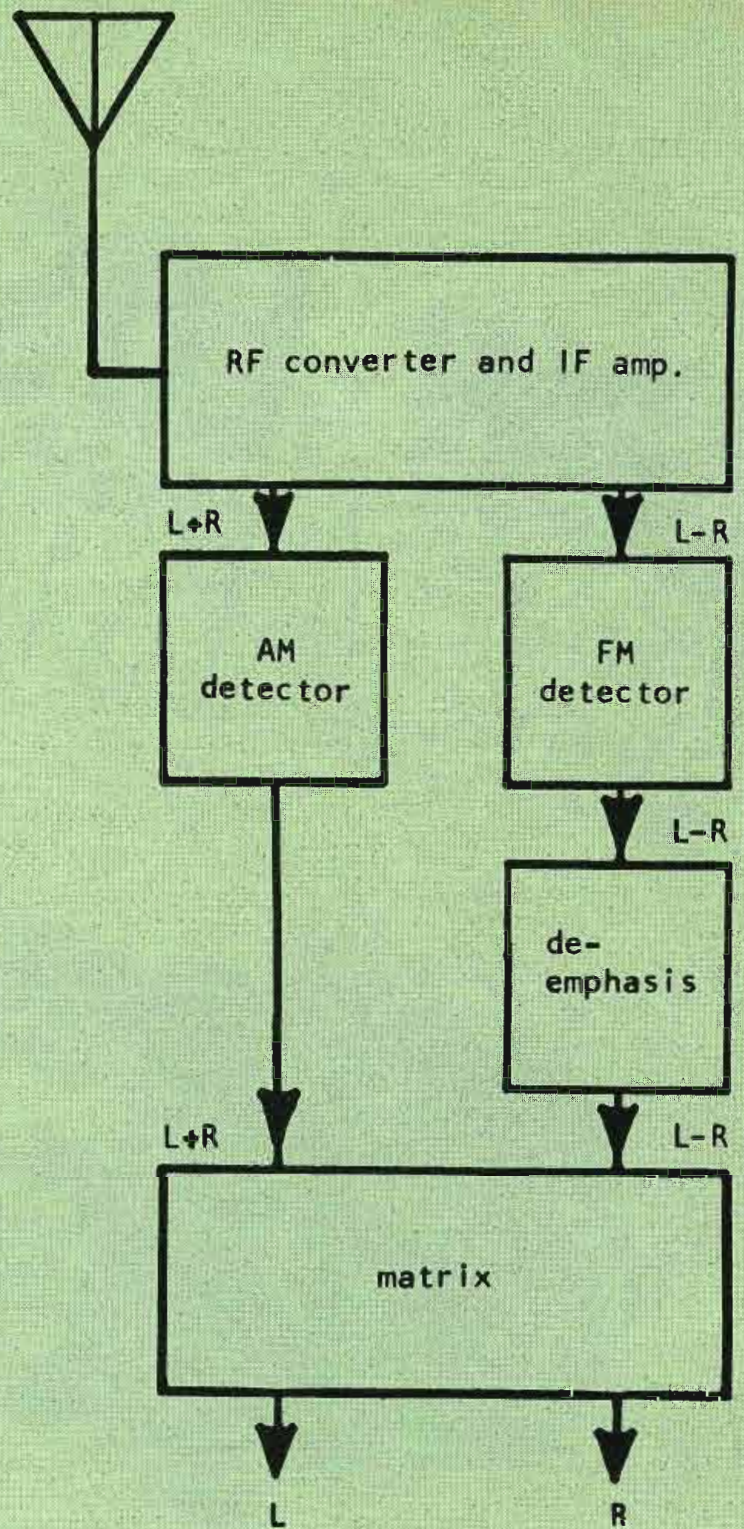


Figure 4. The RCA proposed AM stereo receiver used a conventional mixer and a single IF amplifier to drive an AM detector and a balanced discriminator FM detector. The AM detector was "bootstrapped" with the de-emphasized FM signal to produce the left and right channels.

AM Stereo

(Continued)

competing co-channel signal needs to be only about one-twentieth as strong as the primary signal for problems to occur. With FM, this ratio can get as high as two-to-one before co-channel problems interfere with reception. Likewise, an AM signal is more vulnerable to general man-made and atmospheric noise. This noise problem—particu-

larly when the effects of the ionospheric refraction are added—constitutes the major weakness of the AM process.

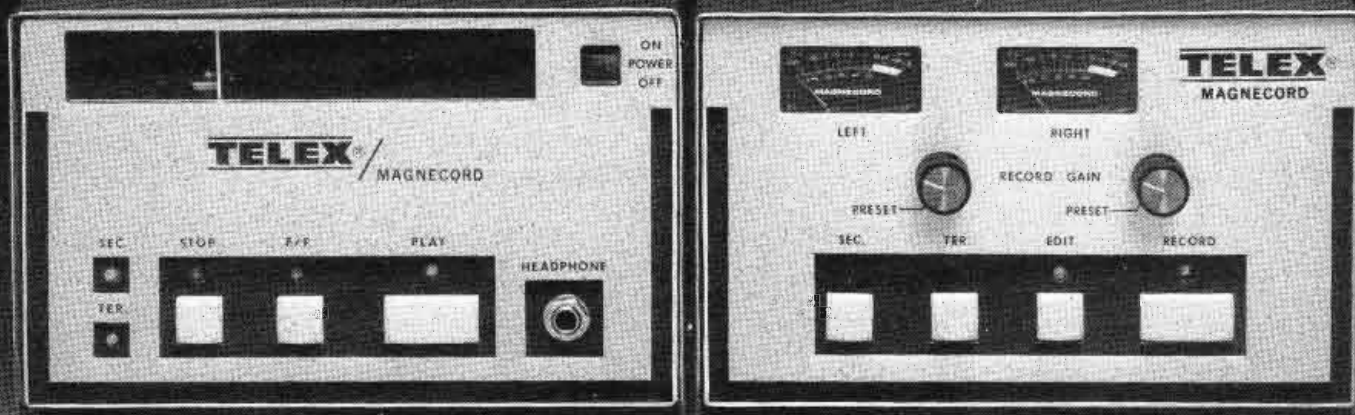
50 Years Of Stereo AM Proposals

AM stereo is anything but new. The first AM stereo transmission dates way back to 1925, when

WPAJ in New Haven, Connecticut demonstrated stereo through the use of two AM transmitters. A year later the first patent on stereo AM using a quadrature modulation of a single RF carrier was granted. A great number of patents have been issued for a variety of approaches to stereo AM in the past 50 years.

Continued...

At Last, a Cart Machine that keeps its cool



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

The MC series offers broadcasters a host of options, including field convertability from mono to stereo or play to record and, of course, end of message, secondary/tertiary cue tones.

Designed for type A or B carts, the MC

series meets all NAB specifications, offers full immunity to EMI and RFI, is remote controllable and automation compatible with CMOS digital logic. Audio muting, air damped low voltage dc solenoid and fast forward are standard features on every MC unit.

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

For detailed information please write:

PRODUCTS OF SOUND RESEARCH

TELEX

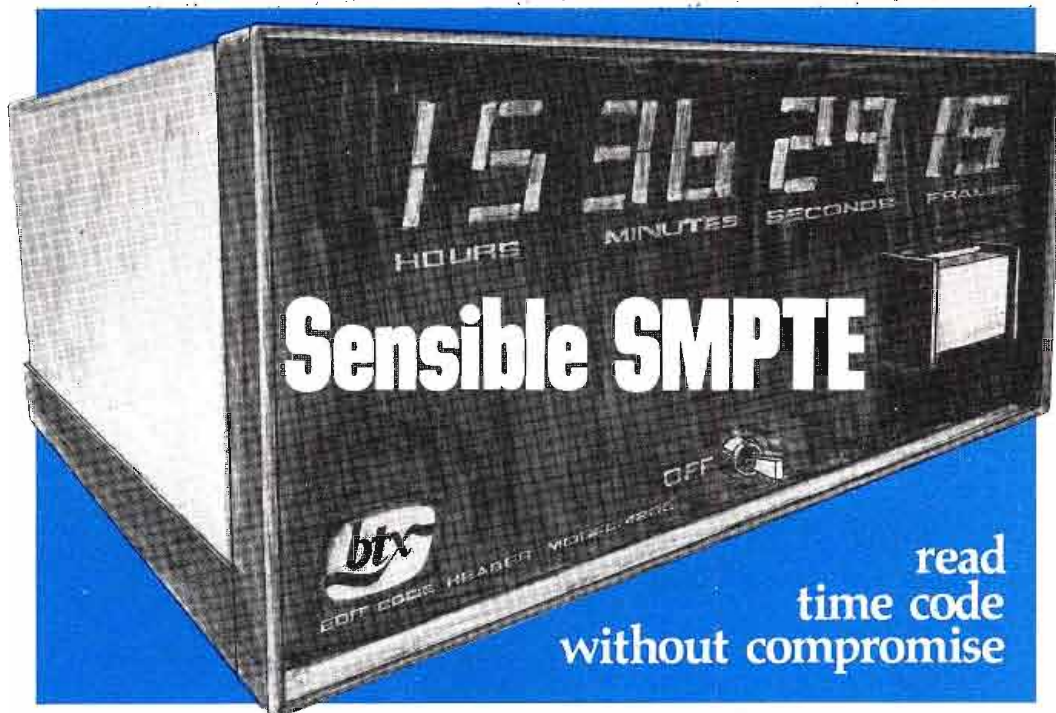
COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO • MINNEAPOLIS, MINN. 55420 U.S.A.

Europe: 22 rue de la Legion-d'honneur, 93200 St. Denis, France

Canada: Telak Electronics, Ltd., Scarborough, Ontario

For More Details Circle (70) on Reply Card



The BTX 4200 is guaranteed to read SMPTE time code reliably at levels down to -18 dBm at any speed from 1/10 to 80 times playing speed.

The 4200 displays large digital characters you can read across the room, and outputs parallel data *plus* serial data *plus* simultaneously regenerated time code.

The 4200 performs with real world SMPTE code better than any other machine at any price. Like BTX comparators, in-video character displays and code generators, the 4200 at \$2,850 is a sensible building block that easily interfaces with and improves the performance of any production system.

For complete information, circle reader service number or contact: The BTX Corporation, 438 Boston Post Road, Weston, Massachusetts 02193 (617) 891-1239.



For More Details Circle (71) on Reply Card

How do you get maximum performance from an outdated T.V. transmitter without expensive replacement?

..... I'm sitting on your answer!

Don't let an outdated transmitter impair your station's performance when a solid state IF MODULATED EXCITER — up to 10 watts UHF, 60 VHF — could be your answer. And for less than 10% of the cost of replacing the transmitter.

This compact unit from Townsend Associates employs the latest state of the art from a pioneer in the field of T.V. transmitter engineering. Townsend is known for quality engineering worldwide; in the design of TV stations and the manufacture of transmitter equipment. See us for the most advanced line in the industry.

Look for me
— George Townsend
at the NAB Convention
BOOTH 519,
SHOREHAM HOTEL
... Across from SONY.



TOWNSEND ASSOCIATES, INC.

PO BOX 484 • WEST SPRINGFIELD, MASSACHUSETTS 01089 • 413-736-7180

For More Details Circle (72) on Reply Card

AM Stereo

(Continued)

Throughout these years there have also been a number of successful broadcast demonstrations of AM stereo.

In the 1950's interest shifted to stereo FM, largely due to the FCC's attitude of pushing expansion in the FM service. Even so, in the late 1950's and early 60's Philco Corporation, RCA and Kahn Research Laboratories all filed proposals with the FCC for stereo AM. The petitions were denied. A number of reasons were cited by the FCC, including a lack of "public need" and "industry desire." Later attempts at filing proposals for AM stereo also met with failure.

If stereo AM could not be authorized for the United States, then how about Mexico? In 1970, XETRA, a 50,000 watt station on 690 kHz, started broadcasting in AM stereo from Tijuana, Mexico. The strong signal covered (and still covers) large portions of Southern California, principally San Diego, Long Beach and Los Angeles. The stereo equipment was developed by Kahn Research Laboratories, which uses a system of separate modulation of the upper and lower AM sidebands. The sidebands are modulated by sum and difference signals and are shifted 90 degrees with respect to each other.

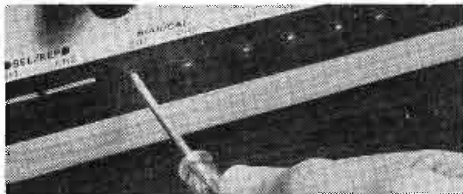
Distortion is reportedly limited to one percent and channel separation measures up to 30 dB when a special receiver is used. By using two standard AM receivers and tuning one slightly above and one slightly below the center frequency, a very respectable stereo effect can be achieved with about 9 dB of separation. (Even 8 dB will provide a stereo effect.) Although the latter approach might sound a little shaky, it appears to work surprisingly well, even when modestly priced AM receivers are used.

More recently the FCC gave permission for WFBR in Baltimore, Maryland to run tests with the Kahn system. Results were about the same as with XETRA—successful. Total harmonic distortion was held to below one percent. Kahn claims that a reasonably modern AM transmitter can be converted to Kahn stereo in as little as an hour's time. Figure 1 gives a block

Continued...

OTARI MX-5050 the original (and still the best) compact professional recorder

Just over two years ago, Otari introduced a unique new product—the first truly professional recorder in a compact package—the MX-5050. Since then, the performance and reliability of this innovative new machine have been tested and proven in over a thousand critical professional applications—by broadcasters, recording studios, A/V departments, musicians, and semipro recordists worldwide. Universal acceptance and repeat orders by these satisfied customers tell this remarkable recorder's success story better than we can.



Bias can be re-optimized in seconds.

As you compare the MX-5050 with other recorders, keep this in mind. The MX-5050 is not a hi-fi machine with a few professional features added later as an afterthought. It was designed from the ground up based on Otari's 10 year experience as Japan's leading manufacturer of professional recorders and high speed duplicators. It is a full professional machine with the performance, features, and field proven reliability that you expect to find only in the larger professional recorders.

Here are some of the key reasons why the MX-5050 is the best compact recorder available today.

Production Features: Creative production is simplified with: Front panel edit to spill tape. Lift-up head cover to mark splices and clean heads. Built-in splicing block on head cover. Adjustable cue to defeat head lifters. Selective reproduce to add new tracks in perfect time synchronization. Two speed operation, 15 and 7½ or 7½ and 3¾ ips (field changeable in dc servo versions).

Performance Features: Headroom is 19 dBm, a full 15 dBm over the switch selectable fixed output of +4 dBm. This standard reference level output can be rear panel switched to -10 dBm to drive a PA system or power amplifier. S/N ratio is NAB weighted 69 dB full track, 68 dB half track, and 65 dB quarter track. Crosstalk is greater than 60 dB half track. Outputs are 600 ohm balanced (standard on half track) or unbalanced. Line input and output connectors are XLR.



Operating Features: Bias is front-panel continuously adjustable (not limited to fixed positions). With built-in test oscillator (not available on other compact professional recorders) bias can be optimized in seconds when changing tape. Record EQ and standard reference level are also front adjustable. Straight-line tape path simplifies threading. Capstan is located on back side of tape for improved tape life. An extra reproduce head is standard on all versions to allow playback of tapes in different formats. For pitch control and freedom from power line variations, an optional dc capstan servo is available with ±10% correction range.



Easy threading; capstan on back side.

Versatility: Available in full-track (with half-track reproduce capability standard), two-track, and quarter-track versions. Walnut case (standard), rugged portable road case, rack mounting adaptor, or floor console. Universal power supply standard. Low impedance input and output transformers and remote control also optional accessories.

See your nearest Otari dealer for the full story or contact Otari. And, if it's multichannel you need, ask about the standard-setting four and eight channel versions of the MX-5050.

OTARI

Otari Corporation
981 Industrial Road
San Carlos, Calif. 94070
(415) 593-1648 TWX: 910-376-4890

Otari Electric Co., Ltd.
4-29-18 Minami Ogikubo
Suginami-ku, Tokyo 167, Japan
(03) 333-9631 Telex: J26604

For More Details Circle (73) on Reply Card

For Tape Heads Head for TABER

At Taber you get precision work, quality results and low price ... unmatched by any other audio head manufacturer.

We will recondition your three head assembly ... F/T \$45.00 ... 2 TRK \$60.00. Three new 2 TRK heads installed and aligned in your AG-440B for \$264.00 ... Scully 280 at \$270.00.

Ampex VTR audio is priced at only \$385.00 for four new heads installed, or \$110.00 for four reconditioned heads. (Add \$38.50 if monitor post needs lapping.) RCA VTR audio heads are available for only \$475.00.

Loaner assemblies are available.

For heads, head for Taber ... the best source available.

Send for free brochure.

TABER Manufacturing & Engineering Company
2081 Edison Ave. • San Leandro, Ca. 94577 • (415) 635-3831

For More Details Circle (74) on Reply Card

AM stereo

(Continued)

diagram for a transmitter for the Kahn system.

Companies have come and gone on the R&D side of AM stereo. Along with Kahn, Motorola and Magnavox are pushing hardest these days for acceptance of their systems. Doubtless, the subject will once more be the talk of NAB. But there will be some faces missing this time around.

A formidable opponent to the Kahn stereo system was demonstrated by RCA at the 1975 NAB Convention. Like the Kahn system, RCA's approach is compatible and can make use of existing transmitting equipment.

FCC-approved experimental stereo AM broadcasts—but not regular programming—were conducted by RCA as early as 1959 over WNBC in New York.

RCA calls their approach "AM-FM," since phase modulation takes place within the AM carrier envelope. Figure 2 illustrates the AM-FM signal and Figures 3 and 4 show a block diagram of a transmitter and receiver for the RCA approach. No attempt will be made here to cover in detail the full technical aspects of either the Kahn or RCA systems, but what has been given should illustrate the basic concepts.

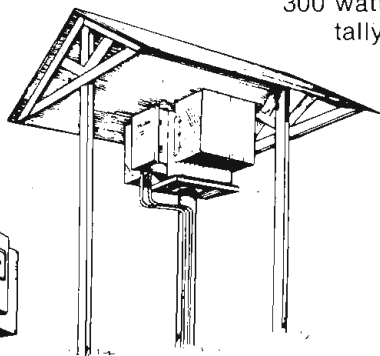
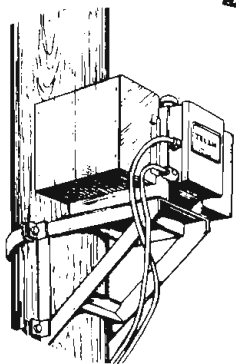
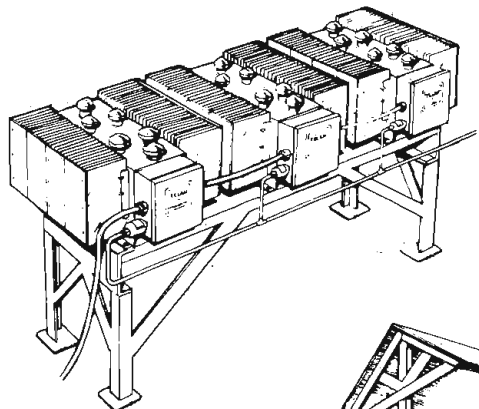
Several months ago the National AM Stereophonic Radio Committee was formed as a combined venture of the Electronic Industries Association, the Institute of Electronic and Electrical Engineers, the National Radio Broadcasters Association and the National Association of Broadcasters. The committee was assigned the duty of evaluating all of the proposed AM stereo systems.

In January, 1976, the Association for AM Stereo was formed to promote the idea of AM stereo in

Continued...

VERSATILE

mount it anywhere



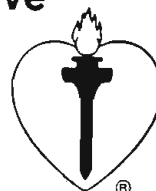
Continuous, unattended power 10 to 300 watts. That's TELAN. So totally reliable and weather-proof, it'll operate in the most remote and inaccessible locations for months without even a maintenance check. Install it in an hour or two, light a match and forget it. No moving parts and it won't flame out. 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 (75) on Reply Card

GIVE...
so more will live
**HEART
FUND**



**RCA
DOESN'T HAVE IT.**

**COLLINS
DOESN'T HAVE IT.**

**HARRIS
DOESN'T HAVE IT.**

You won't find a toll-free telephone number in their ads. But with The New CCA you will. For sales *and* service. It's another indication of our new vitality, our new thrust, our new excitement at CCA. And, that The New CCA *means* business. And service.

See our new products and meet our new people. Join us at the NAB — Booth 201, Sheraton Park.

**ONLY
The New CCA!
HAS IT.**

**800-257-8171
FOR SALES AND SERVICE
In Canada: 800-261-4088**

CCA Electronics Corporation • 716 Jersey Avenue • Gloucester City, N.J. 08030

For More Details Circle (83) on Reply Card

AM stereo

(Continued)

general. The association, which has offices in Washington (for obvious reasons) is made up of AM broadcasters who feel that the important dimension of stereo sound should not be confined to FM. The association has filed a petition with the FCC to act on AM stereo at an "early date."

The next event in the stereo AM

issue will probably be the presentation of the National AM Stereophonic Radio Committee's report at the NAB Convention. The results of the Committee's report will be forwarded to the FCC where it is assumed that the AM stereo issue will again be re-opened. It should be noted that Kahn has chosen not to route its petition for AM stereo through the stereo committee's framework, but, instead, has gone directly to the FCC with its own petition. Kahn reportedly feels that

AM operators are anxious for the immediate "shot in the arm" which stereo would give them against FM stereo competition. Kahn claims that it could start delivering stereo AM transmitter excitors to stations within 60 days after FCC approval. They are also prepared to start granting licenses for the manufacturer of stereo AM receivers (which they don't plan to manufacture themselves) within a similar period of time.

Prospects And Promises

There are close to 4,500 AM stations operating in the United States. Many of these have seen a steady erosion of their audience shares in the past years; a decline that is in direct proportion to the sale of FM stereo receivers. Only with drive time audiences in automobiles has the AM audience held reasonably steady. Figures indicate that there are over 100 million AM radio equipped cars, about 63 percent of which are normally "on" during drive time. Lately, however, the CB craze has been cutting into this 63 percent figure.

AM radio has had to use a variety of new ideas and approaches over the years to hold audiences. For example, program formats, which 20 years ago were all about the same, have become specialized and directed toward specific audience needs and interests. But AM radio has not been able to effectively compete with stereo FM stations for home audiences interested in music. Tests have shown that the added dimension of stereo is even more important to listeners than "hi-fi" quality. You will recall that FM radio really never "took off" until the dimension of stereo was added. There are a few people who would now say that stereo FM is still a gimmick.

Although the issue of AM stereo has been repeatedly swept under the rug for 50 years, it appears that on this "go-around" it may finally be an idea whose time has come. AM radio already enjoys some significant technical advantages over FM. The added dimension of stereo, coupled with a greater engineering emphasis on audio fidelity, may take away the "lo-fi" label from AM and put it on a near equal footing with stereo FM. □

Can A Production Studio Pay For Itself? **\$1,404**



Yes—if it is portable. Microtrak System D, all wood—fits car back seat, console/preamps/ tonearm/turntables & mike—\$1,404

REVOX-A77 Add Walnut Cabinet #1102 Revox for \$839 (Rack Mnt Version \$853) Remote-\$36 NAB Hub Adptr-\$11	SPOTMASTER Add 2000 Cart RP \$623 Playback-\$438, 2-\$869 Significant saving on all Spotmaster items.	SENNHEISER Add the best AM Mike we have ever handled MD421-\$145, Luxo Arm-\$26, Atlas MS10C-\$14
SONY TC377-\$344	SHURE M67-\$144	

3M TAPE
New Reel/Loaded With 3M176/1.5m, White Box

5 in-Doz-	\$19	100-	\$111
7 in-Doz-	\$33	50-	\$112
10.5-Six-	\$35	50-	\$249

TONE ARM/CART/STYLUS		Fidelipac Audiopak				
Microtrak-303	2-\$129	CARTS	#300	#A2	Mastercart Aristocart	
STANTON		40 Sec	\$1.70	\$1.91	\$1.80	\$3.22
500AL	2-\$29 4-\$56	70 Sec	\$1.83	\$1.98	\$1.83	\$3.29
D5107AL	6-\$41 Dx \$78	2.5 Mn	\$2.02	\$2.27	\$2.11	\$3.38
680EE	2-\$45 4-\$87	3.5 Mn	\$2.11	\$2.33	\$2.21	\$3.47
D680	3-\$52 6-\$98	5.5 Mn	\$2.39	\$2.68	\$2.49	\$3.55
SHURE						
M232 Tone Arm/2-	\$61					
M44C, 7-Or-E	2-\$19					
N44C, 7-Or-E	6-\$41					
SC35C/\$19	55C/6-\$37					

One of the best dealer records in broadcasting for savings and satisfaction.

For a competitive quote on any broadcast product, write or call.

David Green
Leesburg, Virginia 22075 Phone 703-777-8660
broadcast consultants corporation

437 small market radio stations in 31 states participate in our unique—Loyalty Discount Plan. They save the most, concentrating all supply & equipment purchases with a single reliable source.

ESE—9:59-min Digital/Timer \$99—2 for \$195 60 Minute \$129
WESTCLOX 12 in Quartz—Clock \$48 each/2-\$89 8 in-\$39/2-\$75

Prices expire 3-31-77 & are cash with order, Satisfaction Guaranteed

For More Details Circle (77) on Reply Card

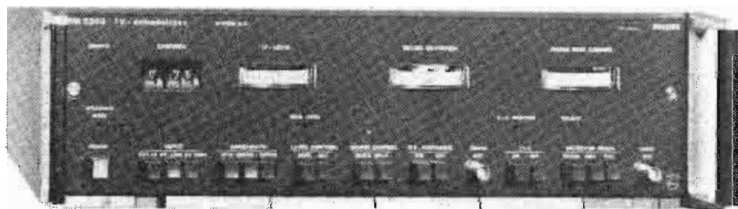
Professional Television Test Equipment

WITH THE EMPHASIS ON QUALITY PERFORMANCE



PM 5580

- High class vestigial sideband MODULATOR
- Fills all broadcast requirements
- Used intensively by TV transmitter mfrs.
- Carriers derived from 10 MHz via synthesizer

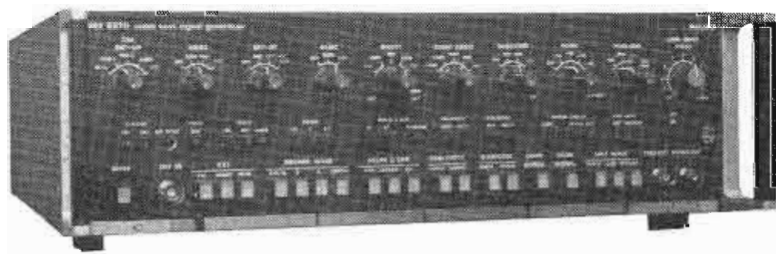


PM 5560

- Precision TV DEMODULATOR
- SYNCHRONOUS and envelope detection
- Instantly tunable
- Quadrature distortion a problem of the past

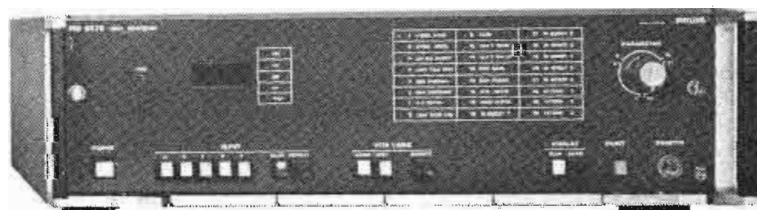
PM 5570

- NTSC VIDEO TEST SIGNAL GENERATOR
- Most versatile signal source available
- All levels adjustable
- Built in SPG in GENLOC capability



PM 5578

- AUTOMATIC VITS ANALYZER
- Automatic measurement and printout of VITS as defined in NTC 7
- 21 measurements plus ALARM indications
- 5 channel input with manual or auto screen



See these and more at the NAB, booth 605 at the Shoreham Americana

For immediate detailed information utilize our toll-free Hotline number:
800 632-7172 (New Jersey residents call collect) or contact:

In the U.S.:
Phillips Test & Measuring Instruments, Inc.
85 Mc Kee Drive
Mahwah, New Jersey 07430
Tel. (201) 529-3800

In Canada:
Phillips Test & Measuring Instruments, Inc.
6 Leswyn Road
Toronto, Ontario, Canada M6A 1K2
Tel. (416) 789-7188



PHILIPS

For More Details Circle (78) on Reply Card

Why Increase Loudness?

By R. R. Weirather

A few observations on the coverage aspects of AM and FM broadcast radio will be made. The interest for AM will be to demonstrate how the capabilities of a technically reaching station might be developed. The focus will be on coverage and loudness. I will not attempt to define what exactly is "loudness", but refer to it generally as the "RMS" value of audio waveform. First, AM broadcasting will be discussed.

By observing the results of amplitude modulating a carrier with various signals, we can draw these conclusions:

1. The variation of the locus of the carrier peaks correspond to the modulating signal, $f(t)$.
2. For 100 percent modulation with a sinusoidal signal, the carrier amplitude is doubled at peaks of modulation and zero at negative peaks.
3. Overmodulation on downward modulating peaks results in a distorted AM signal.
4. Overmodulation on upward

modulating peaks does not result in distortion.

5. With 100 percent modulation with a sinusoidal signal, the spectrum of the AM signal is limited to $f_c - f_m$, f_c , and $f_c + f_m$. The sidebands at f_m are one half the amplitude (6 dB in power) of the carrier.

Some general conclusions may be drawn about AM. Amplitude modulation may be considered a process of translating the frequency range of the modulating signal upward to the range about the carrier frequency. The new frequency spectrum is identical in form with the old.

AM Broadcasting

Several aspects of the AM broadcasting industry have led to significant increases in both coverage and "loudness" of AM programming. The motivation behind such a thrust is clear. Improvement in coverage and loudness serves both the interest of the listening public and the broadcasting facility. The

steps which paved the way for these benefits are:

1. The increase of positive modulation to 125 percent.
2. Transmitters capable of high average modulation.
3. Transmitters capable of reproduction of highly processed audio without distortion or overmodulation problems (modulation fidelity).
4. Increased attention to the transmitter, phasor and antenna, i.e., the Systems Approach.

To illustrate what a progressive AM station can do compared to several years ago, a prediction of coverage and loudness will be made.

125% Modulation

First we must realize the asymmetry that exists in nearly all voice and music.

An AC coupled circuit (transformer and capacitor) will pass an asymmetrical signal if the area above and below the center axis is the same. By limiting (clipping) the audio negative and positive peaks

About The Author

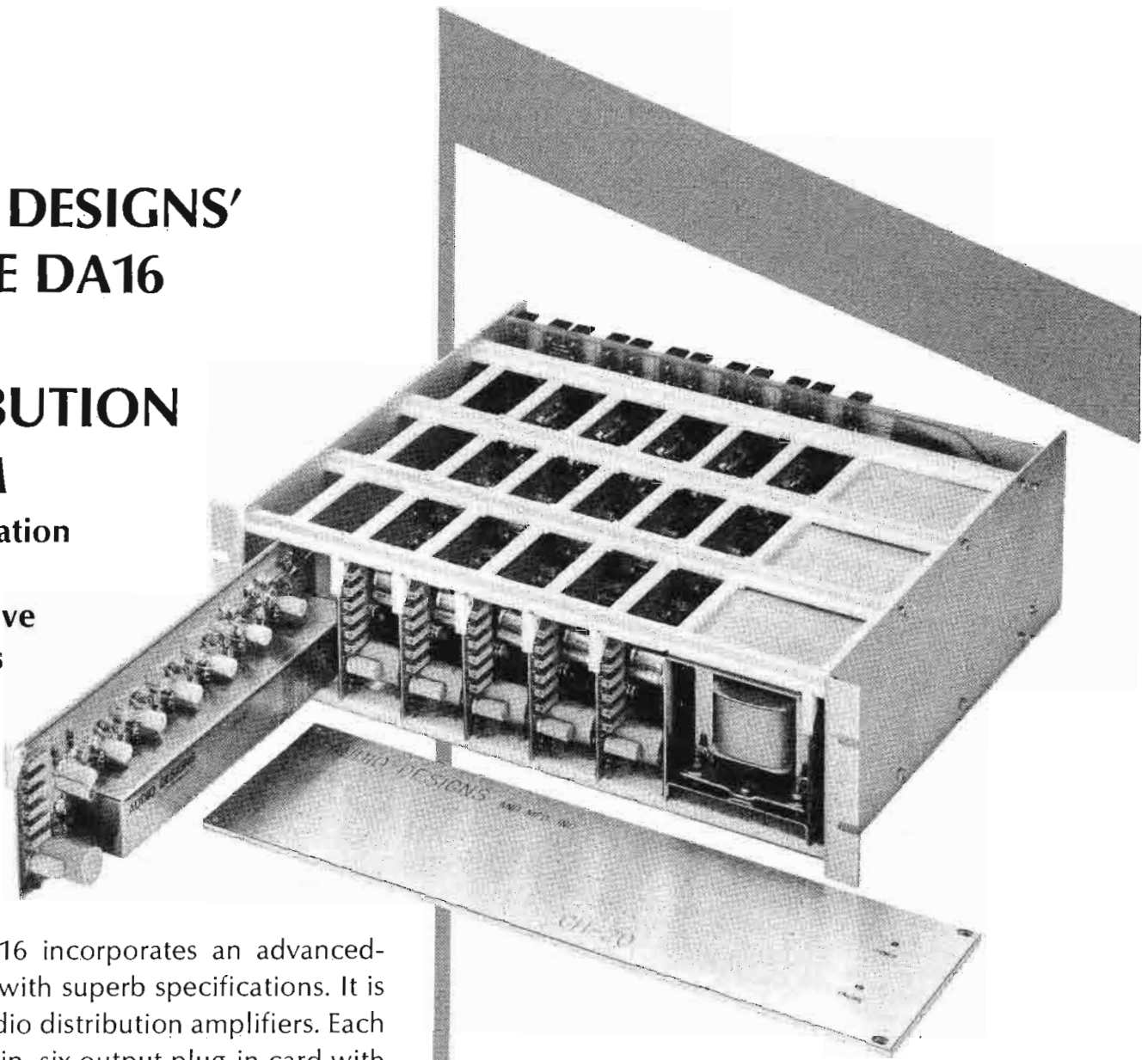
This article was presented in lecture form at seven NAB Regional Meetings from Portland, Oregon to New York City in October and November of 1976.

R. R. Weirather is Manager, FM Transmitters, for the Harris Corporation. He has a Bachelor's and Master's degree in Electrical

Engineering. From 1965 to 1972, Weirather worked as a microwave design engineer with Motorola. He has been with Harris since 1972. His full title within the Harris Broadcast Products Division is Design Engineering Manager.

NOW! AUDIO DESIGNS' UNIQUE DA16 AUDIO DISTRIBUTION SYSTEM

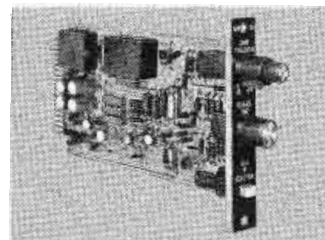
... a combination
of features
no competitive
system offers



The ADM[®] DA16 incorporates an advanced-design approach, with superb specifications. It is the ultimate in audio distribution amplifiers. Each amplifier is a one in, six output plug-in card with +24DBM input and output capability.

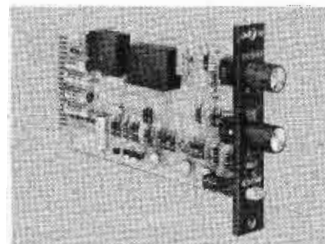
The input is transformer coupled, and each of the six outputs is individually transformer isolated. Amplifiers have individual front panel gain adjustments. Noise level is ultra low, and distortion is less than .1% at +24DBM.

Up to six DA16 amplifiers can be housed in the Audio Designs[®] CH20 rack frame, which includes a redundant power supply with automatic changeover. Built to exacting quality standards, DA16 amplifiers offer exceptionally high reliability. Write or call for specification sheet.

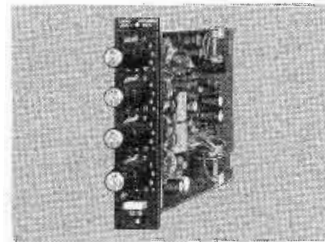


OTHER HIGH-INTEGRITY ADM COMPONENTS

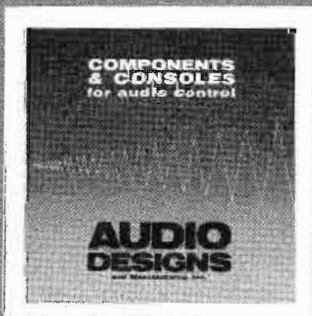
302 LIMITER—a unique, instantaneous device designed to allow constant output regardless of input level.



301 NOISE SUPPRESSOR—a new, fast gain expander that puts silence where there was noise.



1500/1501 EQUALIZER—unity gain, four band, 14 frequency reciprocal equalizer designed to provide EQ anywhere in an audio system.



AUDIO DESIGNS AND MANUFACTURING, INC.
16005 Sturgeon, Roseville, Michigan 48066
Phone: (313) 778-8400, Cable: AUDEX TLX-23-1114

AMPEX

DISTRIBUTED OUTSIDE U.S.A.
BY AMPEX INTERNATIONAL OPERATIONS, INC.

Why Increase Loudness?

(Continued)

to their maximum FCC values, an improvement in signal level in the AM sidebands can be expected. If increases in sideband power can be achieved, then a louder signal will result.

High Average Modulation

Years ago, designs of AM transmitters were based on average modulation levels of 30 percent. Presently, the audio processing made on the original recording and at the broadcasting facility have increased the demand for transmitters with high sustained average modulation capabilities. However, it is not possible to take **full** advantage of this capability because normal programming does have more dynamic conditions than do test tones. It is fair to say that modulation levels are now up to 50 percent or more. This high average condition contributes to a louder sound. Increases from 30 to 50 percent represent an increase in sideband power of $(\frac{50}{30})^2$ or 2.77 (4.43 dB).

Modulation Fidelity Improvements

What can happen when using highly processed audio with a transmitter that has high average modulation capability? With proper design techniques, transmitters can be built to reproduce the audio modulation to a degree never achieved before. Our tests with the MW-1 have demonstrated in comparison with older tube models in signal loudness of 2 to 3 dB.

With signals that have been clipped on negative and positive peaks, tests show gain linearity without overshoot, bounce or sag problems.

Antenna Systems

Some very interesting results of an analysis technique on antenna systems have been shown at Harris Broadcast Products Division.¹ The analysis permits calculations of response of antenna systems with unequal sideband impedances. Some trial cases of antenna systems reveals that modulation depth and distortion can be significantly degraded if care is not used. The

downward and upward modulation indices can be expected to be modified by unequal sideband impedances. The net effect is a loss of modulation capability and increased distortion.

No quantitative number can be placed on a system until the sideband impedances are known. It could be expected that antenna arrays would be more sensitive than an omnidirection antenna. Modulation degradation of 3 dB at the higher sideband frequencies can be easily shown.

Coverage And Loudness

From these factors, we can list the major areas of improvement and the signal improvement: (1) 125 percent positive peak capability = 1.94 dB; (2) High average modulation = 4.43 dB; (3) Modulation fidelity improvements = 2 dB; (4) Antenna system improvements = X dB. Net increase = (8.34 + X) dB.

How does this additional signal put into the sidebands affect receiver coverage near and far? Let's examine the receiver at both points close to and remote from the broadcast antenna.

In the area of primary service coverage, the AM receiver can be described as an envelope detector and low pass filter.²

The total carrier mean noise power at the detector is:

$$N_c = 2 f_m \eta \text{ watts}$$

$$f_m = \text{LPF bandwidth}$$

η = overall noise figure of the receiver measured to the detector.

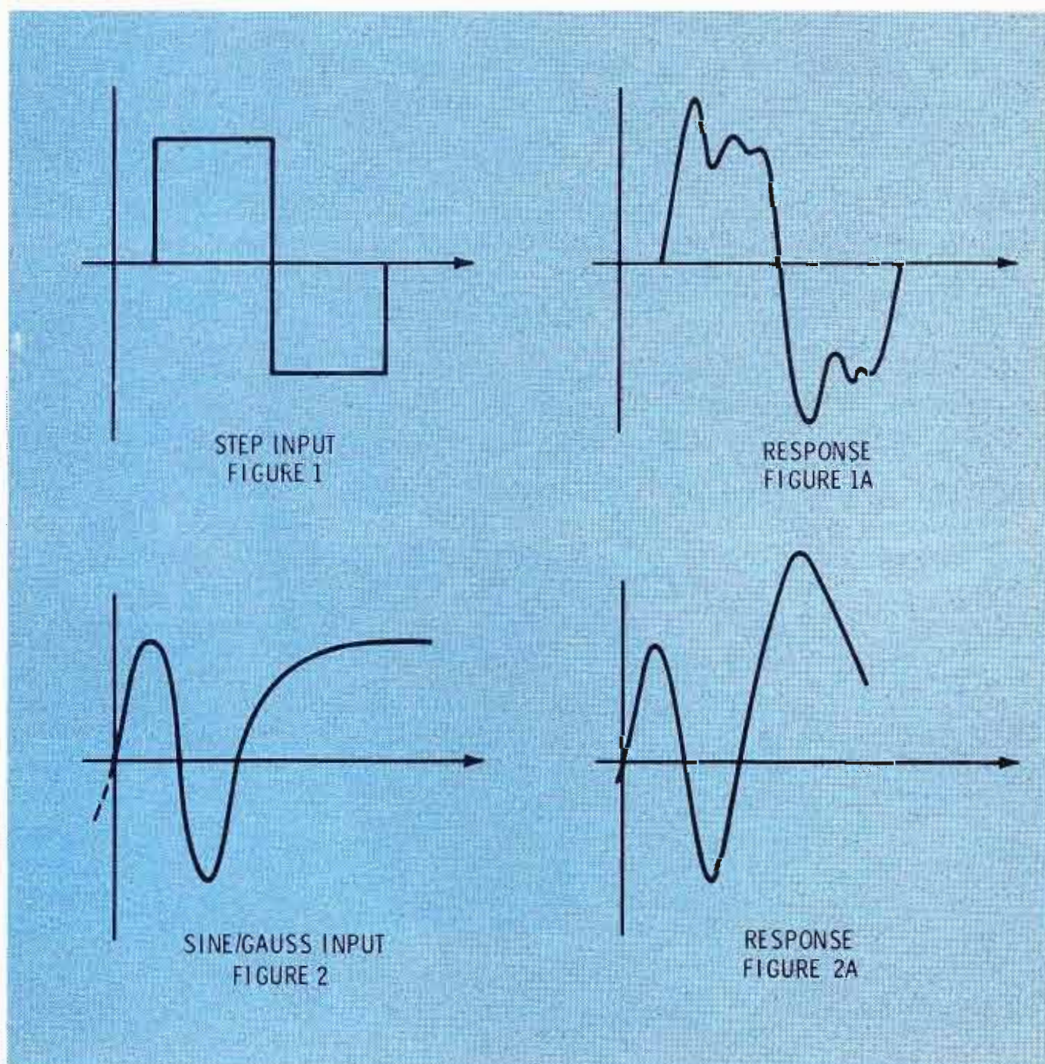
This noise perturbs the unmodulated carrier in a random fashion and will effectively appear as an amplitude modulating signal that will be detected and emerges as a crackle at the receiver output. By further analysis, assuming a large carrier power to noise power, the detector random fluctuations are shown to be:

$$N_o = a^2(2.f_m.\eta) = a^2.N_c$$

a = detector constant

For large carrier to noise ratios, the AM receiver noise output is a function of the carrier noise and the detector. The noise will remain

Continued...



When **WBAC** buys **AMPRO**, they broadcast it . . .



Bill Thomason,
President
WBAC,
Cleveland, Tennessee

and, according to Bill Thomason, President of WBAC . . . “our reason for choosing an Ampro console was its versatility and the unique craftsmanship that went into the makeup of this fine piece of equipment. WBAC has been in the broadcasting business for 32 years and our format and needs have grown. We were impressed by the many functions of our eight channel dual mono Ampro. For this reason, we decided to try Ampro’s cartridge decks and, to our satisfaction, we have not had to do any type of maintenance other than routine head cleaning for over a year.”

Ampro is the choice of the professional broadcaster. Their complete line of 6, 8, 10 and 12 channel audio consoles – stereo, mono, dual mono and stereo or simulcast – as well as cartridge equipment and turntable pre-amps are backed up by a 24 hour

staff of engineers seven days a week. All Ampro equipment features superior RF shielding . . . never a spurious pick-up problem no matter XMTR proximity. All equipment is logically laid-out for easy operation, constructed by craftsmen using the highest quality components. And, most important, Ampro equipment is made to last and last.

Find out how you can BROADCAST it . . . call your Ampro representative or the factory today.



AMPRO CORPORATION
850 PENNSYLVANIA BLVD., FEASTERVILLE, PA 19047 • (215) 322-5100

For More Details Circle (81) on Reply Card

For Transmitting Antennas:

BOGNER
at NAB
High Power
VHF · UHF · FM
Linear & circular
polarization

CCA
SHERATON BOOTH 220

BOGNER
at NAB

Low & Medium
Power VHF, UHF
& Translator

EMCEE
SHERATON BOOTH 110

BOGNER
at NAB

NEW!
TV Emergency
Antenna
From Stock

Any UHF channel
to 500 Kw ERP

COMARK
SHOREHAM BOOTH 321

Why Increase Loudness?

(Continued)

constant irrespective of the modulated signal present on the carrier. It then means any increase in modulation levels will be reflected directly as increases in signal output, S_0 :

$$S_0 = m^2 a^2 S_c$$

We now can compute the receiver S_0/N_0 by:

$$S_0/N_0 = \frac{m^2 a^2 S_c}{a^2 N_c} = m^2 \frac{S_c}{N_c}$$

Increases in S_0 will be on a one-to-one basis with modulation increase. This means that the broadcaster who can take advantage of the modulation increases mentioned can expect a 1 dB increase in loudness for a 1 dB of modulated signal improvement.

Far Field Coverage

For areas of coverage beyond the primary service area, the improvement in S_0/N_0 can be predicted in a similar manner. For $S_c/N_c > 6$ dB the power output signal to noise is as computed for the near field case. It is reasonable to assume that the average broadcast AM receiver listener would not tolerate only a 6 dB carrier signal to noise ratio. Thus, because of practical considerations, the far field predictions can be used for all "listenable" receptions. But if increases in modulated signal output S_0 can be made, the listener can enjoy the same program at further distance. Note that in the equation:

$$S_0/N_0 = m^2 \frac{S_c}{N_c}$$

When S_c decreases, offsetting advantages can be gained by increasing modulation (m).

Prediction of increased coverage due to modulation increases can be made. Assuming an ideal radiation system, the carrier signal, S_c , decreases according to the square root law along radials from the antenna. A doubling in carrier or modulation power will increase the coverage by two.

Loudness And Coverage

We can see that for the near field

case the most notable effect by increasing modulation will be "loudness". The amount of "loudness" that a station can achieve is dependent on how many advantages the station has already exercised. A decibel of modulation increase will be perceived as a louder reception on an AM receiver. All other things being equal, a listener will most likely choose the louder, clearer signal.

Summary

With AM broadcasting it can be shown that increases in modulation will increase "loudness". There are several ways to increase the modulation level.

The four major methods are:

1. 125 percent peak capability.
2. Increase average modulation levels by using processing and properly designed transmitters.
3. Using a transparent transmitter; the modulation fidelity improvement.
4. The System Approach to the antenna.

Coverage will also be increased if the modulation is increased.

FM Improvements

The improvements that exist for AM have an analogy in FM. The electrical characteristics that have potential for increasing your listening audience are, as you might suspect, different from those mentioned for AM. The FM case is varied also by the receiver type and broadcast type. The cases are mono or stereo transmission and mono or stereo receiver. A lively discussion of coverage and loudness of FM broadcasts is underway and some relevant aspects of frequency modulation needs reviewing.

Theoretical Aspects

The process of frequency modulation produces a shift of the signal spectrum to the range of frequencies about the carrier. The spectrum of a wideband frequency modulated carrier takes on a complex form which is dependent on the maximum amplitude of the modulating signal as well as its particular form. For a large modulation index, the FM bandwidth approaches twice the maximum frequency deviation. The complex

Continued...

WKLS, Atlanta, broadcasts 100% disc-to-air. That's why it uses Stanton's 681 series... exclusively.



Bob Helbush, Chief Engineer, making a quality control check using a 681 cartridge.

Top notch broadcasters who capture a large share of the listening audience, are critically aware of the necessity to achieve a superior quality of sound. Station WKLS is just such a station.

As Bob Helbush, chief engineer, states: "We broadcast 100% disc-to-air except for some commercials. So, for maximum quality sound and phase stability, we use the Stanton 681 SE for on-the-air use. We consider it the ideal answer for that application. And our program director uses Stanton's 681 Triple-E for auditioning new releases before we air them".

And Don Waterman, General Manager, added: "Today, every station in the SJR Communications group . . . all eight of them, all in Major Markets . . . use Stanton 681 cartridges on every turntable".

There are good reasons for this vast acceptance. Stanton's 681 Calibration Series cartridges offer improved track-

ing at *all* frequencies. They achieve perfectly flat frequency response to beyond 20 Kc. And the top-of-the-line, superb 681 Triple-E has an ultra miniaturized stylus assembly with substantially less mass than previously, yet it possesses even greater durability than had been thought possible to achieve.

Each 681 Series cartridge is guaranteed to meet its specifications within exacting limits and each one boasts the most meaningful warranty. An individually calibrated test result is packed with each unit.

Whether your usage involves recording, broadcasting or home entertainment, your choice should be the choice of the professionals... the STANTON 681.

Write today for further information to Stanton Magnetics, Terminal Drive, Plainview, N.Y. 11803.



Come visit Stanton Magnetics at the NAB Convention—Booth #521

For More Details Circle (76) on Reply Card

Why Increase Loudness?

(Continued)

nature of frequency modulated signals lead to receivers that provide better discrimination against noise and interfering signals.

Some conclusions and observations are noted about a frequency modulated signal:

1. Peaks of the modulating signals determine the peak deviation.

2. The amount of signal power is invariant with frequency modulation.

3. "Positive" peaks are not usable as such to increase loudness.

The system of signal generation and reception adopted for FM broadcast utilizes audio pre-emphasizing and complementing de-emphasizing networks. This results in a superior carrier to noise characteristic at the receiver and a flat audio response.

The FM Broadcast System

The operation of various devices in an FM broadcast system will be discussed in order to determine

where a broadcaster might improve his so called "loudness" and coverage.

Let us first consider the elements in an FM transmission system. These include the audio processor and limiter, FM exciter, FM transmitter, antenna system, and the FM receiver.

The audio processor and limiter will be examined first. It should exhibit flat frequency response if desired, low harmonic distortion and intermodulation distortion, symmetrical clipping, fast peak response, and low residual noise output. Its purpose is to provide a high average level of modulation without causing overmodulation, that is, the lowest possible signal should be attainable without frequent peaks of modulation which could cause an FCC rule violation. This is sometimes rather difficult to achieve technically. We must provide in a stereo broadcast, low pass filtering with a sharp cut-off on the limiter output in order to prevent high harmonic distortion, as well as achieving linear phase within the passband. These two requirements

are coupled with the flat amplitude response we desire.

If we achieve these goals, one result is overshoot, caused by one or more mechanisms. Overshoot may be seen as either frequent or infrequent flashing of the peak lamp on the FM modulation monitor, depending on the type of program material. It is heard as a "ch" sound on the trailing edge of a cymbal crash. Overshoot occurs because of the audio input low pass filter. Two such waveforms which cause overshoot are: a square wave audio input; and a sine wave audio input which changes to a gaussian step.

The first type of overshoot occurs as a result of the elimination of higher-order terms in the frequency domain for the square wave. The output waveform thus, will not be a faithful reproduction of the input, instead, causing a momentary peak of greater amplitude than the steady-state limiter output. The second type of overshoot occurs as the result of non-linear phase of the filter in the pass band. If a phase

Continued...

NAGRA TIME CODE SOUND RECORDERS



**NAGRA... FIRST WITH THE NEW
AND SECOND TO NONE WITH THE BEST!**

Booth 606 • NAB CONVENTION • March 27-30 • Washington, D.C.

**1/4" Tape Sound Recorders,
for any known Coding System
including SMPTE TV Standard
Code, German IRT, French TDF**

New Time Code techniques are being used to great advantage in both film and video tape picture production. These new techniques simplify and save money during production, special effects shooting, picture editing, scoring, sound rerecording and release. These techniques also eliminate slating, clapsticks, scene number announcements and edge numbering. Fortunately, with Nagra, the producer can move slowly into these techniques which can be programmed to his needs and prepare him for the new systems of "show enhancement" and simplicity.

United States Distribution — Service — Sales
NAGRA MAGNETIC RECORDERS, INC.

19 W. 44th ST., ROOM 715 • NEW YORK, NY 10036 • (212) 661-8066

West Coast Sales — Service & Technical Center
RYDER MAGNETIC SALES CORP.

1147 N. VINE ST. • HOLLYWOOD, CA 90038 • (213) 469-6391

AVAILABLE IN CANADA — BRAUN ELECTRIC CANADA, LTD.

For More Details Circle (84) on Reply Card

To be professional a speaker should be:

**Flat¹, Wide Range²,
Rugged³, Loud⁴,
Uniform,
Wide-Dispersion.⁵**

What else could you possibly want?

**Handsome⁶, Small,⁷
Low-Cost.⁸**



1 & 2. 45 to 18,000 Hz \pm just 3dB. Or 32 to 18,000 Hz with optional equalizer in step-down mode. A result of sophisticated Thiele/Small vented speaker technology. You choose either 4th or 6th order Butterworth filter response.

3. Withstands 30 watts long-term or up to 300 watts short-term (10 milliseconds). Tweeter protector included. Professional enclosure construction.

4. Delivers 111 dB with 300 watt peaks. 96 dB SPL at 1 meter with 1 watt.

5. 126° horizontal dispersion \pm only 31° from 400 to 16,000 Hz. 66° vertical dispersion \pm just 16° from 4,000 to 16,000 Hz.

6. Satin finish oak and matte black with protective black edging is quietly contemporary.

7. Less than 4 cubic feet. Just 20" wide, 28½" high, and 11¾" deep. Mounts readily to wall or ceiling. Tweeter rotates for same room coverage whether vertical or horizontal.

8. At \$291.00 a remarkable achievement. Optional SEQ Equalizer \$60.00. Prices suggested net, slightly higher in the West.

The new E-V Sentry V.

Send today for a fact-filled data folder on the New Sentry V. It will thoroughly prove that even your smallest space can enjoy good sound. Or better yet, ask your E-V sound specialist to arrange an audition. We promise a remarkable experience.

Electro-Voice®

Dept. 377V, 638 Cecil St.
Buchanan, Michigan 49107



a gulton
company

All of the above.

Audio Limiter

**FM LOUDNESS
AND CLARITY
without compromise!**

Model TFL-280 Audio Limiter from Moseley Associates, Inc.

This frequency-conscious limiter cleanly solves the problems associated with the transmission of pre-emphasized audio...including the ringing (over-modulation) produced by low-pass audio filters without the use of clipping. The TFL-280 produces an on-air sound almost impossible to distinguish from the original program source.

See the revolutionary new TFL-280 at booth 203, Sheraton Park Hotel during NAB, or contact us for product bulletin 255.



**MOSELEY
ASSOCIATES, INC.**

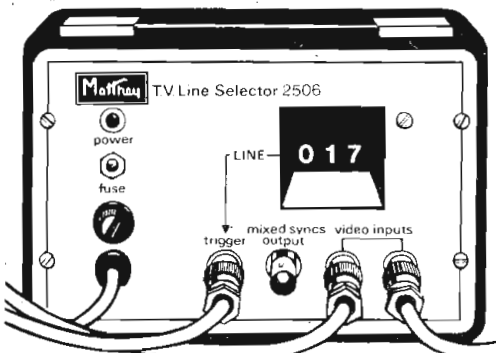
SANTA BARBARA RESEARCH PARK

111 CASTILIAN DRIVE • GOLETA, CA 93017
Telephone (805) 968-9621
Telex 658448/Cable: MOSELEY

**YOUR
SCOPE**
into a T.V. Waveform
Monitor for
only \$600⁰⁰

JUST ADD A

**Matthey T.V. Line
Selector**



- JITTER FREE WAVEFORMS
- REDUCED EYESTRAIN
- NO LOSS OF TRIGGERING
- 3 VERSIONS - 525 LINE (NTSC/PAL-M)
- 625 LINE (PAL/SECAM) 819 LINE (SECAM)
- YOU DIAL EXACT LINE
- EXACT FIELD SELECTED
- AND MIXED SYNC OUTPUT TOO

Television Equipment Associates, Inc.

BILL PEGLER, Director
BOX 260 SOUTH SALEM, N.Y. 10590
Tel: 914-763-8893 Twx: 710-575-2600



For More Details Circle (86) on Reply Card

Why Increase Loudness?

(Continued)

delay compensation network is utilized, the situation can be improved. This all-pass network makes the time delay of the system more constant, with respect to the input frequency, by adding delays at the proper frequencies. The amplitude response, however, also must be flat out to the high end of the audio range. If both these requirements are not satisfied, both the output gain and group delay will change with frequency, causing distortion of the FM baseband signal.

These distortion products will not cause overmodulation if the peak (as well as average) FM exciter input level is reduced. This can sometimes cause a significant reduction in overall loudness, which is not our objective.

We also recognize that a square wave into a LPF at 5 to 6 kHz results in overmodulation. The phase and amplitude response of the LPF are the cause of the overmodulation.

The FM exciter should be able to handle an audio input signal with a high average level of modulation, and preserve the input's low distortion and insure superior separation and crosstalk. This is difficult to accomplish if bandpass filters are present in the exciter. These again must exhibit linear phase and amplitude response in the passband.

The transmitter must then be transparent to the clean signal from the exciter, and not further band-limit or distort the baseband signal in any way. The transmitter output tank should not cause significant amplitude or phase distortion.

The FM antenna must be tuned such that it will provide a uniform impedance load as seen by the transmitter over the entire bandwidth of the FM signal.

Having given cursory treatment to the broadcast facility, let's turn our attention to the receiver.

What governs the audio signal output of a fully quieted FM receiver? The deviation of the carrier which constrained to be 75 kHz by the FCC. Then it only remains that we need to increase the modulation (deviation) to increase "loudness". Modulation increases due to solving the overshoot prob-

lems, improved audio processing, or any other means will increase loudness.

Can you increase coverage? The answer is yes. **We at Harris BPD do not venture, yet, how to increase your average FM deviation.** Let us, however, demonstrate the impact modulation improvement might have. I am going to assume that a majority of broadcasters are stereo. We all realize that going stereo to mono will impact coverage. What we **do** predict is the following.

Mono Receivers

Monophonic receivers comprise a substantial part of the available receivers in a given market. If we examine a "typical" receiver characteristic we could plot coverage as shown. As can be seen, for 30 dB quieting a "noisy but usable" reception gap exists. If we consider the effects of a real transmission, then the increase is as shown in this figure. As can be seen, a possible 1.3 area increase in mono receivers is predicted. Our premise is this: if we can increase modulation and turn these noisy receivers into "listenable" receivers, we have increased coverage.

Stereo Receivers

Due to the nature of receiving stereophonic broadcast, a large area of "noisy but usable" stereo receivers are opened. This is shown theoretically in this figure. The effects of a real transmission are shown in this figure.

Again, our premise is that if we can increase modulation and turn these "noisy" receivers into "listenable" receivers we have increased coverage.

Summary

In FM, it can be shown that increase in modulation will increase "loudness". There are ways to increase modulation.

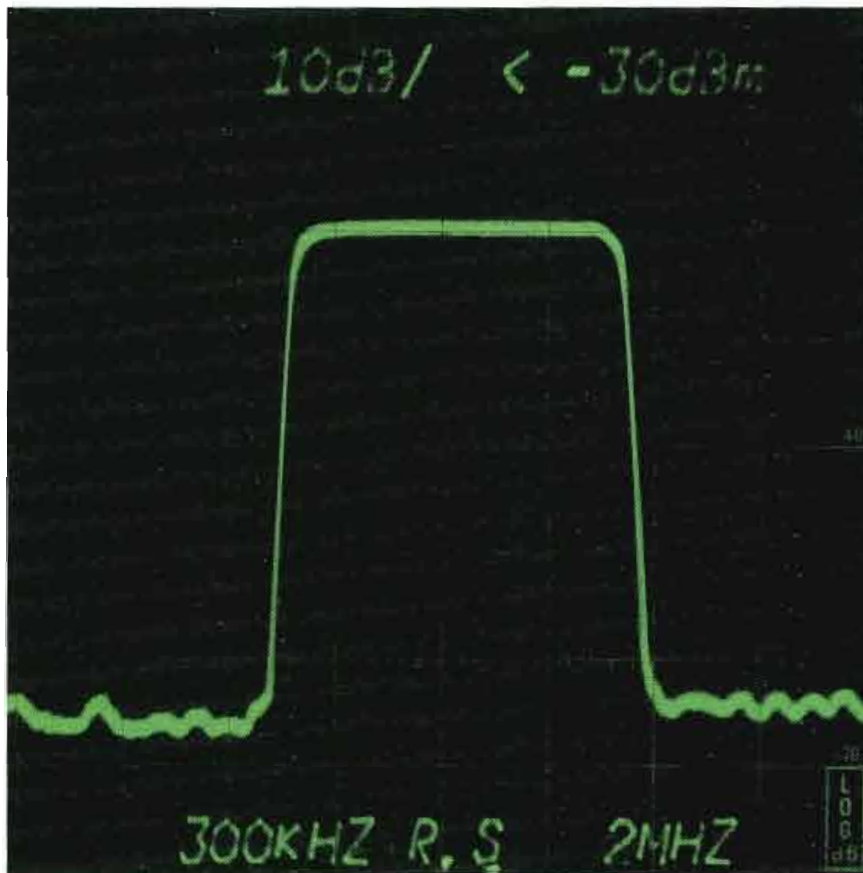
The possible increase in mono FM receiver coverage is **not** substantial. The possible increase in stereo receiver coverage is substantial. □

References

1. Bingeman, Clarke "AM Antenna System Bandwidth vs Harmonic Distortion" 1976 IEEE Broadcast Symposium.
2. Schwartz, "Information, Transmission, Modulation, and Noise," McGraw Hill, 1959.

Announcing the first application of surface acoustic wave (SAW) technology to broadcast equipment

SAW Filter frequency response



The fourth generation of television translators and transmitters has arrived.

Thanks to another technological "first" from EMCEE!

The incorporation of SAW filters in EMCEE broadcast equipment assures significantly improved selectivity... without the group delay distortion associated with current filtering techniques... and providing frequency response curves never before attainable. In translators, for example, it is now possible to employ adjacent channel operation.

In addition to extremely high selectivity, the integrated SAW device insures easy alignment and excellent long term stability.

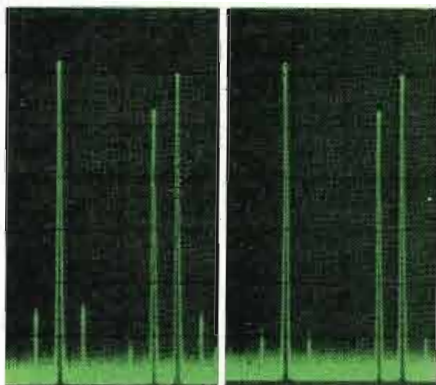
But EMCEE hasn't stopped there with the development of the fourth generation of television translators and transmitters.

There has also been a dramatic improvement in performance — specifically, linearity — as dem-

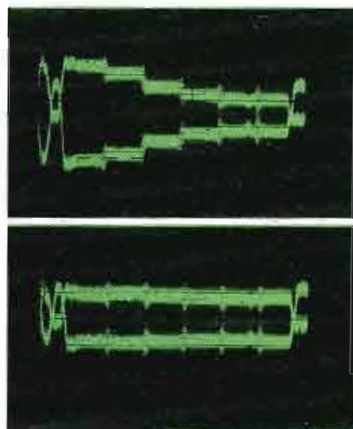
onstrated in the comparison photographs below. New EMCEE technology effectively cancels distortion and simultaneously improves intermodulation products, differential phase, differential gain, and sync compression to minimize signal degradation.

Best yet, EMCEE has achieved this exclusive combination of improved selectivity and linearity *in current equipment and at current prices!*

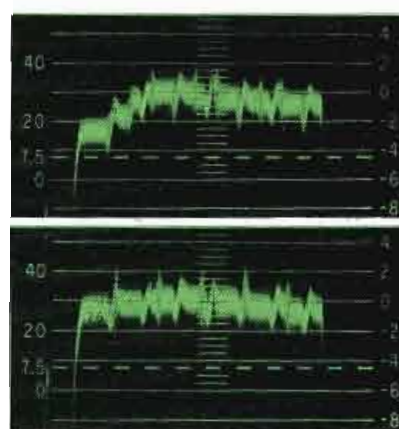
EMCEE. Clearly, the technological leader in translators and transmitters.



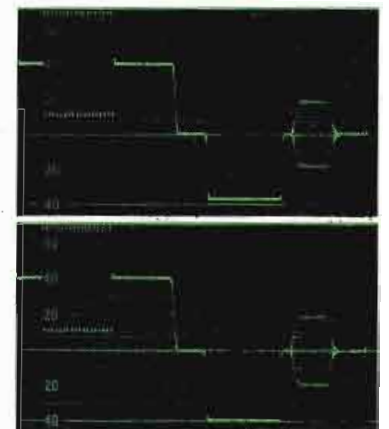
Intermodulation Products
... improved by 6 db



Differential Phase
... reduced by 3°



Differential Gain
... significantly reduced



Sync Compression
... eliminated!



Request free technical paper and data sheet... or call collect

EMCEE BROADCAST PRODUCTS,

a division of Electronics, Missiles & Communication, Inc.
White Haven, Pa. 18661 • (717) 443-9575 • TWX 510-655-7088

See us at NAB Booth #110

For More Details Circle (87) on Reply Card

BE tests the ORBAN OPTIMOD

By Dennis Ciapura

As any FM engineer who has labored to attain a satisfactory mating between signal processor and stereo generator knows, things are not always what they appear to be. Carefully adjusted systems often produce strange and unexplained peaks that tickle the peak flasher into luminous revolt and force the responsible engineer to lower the limiter output level to allow enough elbow room for these errant peaks.

It used to be common practice to blame the limiter for "letting a few peaks through" but these days most of us realize that the answer is not quite that simple, as there is another gremlin at work...the overshoot.

While some FM engineers have toyed with eliminating and/or repositioning filters and 75 μ sec. networks in existing equipment to minimize the problem, it is one that does not lend itself to any easy solutions because of the number of variables involved. The Orban Optimod is a good example of a systems approach to optimum modulation control. In one compact unit, the Optimod is a complete signal processor and a stereo generator complete with low overshoot filters.

Since the audio processing and stereo are designed as a system, the engineering folks at Orban are able to obtain the best balance between average level, fidelity and modulation control.

If you have been considering spilling the viscera of your limiter onto the shop table in an effort to duplicate the Orban scheme of things, don't bother. I doubt that you could duplicate the Optimod for what they sell it for, and as you'll see from our description of the circuitry, the limiter and stereo generator are specifically designed to complement each other.

Our investigation of the Optimod consisted of three phases. First, we obtained enough data from the manufacturer to get a clear picture of how the unit is supposed to work. Next, we ran our own lab tests to spot check the factory specs. Then, as a final test we used the Orban on the air under actual broadcast conditions.

How It Does What It Does

At this stage of the game, it would be helpful to take a look at the simplified block diagram of the

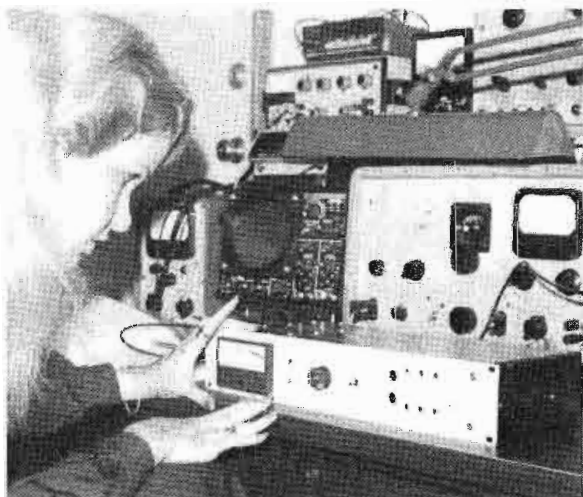
Optimod in Figure 1. When we say simplified, we really mean simplified. As you can imagine, it takes quite a bit of electronic hardware to do what those little blocks call for.

Audio enters the unit at a rear panel terminal strip, and is then routed through a series of isolation pads and RF filters; an apropos welcome for audio that's been cohabitating with transmitters. The next section of circuitry provides a high-pass filter, active of course, that rolls off subaudible components below 30 Hz.

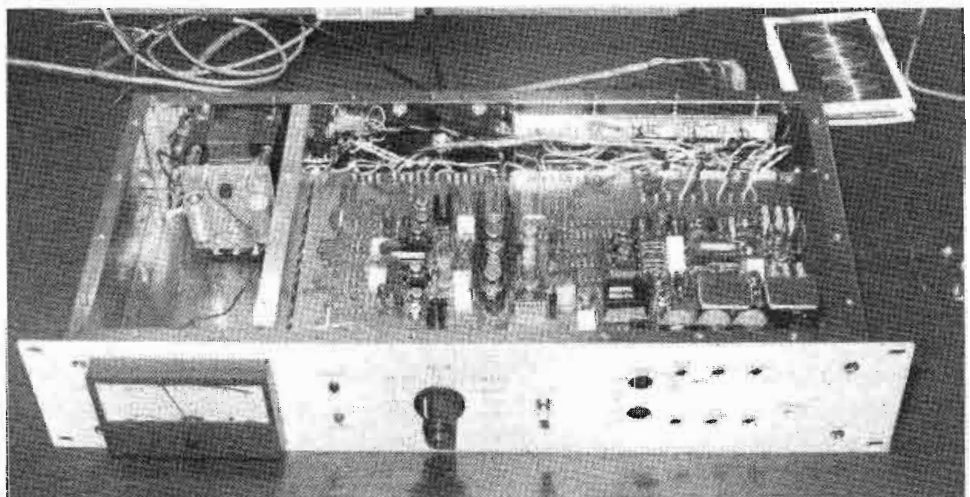
This filter was designed into the unit to accommodate exciters that can't handle low frequency transients. Although these high-pass filters would be very difficult to hear except with rare program passages, they are bypassable so that the purist can also be accommodated, assuming he has speakers that will reproduce wavelengths 16 to 20 feet long!

Next we come to the first of two audio processor sections, a broad-band AGC. This section has a moderate attack speed and a variable recovery characteristic that is a function of the input waveform.

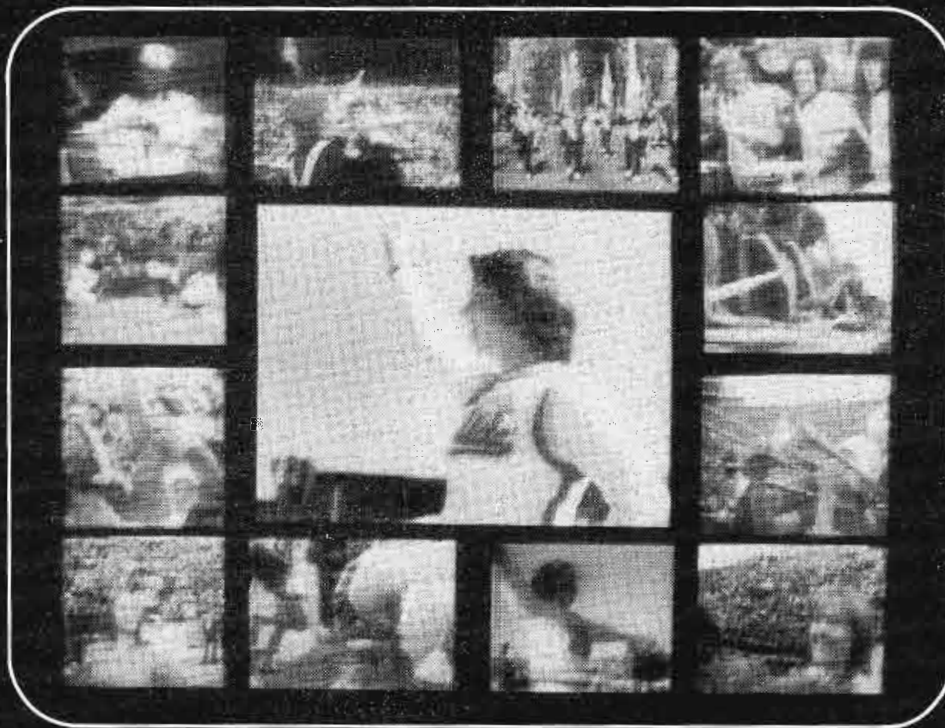
Continued...



Ready for testing, the front panel was removed for access to the user adjustments.



Here you see inside. Note in the upper right corner that the input connections are shielded inside the unit.



NCAA Football lead-in
courtesy of ABC Sports
and Image West.

GREAT MOMENTS IN DIGITAL VIDEO HISTORY.

THE FRAMESTORE SYNCHRONIZER BECOMES A TOOL FOR ENG AND PRODUCTION.

AND MICRO CONSULTANTS IS THERE WITH THE QUANTEL DFS 3000.

Our DFS 3000 is a lot more than a synchronizer. It makes ENG more practicable, more professional, more profitable than ever before.

It takes only 8¾ inches of rack space. Of course, it's also portable —and rugged enough to take the rugged treatment portable units get.

It makes production more vibrant than ever before. It lets you compress live images. Move them around with a "joystick." Freeze them. Run them through your switcher for special effects. Make hot cuts. Time base correct. And control everything from a remote panel.

It's been used by networks and local stations to enhance practically every recent major television event you can think of. The Olympics, the primaries, the political conventions, Seattle's Sea Fair, Monday Night Football, the Super Bowl, and more.

Local stations also use it to zip up their news programming. Production houses (like Image West) use it for innovative post production.

See for yourself. Ask for a demo **in your own facility**. Write or call Micro Consultants, Inc., P.O. Box 10057, Palo Alto, California 94303, (415) 321-0832.



The digital video people



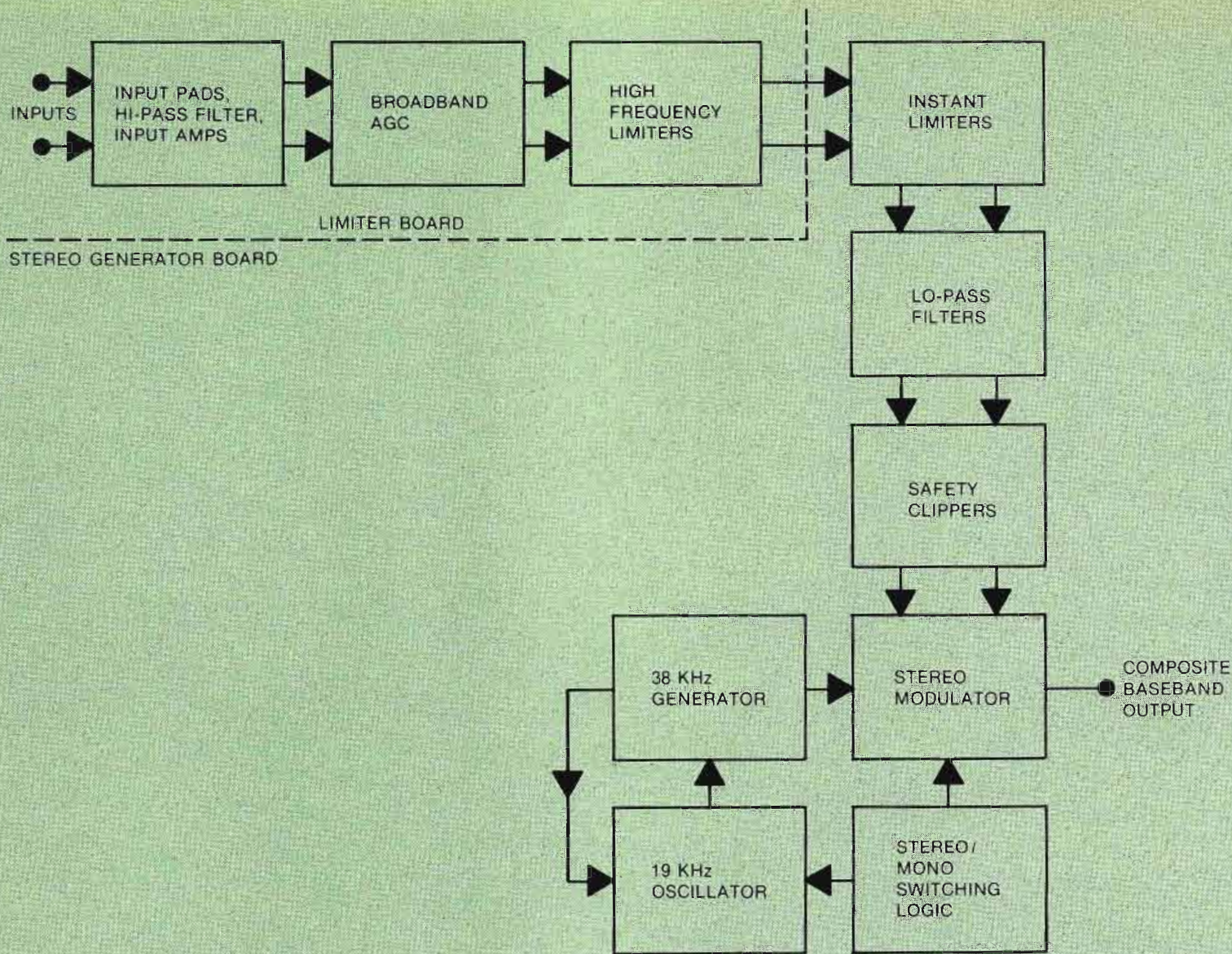


Figure 1. This is a simplified block diagram of the Optimod system.

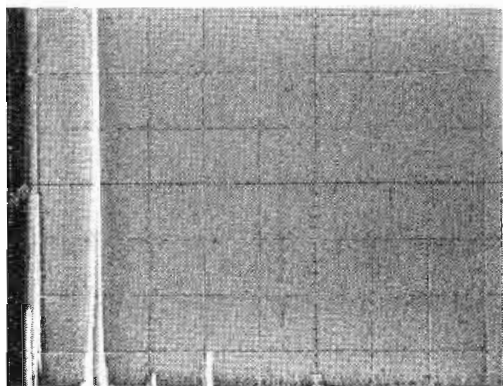


Figure 2. Harmonic distortion at 1 kHz without de-emphasis. Corrected for 75 μ sec curve, 0.014%. (Scale is 10 dB and 1 kHz/div.)

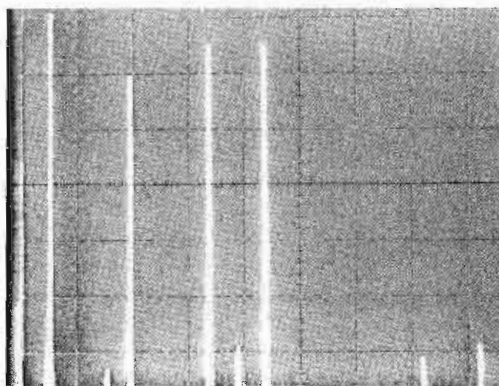


Figure 3. Composite output with 5 kHz left only audio input. Scale here is 10 dB and 10 kHz/div. 38 kHz is suppressed about 55 dB in this photo.

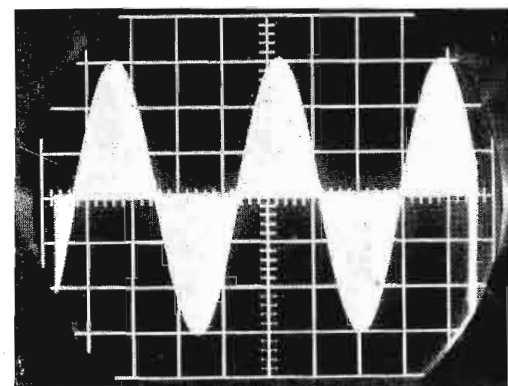


Figure 4. Composite output with left only input and 19 kHz pilot removed. Note the flat baseline. The unit was tested as shipped, and no adjustments were made. When this view was expanded, it showed better than 50 dB separation.

The Orban Optimod

(Continued)

The Optimod's designers have determined that 10 dB of compression is optimum for broadcast, as any further squashing produces very little increase in average level. The Optimod's processing circuits, therefore, have been designed to provide the least audible control of the input signal up to 15 dB of compression. If this value is ex-

ceeded by much, an overload light signals possible audio degradation.

The AGC circuit itself is rather interesting as it employs an IC op amp whose input attenuation is controlled by an FET. The FET is operated at a relatively low audio level and is very well linearized for exceptionally low distortion. The

output of the op amp is sampled by a comparator which drives the FET through a complex variable release time circuit, which is the key to its subtle inaudibility.

The high frequency limiters are similar to the broadband AGC, except that variable pre-emphasis is

Continued...

what, no light?

try the FUJINON 6mm f/1.4
(70° 36' superwide angle)
it stays in focus, from 6" to infinity

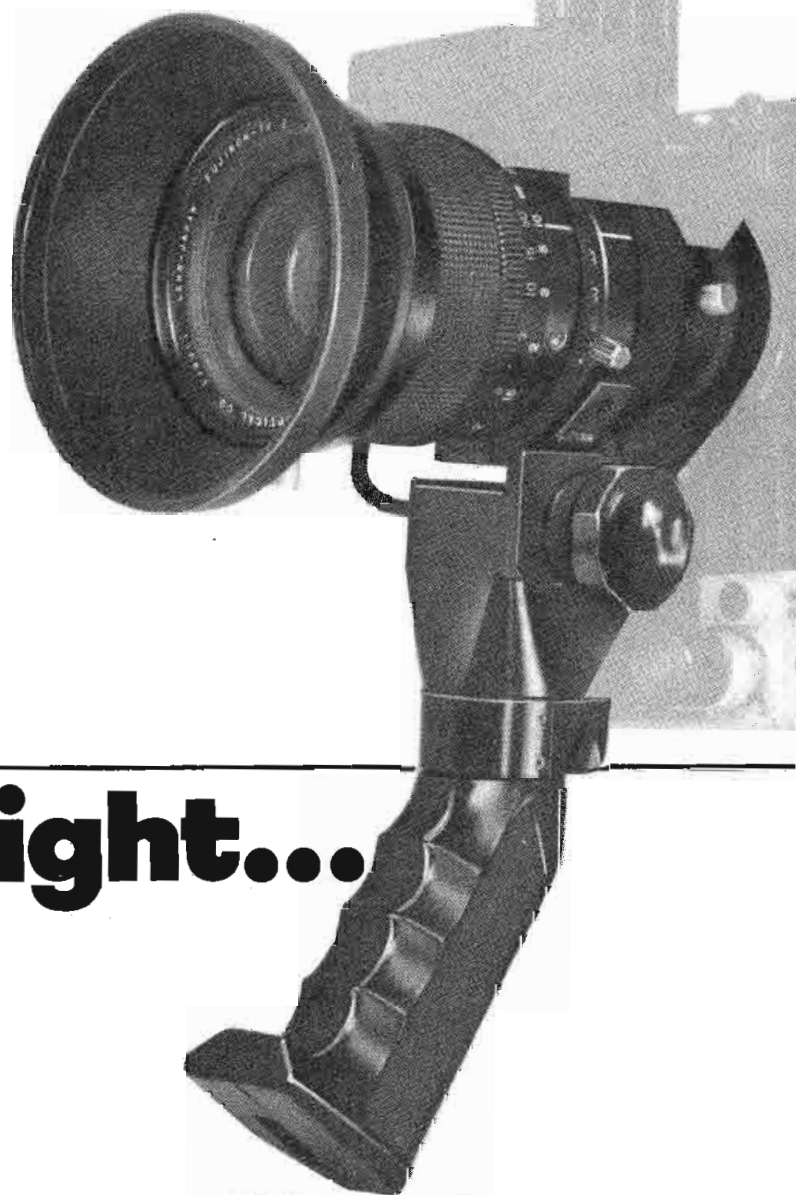
—OR—

the FUJINON A 7x9 f/1.4
(52° with *E.B.C.)
(9-63mm)

some light...

try the FUJINON
12x9 f/1.7
(9-108mm)

with macro focus,
adjustable back focus,
3 way servo zoom,
31" close focus,
remote focus,
lightweight (3 lbs),
*E.B.C.



a little more light...

try the FUJINON
14x10 f/1.9
BUILT IN 2X EXTENDER
(10-140mm)

with extender (20-280mm)

equivalent to 544mm on a 1 1/4" format

with macro focus, adjustable back focus, 3 way servo zoom,
31" close focus, lightweight (4 lbs), remote focus, * E.B.C.

* (Electron Beam Coating)

If there is a story in the field
we can cover it for you

FUJINON

FUJINON OPTICAL INC., 672 White Plains Road, Scarsdale, N.Y. 10583 • 914-472-9800

For More Details Circle (90) on Reply Card

What do these Stations know that you don't about Vendor Searching?

WANO . WAYB . WBEY . WBGY . WBPZ . WBTC .
 WCHB . WCOS . WDIZ . WBAY-TV . WELW . WENK .
 WGSO . WHBY . WHCO . WHIP . WHUS . WNAC-TV
 WKNE . WKNT . WKOP . WKPM . WKWZ . WKYO .
 WMSR . WNAS . WNIU . WNKO . WODY . WOPR . WOTT . WPMB . WPRB . WPUB .
 WQTX . WQUH . WQYK . WBTB-TV . WRSA . WSMW . WSSY . WTHR . WTIM .
 WTNK . WTSC . WUAT . WVHI . WVTC . WWJC . WWNC . WWNY . KCID .
 KDEA . KCRG . KCSU . KDRS . KDUN . KDVC . KEDO . KEZX . KFDR .
 KFRO . KGEE . KHFM . KHUB . KHYM . KIKN . KLAD . KLCB . KLCC . KLIF .
 KLPI . KLSN . KLVL . KMMT . KOLJ . KORE . KPGY . KRWS . KSJO . KSOM .
 KUBA-KHEX . KUTI . WAVY-TV . WKLS . WGNS . WGSN . KDLU-TV
 WMBS . KID-TV . WKLS . KCLU . KFOR . WANO . WAYB . WBEY .
 WBGY . WBPZ . WBTC . WBTX . WCAU . WCCR . WCHA . WIIS .
 WCHB . WCOS . WDIZ . WDOE . WELW . WENK . WETS . WGLI
 WHBY . WHCO . WHIP . . WGNS .
 WKPM . KUDO-TV

**They've
discovered IMAS,
the only FREE buyers' service!**

Everytime you're calling or writing for bids on electrical or electronic equipment ... from tubes to transmitters ... CALL IMAS. When your need is current and well-defined, IMAS increases your options ... and more options mean you get the best deal possible! From a standard re-order purchase to a problem new or hard-to-find purchase ... IMAS can only help!

- Find new sources • Pinpoint the best price performing products by direct comparison of specs and costs • Control costs by matching vendor capabilities with your needs • Save time searching for vendors.

IMAS is completely computerized ... so let us help you regularly in your product search. PUT IMAS ON YOUR BID LIST. Your purchasing requirements will be automatically fed into our system and efficiently dispersed to hundreds of IMAS subscribers across the country.

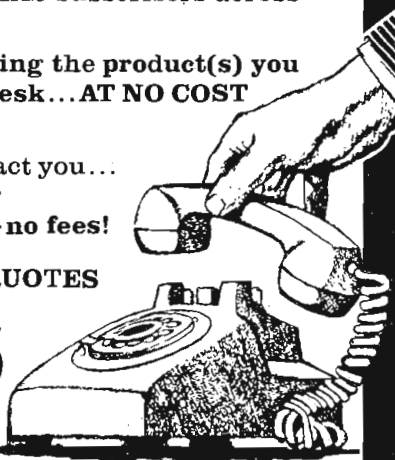
Every IMAS subscriber capable of supplying the product(s) you need will find your requirements on his desk... AT NO COST OR OBLIGATION TO YOU.

From that point on, the suppliers will contact you... IMAS does not get involved in the selling procedure in any way—no commissions—no fees!

**SEND YOUR REQUESTS FOR BIDS OR QUOTES
BY MAIL OR**

CALL TOLL FREE 800-336-3045

In Virginia, 800-572-3025



CALL NOW ... our lines are open at all times!

Join the ever-growing list of organizations using IMAS Buyers' Service!

**industrial marketing
advisory services, inc.**

2425 Wilson Boulevard, Arlington, Virginia 22201

A NEW PERSPECTIVE IN MARKETPLACE EFFICIENCY!

The Orban Optimod

(Continued)

applied to the signal as levels and frequencies demand. The parameters of the high frequency limiters, like the broadband AGC, were based on hundreds of hours of listening tests to obtain the least audible action, and as we saw later in the listening tests (or should we say heard) the high frequency response is amazing considering the average level attained.

Out of the high frequency limiter the audio is passed through a temperature compensated instantaneous limiter using biased Schottky diodes in a shunt clipper circuit. Next come the active low-pass filters which protect the stereo pilot from supersonic audio components and prevent distortion causing "aliasing" which occurs when supersonic components fail to be properly encoded due to the relatively low stereo subcarrier frequency of 38 kHz: sort of like trying to modulate your 1000 kHz AM rig with a 1400 or 1500 kHz tone. The active filter circuitry utilized in the Optimod, however, is designed to provide the required protection with only two percent overshoot, which eliminates the erratic peak action that has plagued FM broadcasters for decades.

After final limiting by a safety clipper circuit to remove any slight overshoot that might occur, the audio is now fed into the stereo generator which uses a "Gilbert linearized" transductance multiplier.

In the final test data that accompanied the Optimod that we used for the tests, the factory noted that a Tektronix 5L4N Spectrum Analyzer had been used for the tests. Fortunately, we had the same instrument on hand, which gave us an excellent opportunity to duplicate the manufacturer's test set-up very closely. It would be a very interesting test indeed, as all of the factory's distortion figures were below 0.1 percent with midrange values down near 0.01 percent! The factory tests were made in the normal operating mode with 5 dB of gain reduction, conditions which we duplicated for our spot checks.

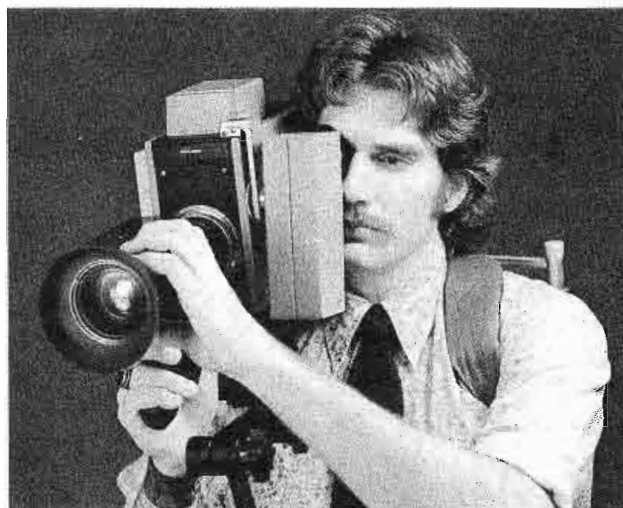
Our test results, which are re-

Continued...

Now Hitachi Covers The News...



Hitachi FP3030



Hitachi SK-70

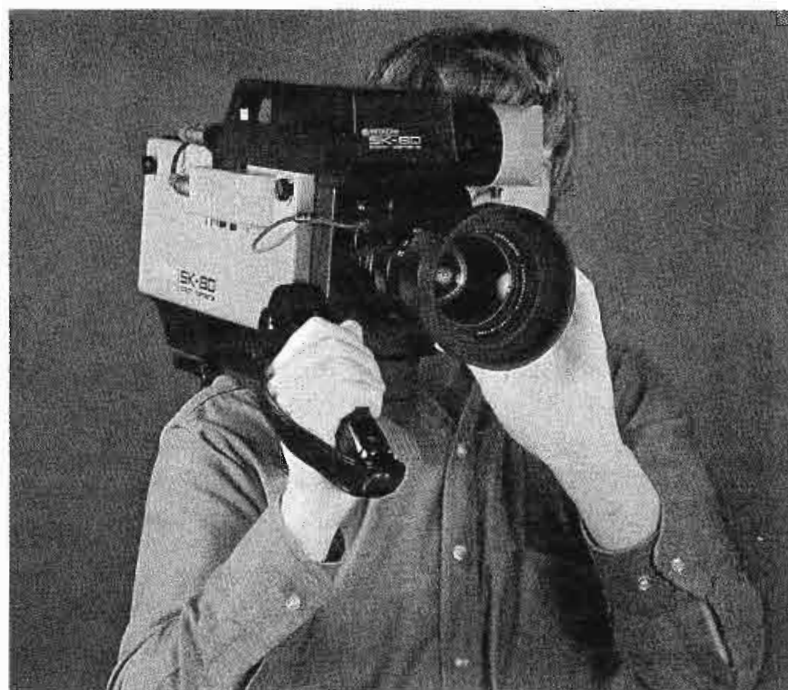
Three Different Ways

The addition of the new Hitachi SK-80 camera to our existing line, now gives you three top performance Hitachi ENG cameras to choose from. Each camera also has the versatility to be applied to other non-ENG operations.

Hitachi FP3030 A low cost and lightweight (7.7 lbs.) completely self-contained portable color camera with built-in battery that is ideal for broadcast capability in ENG, as well as a variety of industrial applications. The FP3030 also features excellent colorimetry and sensitivity with registration-free tri-electrode single tube.

Hitachi SK-70 A modular system camera that can be converted easily from studio to portable use with superior broadcast performance in either mode. Digital command control unit is also available. The SK-70 is many cameras in one!

Hitachi SK-80 Totally self-contained ENG camera whose exceptional design and features are sure to be appreciated by broadcasters. Features three 2/3" Saticon tubes. Optional Gen-Lock available, as well as many other fine built-in features.



Hitachi SK-80

To get the complete scoop on ENG cameras, contact your Hitachi dealer today. And find out how much **more camera** Hitachi gives you for the price!



HITACHI
Hitachi Denshi America, Ltd.
FORMERLY HITACHI SHIBADEN CORP OF AMERICA

Executive Offices: 58-25 Brooklyn-Queens Expressway, Woodside, N.Y. 11377 (212) 898-1261
Offices in: Chicago (312) 344-4020 • Los Angeles (213) 328-2110 • Dallas (214) 233-7623 • Atlanta (404) 451-9453
NAB Show, Booth No. 228, Sheraton



VIDEO TEST FILM...

NEW TEST FILM AND SLIDES FOR PRECISION TELECINE ALIGNMENT

- MT Multitest—A pattern of neutral grays and colors available in 16 mm film loop or slide.
- TA2—Five-step crossed gray scale slide, 2.5 power law.
- CB2 Color Bar slide—six colors plus white, colors designed to fall on vectorscope radials.

MT, TA2 and CB2 have a mid gray (60 IRE) surround to the active area and have the same spectral characteristics as the majority of programming material.

- DM—Depth of Modulation slide.
- TC—General Purpose Test Chart incorporating registration, centering, focus and safe title patterns.
- FT Flare Test slide—instantly shows the existence of optical flare.

The above patterns are available in 3 1/4" x 4" and 35mm slide sizes.

All DSC test materials are computer calibrated to an accuracy of ±1 IRE unit. May be purchased or leased.

DSC also has a complete line of 8" x 10" test slides for studio camera alignment.

Since 1965, DSC has been supplying precision test materials to the television community. For additional information, please telephone or write:



D and S Corley Limited
80 Galaxy Boulevard, Unit 3,
Rexdale, Ontario, Canada, M9W 4Y8
Telephone: (416) 678-0511

For More Details Circle (93) on Reply Card

One of the Largest! One of the Best!

for NEW and USED

broadcast equipment



AKG
AMPRO
ATLAS
AUDIOLAB
AMPEX
AUDIOPAK
BEUCART
EUGEN BEYER
CABLEWAVE SYSTEMS
CROWN INTERNATIONAL

DBX
ELECTRO VOICE
LPB
McMARTIN
MICROPROBE
NORTONICS
OTARI
ORBAN
PHELPS-DODGE
PULSE DYNAMICS

QRK TURNTABLES
RAMKO RESEARCH
REVOX
RUSSCO
SCULLY
SHURE
SPOTMASTER
STEVENS ON INTERFACE
UREI
UTAH
VECA



CALL US TODAY...IT'S GOOD BUSINESS

For More Details Circle (94) on Reply Card

The Orban Optimod

(Continued)

corded photographically in Figure 2, showed 0.014 percent harmonic distortion at 1 kHz when the ratio of the harmonics to the fundamental were corrected for standard 75 μ sec. de-emphasis; exactly what the factory test sheet said and very close to the residual distortion of our signal source.

While we could have run our audio generator through a 1 kHz tuned circuit to remove its harmonic content, it seems a moot point when you're looking at figures in the 0.01 percent range. The output, by the way, was sampled at the composite output of the Optimod, so these figures are for the whole system, stereo generator included.

Figure 3 is a look at the composite output with a 5 kHz left channel input signal. Once again, correcting for de-emphasis, the audio harmonics can be seen down there well below 0.1 percent. 38 kHz suppression can be seen exceeding 50 dB, 76 kHz not visible at all and 76 kHz sidebands down about 70 dB. Frequency response was checked using the Low Frequency Spectrum Analyzer in conjunction with its tracking generator, and it was within a fraction of a dB from 50 to 15,000 Hz.

Stereo separation was found to be 56 dB at 400 Hz with the factory data showing 50 dB or less and 50 dB at 15 kHz, which equaled the factory data exactly. Figure 4 shows the composite output with the pilot off. Note the flat baseline. The factory said that the pilot frequency was $-.48$ Hz from the ideal 19,000 and we measured $-.50$ with our counter.

All in all, the Optimod really did live up to its specs. We were anxious to get into the operational part of our review and find out what the unit could do with a program input and what it sounded like on the air connected to a typical transmission system.

For the actual operational checks we were interested in several factors. First of all, how is it built? The unit is a very high density package. It's easy to service, though, because of the way it's laid out. What you can't see from the

Continued...

...at NAB get the feel of a REAL switcher... the incomparable CD-480



Booth 104 Sheraton Park

For More Details Circle (95) on Reply Card



CENTRAL DYNAMICS LTD

CANADA

Montreal
147 Hymus Blvd.,
Montreal, Quebec H9R 1G1
Phone—514-697-0811
TWX—610 422 3906

U.S.A.

New York City
230 Livingston Street,
Northvale, NJ 07647
Phone—201-767-1300
TWX—710 991 9753

Chicago

331 West Northwest Highway,
Palatine, IL 60067
Phone—312-991-4720
TWX—910 693 4805

Los Angeles

15130 Ventura Blvd.—Suite 307,
Sherman Oaks, CA 91403
Phone—213-789-0574
TWX—910 495 1713



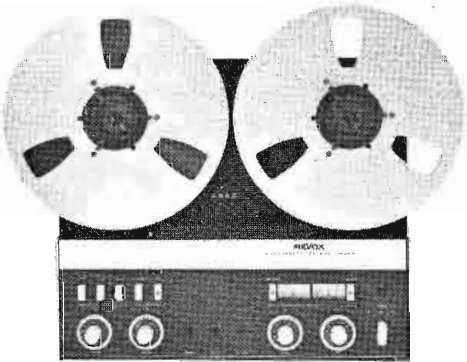
**saves you time
and money**

Check us for best cash discounts
in broadcast components



SCULLY 280-B

American made - reliable
A/C or servo capstan



REVOX A-77 MK IV

Economy - D/C servo drive



OTARI MX 5050

A/C or servo drive
Various head track options

For a complete line of brand name accessories
and the best pricing available

(215)437-0607



Communication Medias
Broadcast Component
Distributors

P.O. Box 54/Allentown, Pa. 18105

The Orban Optimod

(Continued)

photo is the quality of components. Many parts are military grade and important adjustments like the composite output control are multi-turn pots. The inputs are very well shielded and filtered against RF.

The front panel meter can be switched to monitor just about anything you might want to monitor, including audio input levels and gain reduction. At proof time the test switch defeats all limiters and controls and provides up to 10 dB of headroom so that a proof can be accomplished without re-adjusting the output levels. A front panel release time control provides the user with some degree of control over the control characteristics but not so much range that you could really make it sound bad.

If the input levels are adjusted so that the meter reads normal deflection to full scale with a program input, an average of about 8 to 10 dB of gain reduction will be taking place, a value that the Orban people have found to produce an optimum balance between dynamic range and average modulation level.

The user is free to tailor his own sound, however, by experimenting with different combinations of input levels and release times. An engineer interested in full dynamics and the ultimate in fidelity could operate the unit with lower input levels and the slowest release time. On the other hand, an engineer interested in a really high average modulation level at all times would choose normal meter deflection when monitoring the input and a faster recovery time, thus increasing the density of the audio signal.

The Optimod was mated with a Harris FM20 H3 transmitter, chosen because it currently is in wide use and therefore representative of the type of equipment that you're likely to operate the Optimod with. With many rigs, no interface is required, but the TE-3 exciter in the Harris requires a matching unit that is normally used for hooking a composite STL to the modulated oscillator input. The whole installation only takes a few minutes and once on the air, the pilot and composite output level adjustments are a statement of the

obvious.

The first thing that is likely to impress a new user is the lack of peak flasher activity for a given modulation level. If the output is gradually increased until the peaks are just hitting 100 percent, the average level is at 80 to 90 percent and yes, Virginia, there are no overshoots. The next departure from the expected is the high frequency response. Orban recommends not using any other processing gear ahead of the Optimod and so do we. The unit does a fine job all by itself, and any additional devices would only detract from the clean reproduction that it yields.

Even when operated with the input levels 7 or 8 dB below normal so that almost no gain reduction is produced in the broadband AGC, the clever design of the high frequency limiters allowed an unusually high average level with extremely good fidelity. The input source levels do, of course, have to be rather well-controlled when operating in this mode, but that is usually not too difficult with automated tape systems. Most stations would probably want to use the unit with normal input settings to take advantage of its automatic leveling and to gain an optimum average modulation level.

Next, an H.P. 8558 High Frequency Spectrum Analyzer was set up to measure the occupied bandwidth. Our test unit was fed easy listening program material, which is not notorious for causing modulation problems. We also checked a rock station in town that has an Optimod and in both cases we found the sides to be well within FCC limits.

The Optimod comes to its new home with a very comprehensive instruction manual and lots of explanation about how it works for the guy who wants to plan his own customized adjustments. At the same time it's simple enough to install and set up so that less adventurous persons can be assured of a good sound with a minimum of tweaking.

The stereo generator itself would probably be worth the price to many stations who have older units that just barely make minimum specs, or worse. For those stations, the processing features are a nice bonus. □

audiopak A-2
BY CAPITOL

The broadcasters' choice for reliable playback.



The Audiopak® A-2 by Capitol® Broadcast Cartridge.

Broadcast engineers rely on Audiopak® A-2 Cartridges for good reason. All of the major components are assembled to get you from point A to point B. With efficiency and precision. For example, the constant-force, foam pressure pad assures unvarying head to tape contact over the life of the cartridge. The positive, non-slip brake mechanism locks the tape, rather than the hub, assuring accurate cueing and timing. The strong durable housing is yet another factor contributing to its reliability.

And to assure you of premium performance, each cart is individually tested — 100% — for wow and flutter, electrical output, tension, and other properties. And because we manufacture the entire package — from tape to packaging — we can assure you of the highest possible quality control.

After all, no other tape manufacturer knows professional recording and duplicating needs better than Capitol.

AUDIOPAK® A PROFESSIONAL PRODUCT MANUFACTURED BY THE SAME PEOPLE WHO MAKE AUDIOTAPE®, AUDIOFILM™, AUDIODISCS® AND THE LEARNING TAPE™ BY CAPITOL®.

audiopak
BY CAPITOL



CAPITOL MAGNETIC PRODUCTS A DIVISION OF CAPITOL RECORDS, INC., 1750 NORTH VINE STREET, LOS ANGELES, CALIFORNIA 90028

For More Details Circle (97) on Reply Card

Table 1

V_{CC} = +5V

Boolean	Terminology	DTL-TTL Voltage Range* (Signal Voltage)	Lamps Lit (2-Light Indicator)	Lamp (Single Light)
"1"	HIGH	+2.4 V or more	HI	Bright
"0"	LOW	less than +0.7 V	Low	Off
	Bad Level	between +0.7 V and +2.4 V	Neither	Dim

* This voltage range may vary by a few tenths of a volt. Check your specific probe specifications.

Table 2 TRUTH TABLE FOR OPERATOR AND

Inputs		Output
A.	B.	
0	0	0
0	1	0
1	0	0
1	1	1

digital lab

DIGITAL TROUBLESHOOTING

By Harold Ennes

A logic gate is a black box that has an output dependent upon inputs for the particular type of logic to be performed. We will be concerned at this time only with DTL (diode-transistor logic) and TTL (transistor-to-transistor logic). Other "families" may use different voltage ranges. The 7400-series is TTL.

Signal levels are specified as either HIGH or LOW by boolean

notation. This simply means that a "high" is a 1, and a "low" is a 0. Study Table 1 and you will see the actual voltage ranges as indicated by two basic types of logic probes. The DC (V_{CC}) applied to the chip is normally +5 volts. When you use your scope, it should be operated on DC input, with ground level established.

The AND Operation

Figure 1 shows the pin number notation and block diagram of the

four individual AND circuits in the SN 7408 chip. We will use only one gate; pins 1 and 2 are the inputs, and pin 3 is the output. Note that pin 14 goes to +5 and pin 7 goes to ground. This must be established in all of the following operations; the +5 and ground is assumed connected.

Table 2 reviews for you the AND operation (truth table). Note that it very simply says that both inputs must be HIGH to obtain an output (HIGH). Zero is no output.

You normally will not be concerned with the internal schematic of a chip. A single chip can replace a fantastic number of transistors and resistors and other components. However, we will present Figure 2 which shows the equivalent schematic of just one gate in the 7408 chip, so that some of the following measurements will "make sense."

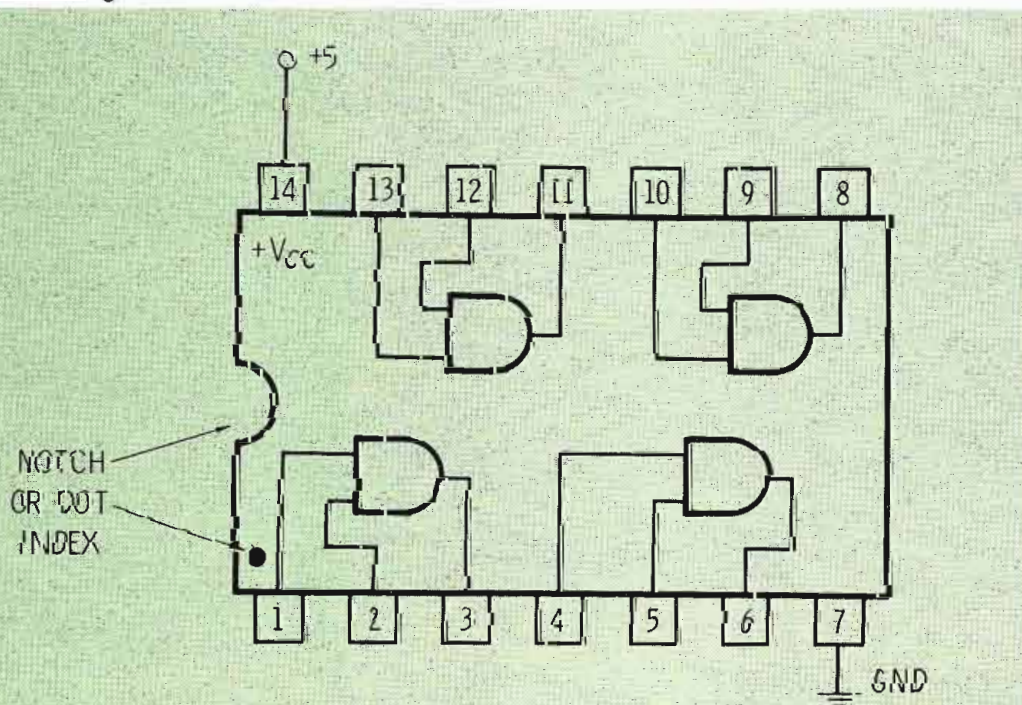
To measure DC voltage, use either the DC scope (calibrated) or the digital voltmeter.

Follow Through

STEP 1. See Figure 3A. With all pins open (except the +5 and ground pins), you will measure about +1.6 volts on pins 1 and 2, and about +4 volts on pin 3. All other **input** pins (4, 5, 9, 10, 12 and 13) will measure about +1.6 volts. All other **outputs** (pins 6, 8 and 11)

Continued...

Figure 1. The SN7408 quad two-input AND gate. The pin numbers are related to a top view of the chip. **Caution:** Always remove the voltage when inserting or removing an IC.



ARE YOU SATISFIED WITH YOUR REFURBISHED VIDEO HEADS?

Now you can get a better head for \$825!

Are you completely satisfied with the refurbished heads you're using now for your Ampex or RCA quad machines? Surprisingly enough, you might not be if you could inspect and test them as completely as we can, part-by-part, and tolerance for tolerance.

So what's the point? When it comes to the quality of our refurbished heads, we'll put our money where our mouth is. You pay \$895 the first time around, which is itself a full 20 to 25% below the competition. Then the price for that head drops to \$825 thereafter for the exact same refurbishing procedures you got the first time.

How do we do it? Fourth generation tooling and 18 years of experience let us give you a better product at a lower price. So, if you're not completely satisfied with your refurbished heads, send us one or a bunch and let us prove why we're better.

Incidentally, if you're interested in finding out the condition of the head you send in, ask us for an Original Condition Report. It may surprise you.



VIDEOMAGNETICS, INC.

General Office and Marketing
155 San Lazaro Avenue
Sunnyvale, California 94086
(408) 737-8300

In Southern California
Superior Video Services
(213) 786-7060

Studio and Operations
Front at Reagan Streets
Sunbury, Penn. 17801

In Texas and Oklahoma
BOB Associates
(214) 434-2145

For More Details Circle (98) on Reply Card

CM has
replacement
PARTS
in stock for all
Spotmaster
consoles,
cartridge machines
and accessories

Franchised Warranty & Repair
Station for Spotmaster

**same day
shipment**

Via Airmail Special, Bus,
United Parcel delivery

phone

215-437-0607

anytime—24 hours
a day

Call CM
for best buys on
broadcast components

... we're distributors for:
Scully, DBX, Revox, LPB,
Catel, Fidelipac, Russco, ROH,
Scotch, Otari, Stanton, Telex



Communication Medias

A Division Of The William Challenger Corp.

Broadcast Component
Distributors

P.O. Box 54/Allentown, Pa. 18105

For More Details Circle (99) on Reply Card

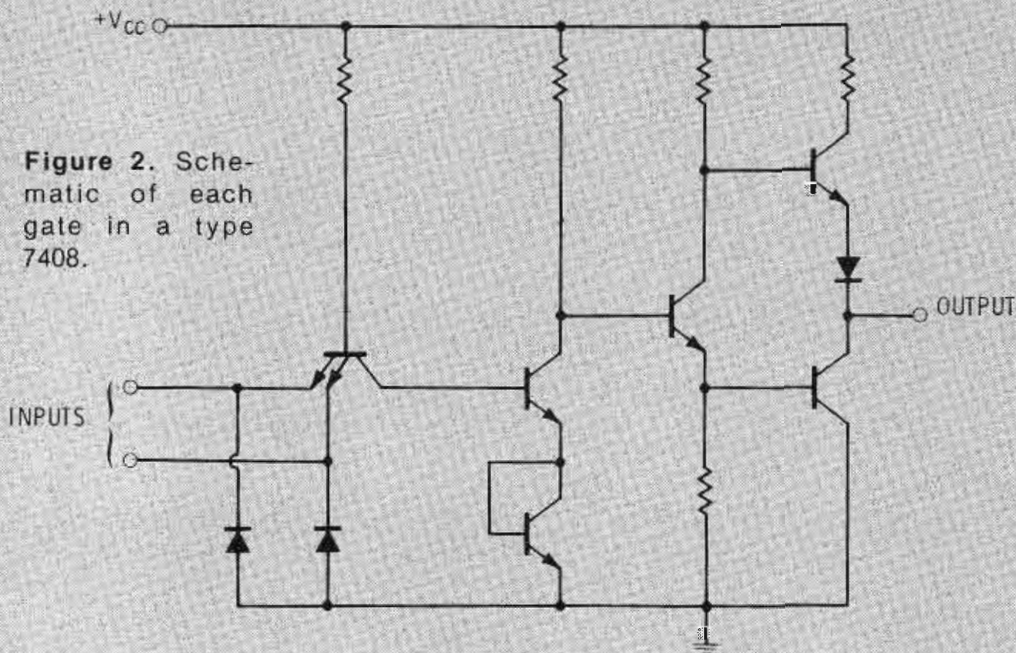


Figure 2. Schematic of each gate in a type 7408.

Digital Lab

(Continued)

will measure about +4 volts.

Look at the circuit of Figure 2 and you will see why these voltages exist, particularly in the input circuit. (The "totem-pole" output circuit will be discussed in Part 4). With both input pins floating, the dual-emitter input transistor is not conducting, and you will measure about +1.6 volts at the emitters from the +V_{cc} on the base. As you know from the truth table, if both inputs are positive (high or boolean

1) the output will be high. If **either** input is grounded (or less than +0.7 volt), the output will be low.

Several rules can now be established. Since the output is **HIGH**, **open input pins are interpreted as a high level**. Also, you will note that the output is +4 volts, or about 80 percent (or slightly less) of V_{cc}. **Rule**—If the output is +5 volts, you can be sure it is shorted to V_{cc} either internally or in the printed wiring. Conversely, if the output measures ground or 0, (with input pins greater than +2.4 v) you can be sure it is shorted to

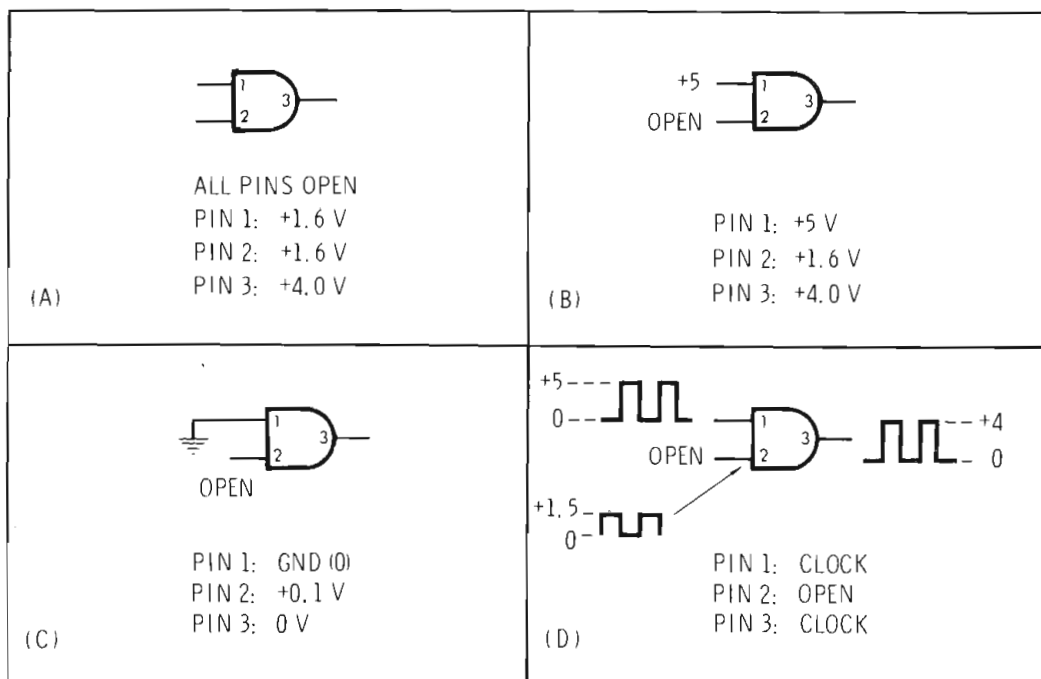


Figure 3.

TYPE SN7408

FIXED: PIN 14: +5 V
PIN 7: GROUND

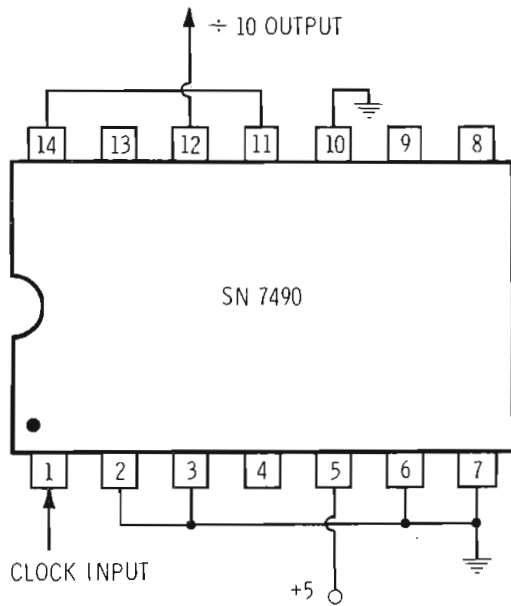


Figure 4. Connection of the SN7490 as a divide-by-ten operation.

ground either internally or externally (in the printed wiring or any connected component).

STEP 2. Now apply +5 to pin 1 leaving pin 2 open. (Figure 3B). You will still measure the +1.6 volts on pin 2, and +4 volts on pin 3. This again says that the open pin is interpreted as a high level. Note that this level is actually a **bad level** as indicated in Table 1. To insure that pin 2 is at boolean 0, this level must be **under** about +0.7 v (Table 1).

STEP 3. Now ground pin 1 (Figure 3C). Since the input transistor in Figure 2 is now conducting, pin 2 drops to about +0.1 volt. Since both inputs are now low, the output (pin 3) measures essentially 0 volts. Also, even if you apply +5 to pin 2 (with pin 1 grounded) the output would still be 0 volts because **both** inputs must be high to get an output. Try it.

STEP 4. Apply the clock waveform to pin 1 and leave pin 2 open (Figure 3D). The clock pulse usually switches between ground and +5 volts. In steps 2 and 3 (Figures 3B and 3C) you should note that pin 2 changed from +1.6v in (B) to +0.1v in (C). This was done by simply changing pin 1 from +5 to ground. Since the clock waveform is just a switch between ground and +5, you would expect a $1.6 - 0.1 = 1.5$ volt waveform at pin 2. This is just what you will observe at pin 2 on your scope. The output (pin 3) will now switch between ground and about +4 volts. Again, note that open pin

Continued...

TELE-PAT PRECISION TEST SLIDES PUT YOU RIGHT IN THE PICTURE

Whether you're a top network station or an independent videotape producer, the picture your viewers see must be clear, sharp and color-true. There's only one way to make sure—and that's to check and align your TV cameras regularly with Tele-Pat precision test pattern slides.

Tele-Measurements provides 17 different test patterns in two sizes. The 100 series slides are 2" x 2" in size, for film multiplexers and spot scanners. The 300 series are 8" x 10" for use with Tele-Pat test pattern illuminators. Series 200 and 400 are special color patterns, and series 500 are customer specified slides, available on special order.

All test slides are mounted in optical glass and are electronically accurate to $\pm 1\%$ of vertical and horizontal tolerances. Test patterns include:

TM-101 & TM-301 Resolution Slide (Retma). Standard reference for measuring resolution, testing for streaking, interlace, shading, scanning linearity, and aspect ratio. Horizontal and vertical wedges with 200 to 800 line resolution.

TM-102 & TM-302 Resolution/Extended Gray Scale. Same as TM-101 and TM-301, with the addition of four logarithmic gray scales for transfer characteristic testing.

TM-202 & TM-402 Color Fleshtone Slide. For overall color performance and set-up purpose.

TM-501 Station I.D. Color Slides. Supplied with your station call letters, channel, and location. Professional identification for local monochrome and color programming.

See us at Electro/77 Booth No.'s 731 & 733

For a complete list of Tele-Pat test pattern slides and illuminators, call or write

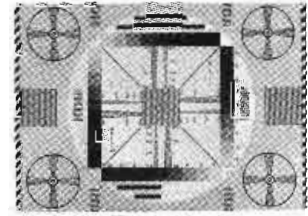


TELE-MEASUREMENTS INC.

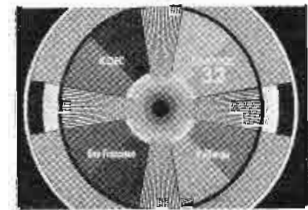
145 Main Avenue, Clifton, New Jersey 07014

(201) 473-8822

(212) 581-9020



TM 102

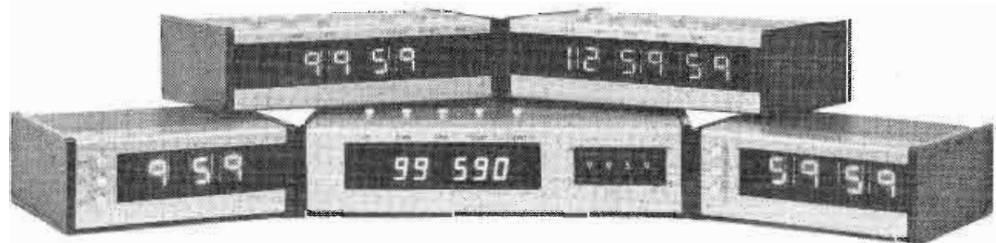


TM 501

For More Details Circle (156) on Reply Card

PERFECT TIMING

Low Cost ESE Right On Timers



- | | |
|--|----------|
| ES-300: Four digit incandescent display, one hundred minute timer (99:59) with six controls: Count Up, Count Down, Min-Set, Sec-Set, Stop, Reset. | \$180.00 |
| ES-301: Identical to ES-300 except with planar, gas discharge display. | \$198.00 |
| ES-302: Equivalent to ES-301 plus fast-set lever wheel programming. | \$254.00 |
| ES-400: Three digit ten minute timer (9:59) with Start, Stop, Reset. | \$105.00 |
| ES-510: Four digit sixty minute timer (59:59) with Start, Stop, Reset. | \$134.00 |
| ES-500: Six digit, twelve hour combination clock/timer with five controls: Start, Stop, Reset, Fast Advance, Slow Advance. | \$160.00 |

STANDARD OPTIONS AVAILABLE: Kit; Slave; BCD Output; Remote Connector; 6' Remote Cable and Pushbutton Set; 220V A.C., 50Hz; 9" or 19" Front Panel 3½" high; 3 Wire Cord and Molded Plug. Tenths of seconds are available on all timers except the ES-500. Relay Contact Closure at Zero and/or Stop at Zero available on ES-300, 301, and 302. Crystal Timebase available for ES-500. Custom options and special orders available.

WRITE, WIRE OR CALL TODAY

505½ Centinela Avenue

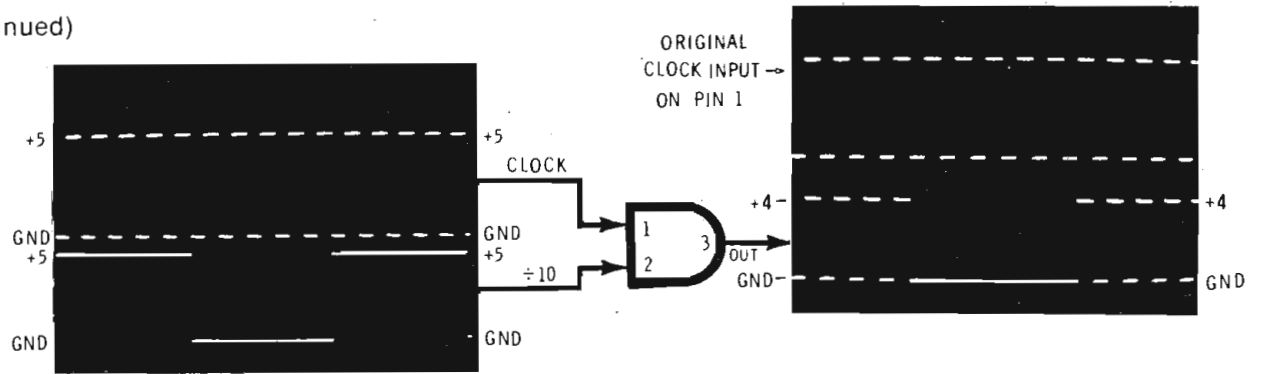
Inglewood, California 90302

(213) 674-3021

ESE

For More Details Circle (157) on Reply Card

Figure 5. The clock input on pin 1 is gated by the divide-by-ten waveform on pin 2.



2 is interpreted as a high level, and the output will depend strictly on the pin 1 input level.

Why It's Called A Gate

If, in Figure 3D, you ground pin 2, no clock pulse will appear at the output. This agrees with the truth table. The IC therefore can be called a **gate**; it is open when pin 2 is high (or even a "bad level") to allow clock pulses to pass through; it is closed to the clock pulses if pin 2 is low (below 0.7v).

STEP 5. Connect your SN7490 as a divide-by-ten counter as indicated by Figure 4. Leave this connected

on your board as it will be used later. The output should be as indicated to pin 2 of Figure 5. Note that there is one cycle (a positive and a negative pulse) for every ten clock pulses. Thus the duration of the divide-by-ten pulse is positive over a 5-pulse clock period, and negative over the alternate 5-pulse clock. **Note:** there are actually 10 clock cycles in each period of the divided pulse, but in digital parlance, we assign a "1" to a positive level and a "0" to a low level. So there are five "ones" in each period. In electronic parlance, a "1" is a pulse, a "0" is no pulse.

STEP 6. As in Figure 5, apply

the clock pulse to pin 1 and the divided clock pulse to pin 2. The output at pin 3 shows the **gating characteristic** of the AND circuit. When the divided pulse is positive, the clock pulses are passed (gate is open). When the divided pulse is ground, the gate is closed and no clock pulses are passed. Again, this agrees with the truth table for the operator AND.

We will meet again next month with the operator NAND, OR and NOR. In the meantime, repeat the steps in this section until you get a good comprehension of the results, using your scope, logic probe and voltmeter. □

Come in for a closer look at the people and the systems that have everyone talking. You'll agree that one of our systems belongs in your station.

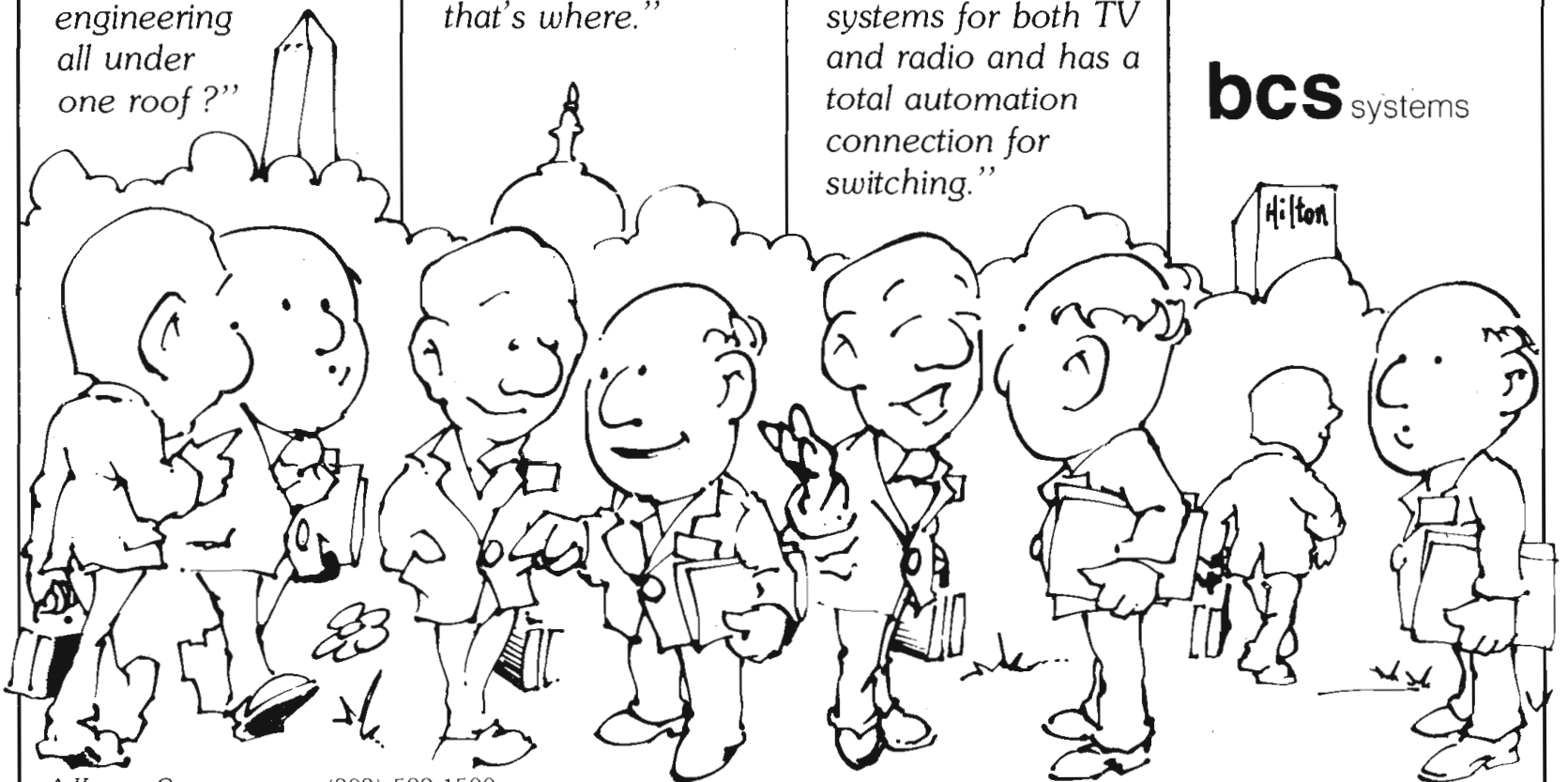
"Where at NAB can I find TV, radio and engineering all under one roof?"

"At BCS, booth 425, in the Hilton, that's where."

"Of course. Only BCS has traffic systems for both TV and radio and has a total automation connection for switching."

"He's asking me?"

bcs systems



A Kaman Company (303) 599-1500

Kaman Sciences Corporation 1500 Garden of The Gods Road Colorado Springs, Colorado 80907

It's a very good year...



to buy Belar.

There were always lots of good reasons to buy Belar . . . now we can give you many more. Like our new automatic Stereo Monitor, shown above.

We're introducing a line of new products that will set new standards of performance in broadcast monitoring. Each piece of equipment has been Belar-engineered to remain state-of-the-art for years to come. And, of course, our monitoring systems are suitable for ATS.

Check our new equipment and see why we say this is a vintage year. Buy Belar today . . . in ten years, you'll still be thanking yourself.

- Our new **FM Modulation Monitor** features a sample-hold and absolute magnitude peak detector circuit to capture and display all the program peaks on the modulation meter.
- Our new **Digital FM Modulation Monitor** features a continuous LED display to instantaneously indicate program peaks.
- Our new **Stereo Monitor** features two sensitive auto-ranging voltmeters for simplified automatic measurement of stereo separation and crosstalk.
- Our new **SCA Monitor** features an auto-ranging voltmeter for simplified SCA measurements.
- Our new **Digital FM Frequency Monitor** includes off-frequency alarms for carrier, 19 kHz pilot, and SCA frequencies.
- Our new **FM RF Amplifier** maintains full stereo performance with the ability to select any channel.
- Our new **Digital Clock** provides the necessary timing function for ATS.
- Our **AMM-2 AM Modulation Monitor** features three peak lights and outputs for ATS modulation control.
- Our **AMM-3 AM Modulation Monitor** features separate meters and four peak lights for negative and positive modulation, and also includes outputs for ATS modulation control.
- Our new **AM Frequency Monitor** includes ± 10 Hz and ± 20 Hz off-frequency alarms, and a loss-of-count alarm.
- Our new **AM RF Amplifier System** permits reliable monitoring with our new shielded loop in a field of 50 microvolts per meter.
- Our new **Automatic Power Controller** provides power correction and alarms for ATS.
- Our new **Mod-Minder** provides automatic modulation control and alarms for ATS.
- Our new **Status Alarm System** starts with two statuses and can be expanded to over 900 statuses.



BELAR ELECTRONICS LABORATORY, INC.

LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 826 • (215) 687-5550

When Accuracy Counts . . . Count on Belar

March, 1977

For More Details Circle (159) on Reply Card

123

SMPTE Handles The Hot Issues

By Joe Roizen

It would be hard to say if the unqualified success of the recent Winter Conference was due to the highly topical nature of its three themes (Beyond ENG, Digital Television, One-Inch VTR's), or simply because the seasonably comfortable climate indigenous to San Francisco attracted so many members away from the Arctic fallout that enveloped everything east of the Rockies.

Whatever the reason, and it may have been a combination of the two, Charles Anderson, conference chairman, reported that over 950 attendees, of whom there were over 750 paying registrants, not only provided SRO audiences for the technical sessions and gratified the more than 30 exhibitors on hand, but also swelled the cash and membership registers of the Society.

The technical sessions were divided into orderly progressions which on the first day worked their way through a series of papers related to the future role of ENG equipment in non-news gathering applications. At the end of these papers, a panel was convened to generate a dialogue between manufacturers, users, and the audience on the important question of the new one-inch helical video tape recorders being offered to broadcasters as alternate or replacement machines for quadruplex VTR's.

On the following day a similar range of papers of consecutively increasing complexity covered the major aspects of digital television in a manner that catered to both the neophyte and expert in this burgeoning field.

The importance of this conference was manifest in the very wide range of attendees from all over North America and several foreign countries. There were representatives of all major networks in the U.S. and Canada in evidence, the BBC and the IBA sent delegations

and individuals from France, Germany, Sweden, Japan, etc. representing either the national network or major manufacturers, all in all, a good turnout for a technically satisfying and socially gratifying SMPTE event.

Beyond ENG

The Conference opened with a welcome to the packed hall by Frank Flemming of NBC, the Society's Vice President for Television Affairs. The application of portable ENG equipment and its studio interfacing counterparts to fast-breaking news is sufficiently widespread at the present time to be considered an established form of operation. Credited with spearheading the drive in this direction and having also collected a technical Emmy on behalf of his network for pioneering ENG, it was appropriate that the lead speaker at this session be Joseph Flaherty, Vice President and General Manager of Engineering and Development at CBS.

Flaherty put on a convincing presentation which showed the steady growth of tape-oriented program production as compared with film. In the past three years, according to one of his charts, the split between tape and film has reversed itself, going from a 50/20 ratio in favor of film in 1973 to a 70/30 ratio for tape in 1976. Quoting an article by Ron Whittaker in **Broadcast Engineering** titled "ENG: TV News Will Never Be The Same," Flaherty emphasized that the trend toward more electronic coverage is irreversible and insisted there will be a commensurate growth in other areas of TV production that will take advantage of these new portable television gadgets to further diminish film usage.

Flaherty divided the "Beyond

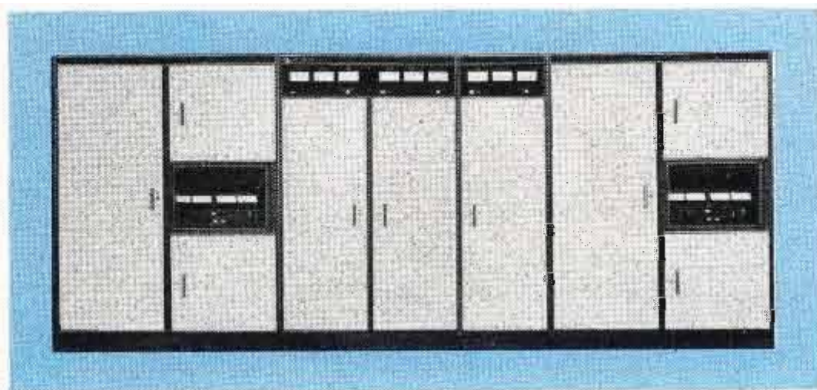
ENG" applications into two categories; local and national. On the local scene he predicted the ENG gear will also be used by enterprising stations and independent producers to shoot documentaries, do community-oriented programming, and produce low budget commercials for spot clients. On the national front, the same gender of equipment for perhaps the more expensive versions will also be used for documentaries, on-location commercials, and general entertainment programs that require field acquisition material. Some examples of this kind of programming were shown to the audience and certainly proved the points being made by the speaker.

Perhaps the most impressive demonstration by Flaherty was in the domain of the application of one-inch helical VTR's to originate program production of sitcom-type weekly shows now shot on film. CBS experimented with the currently popular Bob Newhart and Phyllis shows which are done on 35 mm color film. For this experiment the setup included parallel 35 mm movie cameras, Thomson-CSF 1515 triaxial studio cameras and Thomson Labs Microcams.

Consecutive sequences of the same images made by each of the three camera setups were replayed from Sony BVH 1000 recorders and there was virtually no visible differences on the color monitor screens between the three different originations. Both electronic cameras showed slightly higher chroma saturation than the film take, and high contrast exterior scenes with vertical fine detail (a second story bannister on a street scene) exhibited some moire or strobing typical of TV cameras, and similar to what we often see when Johnny Carson wears one of his pinstripe jackets for his monologue.

Continued...

12 kW VHF TV TRANSMITTER ELIMINATES THE NEED FOR STANDBY UNIT



Acrodyne's 12 kW transmitter utilizes two hybrid combined but totally independent transmitter assemblies to achieve 12 kW output.

Two vacuum tubes are used in each visual amplifier chain and one vacuum tube is in each aural chain. All other circuitry is solid state.

Low level IF modulation is utilized to insure performance stability at the highest possible levels of program quality.

Automatic failure sensing and modulator switching along with the inherent qualities of hybrid combined power amplifiers insure continued broadcast service in the event of any single component failure or equipment malfunction. The equipment is configured to permit maintenance personnel to work with complete safety on one-half of the transmitter while the other half is in operation. One half of this new machine, rated at 6 kW, will be on display for inspection at the NAB.

5 kW INTERNALLY DIPLEXED TRANSMITTER SCHEDULED FOR SPRING INSTALLATION

Acrodyne has announced delivery of an internally diplexed 5 kW television transmitter for mid-spring 1977. The unit stresses low cost and reliability.

The transmitter features 100% built-in redundancy. Along with internal diplexing, it is designed with IF modulation, allowing the optimum in video performance while dramatically minimizing circuit components and complexity. It has the reliability feature of completely independent field-proven amplifier chains and independent dual modulator/exciter. These allow automatic uninterrupted operation in the event of failure of any power supply or amplifier stage. The 5 kW is also low in both original cost and maintenance.

NEW DATA

New data sheets are now available on the following:

- Television Translators—complete line
- Television Transmitters—5 kW; 6 kW; 12 kW
- Weatherproof Enclosure System

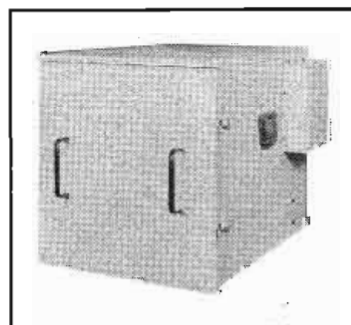
TRANSMISSIONS AND TRANSLATIONS

CANADA: Acrodyne transmitters in Canada approach the 100 unit mark in less than two years. Ranging in power levels from 10 watts to 1 kilowatt, the units are operating with an excellent record of reliability. The 100 unit mark will be shattered with the completion of 30 additional installations scheduled for spring 1977.

ALASKA: In Alaska, mini-TV's continue their fast sales pace. 20 additional Acrodyne mini-TV installations are in process.

NEW YORK STATE: Two new BOCES translator systems—**Steuben/Allegany:** Sixteen Acrodyne Translators, power levels from 1 watt to 100 watts. The system receives the primary Channel 46 feed signal through a 2.1 GHz translator relay. 100% factory testing, installation and on-site inspection was carried out by BOCES officials and consultants.

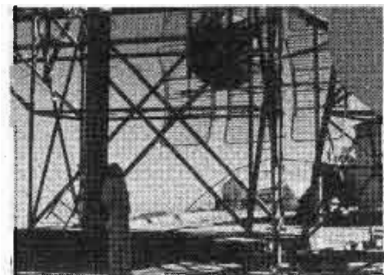
Cayuga BOCES: On the Air with 10 watt solid state Acrodyne UHF translators and reporting 100% reception



by all schools with the added benefit of public TV in the translator areas. These translators utilize the new Acrodyne pole-mounted Weatherproof Enclosure System (photo) which eliminates building requirements and reduces site development costs.

WCNY; Syracuse uses a 100 watt and a 1 kilowatt UHF translator to meet critical requirements for flexibility and future programming.

NEVADA: Five series T-200 V/U 100 watt translators solve Pahrump Valley viewing ... 3 series T-130B V/U 100 watt translators on Angels Peak—plus nine additional translators to cover Nye County through Communications Engineering, Inc.



ELSEWHERE: Nineteen 250 watt and 500 watt CCIR Pal-B transmitters have been installed and turned on by Page Communications Engineers, Inc. for Sudan. New international orders include twenty five 100 watt and 200 watt CCIR Pal-B translators for a Mediterranean installation and 30 VHF and UHF transmitters for a Central African broadcast application.

SMPTÉ

(Continued)

To prove the editing and multi-generation capability of the Sony BVH 1000, Flaherty ran a program tape of a brightly lit scene involving a musical number and speculars from reflecting instruments. The second generation was excellent and looked like a good quad reproduction. Surprisingly, the 12th generation shown right after was also an acceptable broadcast quality on a subjective evaluation basis. Flaherty assured his audience that these

tests were rigorously made, with the multiple generations produced on a machine interchange basis, thus verifying the compatibility of the one-inch format on a multiple machine arrangement.

Perhaps the most significant comment by the CBS Engineering Vice President as far as future television production is concerned, was his statement that upon ratification by IATSE, CBS will provide Sony recorders to production houses that do some of the network's outside programs. The program tapes in the one-inch format can then be

post-production edited either by transfer to quads or on other BVH 1000s equipped with editing accessories. The distribution copy of the master program tape can then be made from the Sony format to whatever is necessary for the recipient TV network or independent studio.

Dr. Boris Townsend of the Independent Broadcasting Authority in the U.K. (the commercial network) was both witty and informative about the progress of ENG in Great Britain. His message was that, while they are beginning to experiment with portable equipment, these techniques are hampered somewhat in England by the fact that the PAL color system demands better portable VTR's than NTSC does. This is due to the wider bandwidth (5 MHz and higher color subcarrier (4.43 MHz). Nevertheless, Dr. Townsend felt the spread of ENG overseas will parallel that which has occurred in the USA as the proper equipment is developed.

A following paper by Uno Nilsson of Swedish Broadcasting reflected some of the previous speakers' remarks in its description of some ELD experiments that proved disappointing as far as picture quality was concerned.

C. Robert (Bob) Paulson gave a humanistically oriented review of the "people problems" that a technological revolution spawns. Beyond ENG techniques also require special skills, Paulson cautioned, and the professional societies such as the SMPTÉ must be prepared to provide these so that their members who work in the TV industry are not made obsolete by all the shiny new and unfamiliar gadgets. To sum it up, Paulson said technological revolutions terminate needs for existing skills and abruptly demand instantaneous new skills. His concepts of technical unemployment were frightening enough to warrant serious attention.

Both Isaac Hersly of ABC and Al Hillstrom of KOOL in Phoenix made presentations that involved U-Matic cassettes illustrating their use of ENG equipment for sports coverage and local commercials. Both exhibited innovative use of this inexpensive and portable camera/VTR combination with results typical of multi-generation

SENNHEISER. YOUR WAY.



Now, you don't have to give up the ultra-low-noise, wide-range response, superior linearity, precise directionality and easy-to-position compactness of Sennheiser RF condenser microphones... to get the convenience and compatibility of 48V central studio supplies.

Due to popular demand, our MKH condenser microphone series—cardioid, ultra-cardioid, shotgun... even our lavalier—is now available in "P" versions, directly compatible with all standard 48V sources. As an alternative to our present A-B version, which can be powered from a built-in battery supply, or directly from low-voltage devices, such as Nagra tape recorders, mixers and other field equipment.

For more information, please write or call us... or better yet, contact your Sennheiser dealer for a demonstration.

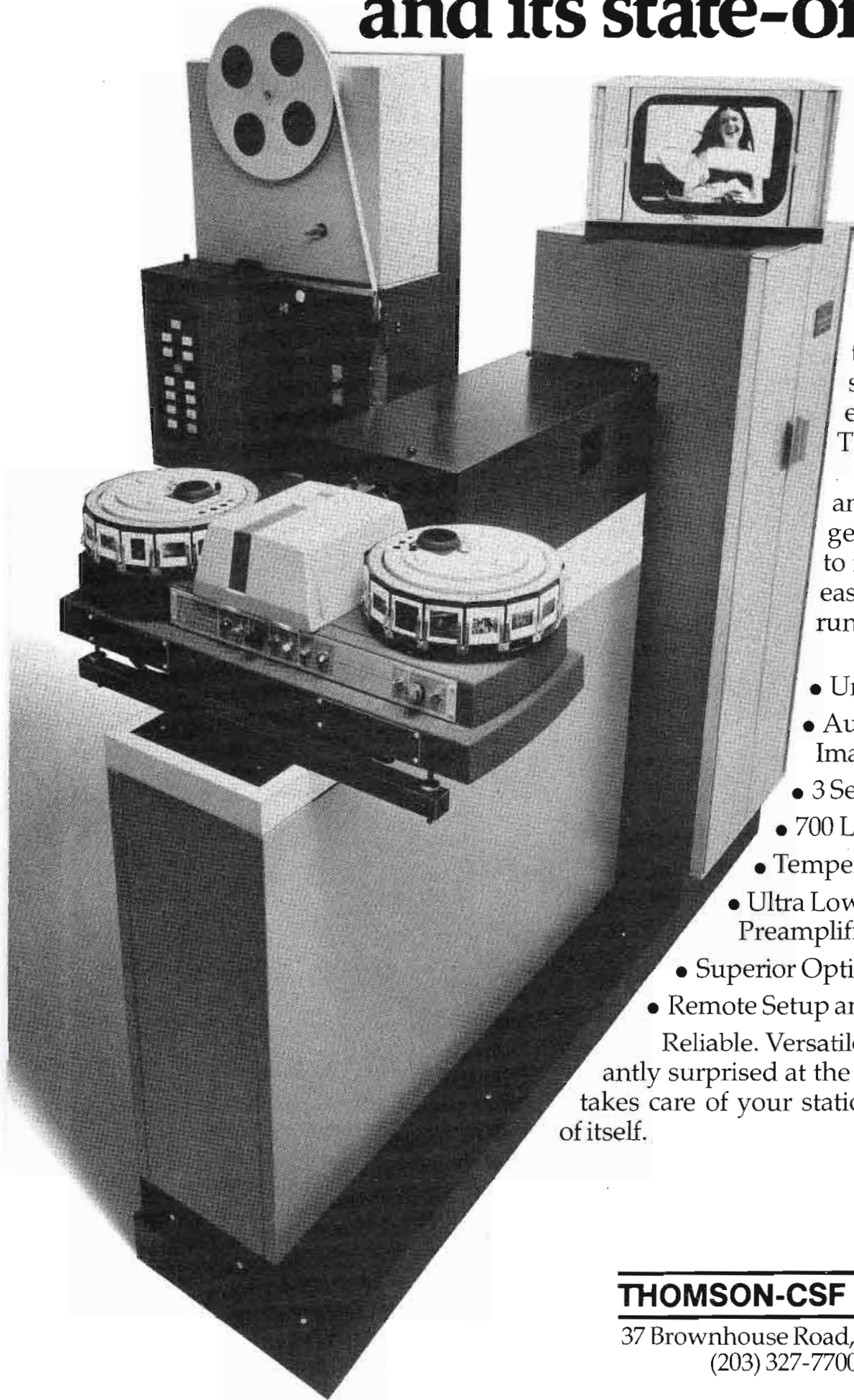
Sennheiser Electronic Corp.,
10 West 37th Street, New York,
N.Y. 10018 (212) 239-0190

Manufacturing Plant: Bissendorf,
Hannover, West Germany

SENNHEISER CONDENSER PERFORMANCE HERE

48V CENTRAL POWER SUPPLY HERE

Reliable, versatile, cost-effective, and it's state-of-the-art.



That's the Thomson-CSF Laboratories 1550 Telecine System. A heavy-duty, multi-duty system designed to handle the everyday demands of your TV station.

Built to be self-monitoring and self-regulating, with a rugged, ultrastable electronic design to insure reliable performance and easy maintenance. It practically runs itself.

Check these features:

- Unsurpassed Colorimetry.
- Automatic Color Balance and Image Enhancement.
- 3 Separate Mesh Vidicons.
- 700 Line Resolution, 600 Line Corner.
- Temperature-Compensated Amplifiers.
- Ultra Low Noise Level FET Video Preamplifiers.
- Superior Optical System.
- Remote Setup and Control Panels.

Reliable. Versatile. Cost-effective. You'll be pleasantly surprised at the price. The 1550 Telecine System takes care of your station, while practically taking care of itself.



THOMSON-CSF LABORATORIES, INC.

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

For further information contact:

Northeast Office: 37 Brownhouse Road, Stamford, Connecticut 06902 • Telephone (203) 327-7700

Southeast Office: 37 Brownhouse Road, Stamford, Connecticut 06902 • Telephone (203) 327-7700

Midwestern Office: 4220H Casa Brazilia Drive, St. Louis, Missouri 63129 • Telephone (314) 487-2450

Western Office: Post Office Box 36, La Canada, California 91011 • Telephone (213) 790-4393

Thomson - CSF Canada Ltd., 1000 Sherbrooke Street West, Montreal, Quebec H3A2P3 • Telephone (514) 288-4148

SMPTÉ (Continued)

cassette recordings which leave something to be desired from a picture quality viewpoint. Hillstrom brought the house down when after his introduction (by Lee Marvin of TRI), which included the information that he had recently survived open heart surgery and a rearend collision with a large truck, he stated "Good morning, Ladies and gentlemen, I am **really** glad to be here today!" What was most notable in the Hillstrom paper was some statistics. In 1970 a single PCP 90 covered a few stories. By 1974, two Ikegamis and Sony U-Matics provided 19 stories during that year's elections. The 1976 elections fostered 34 stories and currently the station has two Mini-cam vans with two GHz microwave and 13 GHz window microwave which lets them go live in minutes. They have Sony equipment including BVU100s in mobile vehicles, a helicopter and other units at the station. At last count, 13 U-Matics were in use for technical operations and if executive viewers are included, the number jumps to 25.

The afternoon session chaired by

Dave Fibush of Ampex started with an Eastman Kodak paper about a new high-speed news film (7250) and a rapid access processor. Obviously, film isn't going to take all this electronic wizardry lying down.

The following two papers by Nigel Hamley of Keeline Productions in London and Scott Gibbs of KPIX-TV, San Francisco, were poles apart. Hamley described a system for transferring film to the U-Matic cassettes for editing. Using Convergence Corporation joystick editors, he claimed rapid, accurate results using photographic edge numbers to produce the final release print for television or cinema. Scott Gibbs, an experienced film producer, was given the job of setting up his station's ENG equipment and he found he could do it adequately, but wasn't fully convinced of its supposed superiority over his old medium.

This was the title of the late afternoon panel that kept an audience of over 600 people riveted to their seats. The panel was made up of a star-studded cast of specialists in supposedly adversary positions. On the manufacturers' side, Kiyoshi

Yamakawa of Sony, Henry Zahn of Bosch/Fernseh and Carlos Kennedy of Ampex represented the three non-compatible one-inch formats fabricated by each of their respective companies. Weighing in for the networks were Uno Nilsson of Swedish TV, Boris Townsend from IBA and Marcel Auclair for the CBC.

The interests of the production houses were defended by Blair Benson of Teletronics, Ed Dudkowski, a local independent, and Richard Hill from Consolidated Film Industries. It would be hard to find a better cross section of television tape experts for such a dialogue, and it was ably and vociferously chaired by Jim Lipke, Editor of BME.

The chairman reviewed the dilemma facing the industry today with the introduction at last year's NAB show in Chicago of three incompatible formats whose only major commonality is a tape width of one inch. Each panelist was allowed a statement which tended to support the current posture of their individual organizations. Zahn started the discussion by pointing

Continued...

The Most Dependable Automatic Light Control system for film chains is now in operation at over 70 TV stations!

Is it in yours?

The BEI-709 Auto-Light Control...the heart of Beston Electronic's total light control system for large-image film chain cameras. A fast, drift-free operation that is easy to set up, the BEI-709 has proven to be efficient to operate.

NEW PRODUCT INFORMATION;

BEI is now manufacturing a low-cost character generator with features found only on units costing several times more. The CG-410 Character Generator with roll, crawl, automatic centering and featuring 24 pages of memory is now available for \$4,000.00.



BESTON ELECTRONICS INC.

903 SOUTH KANSAS AVENUE • OLATHE, KANSAS 66061 (913) 764-1900

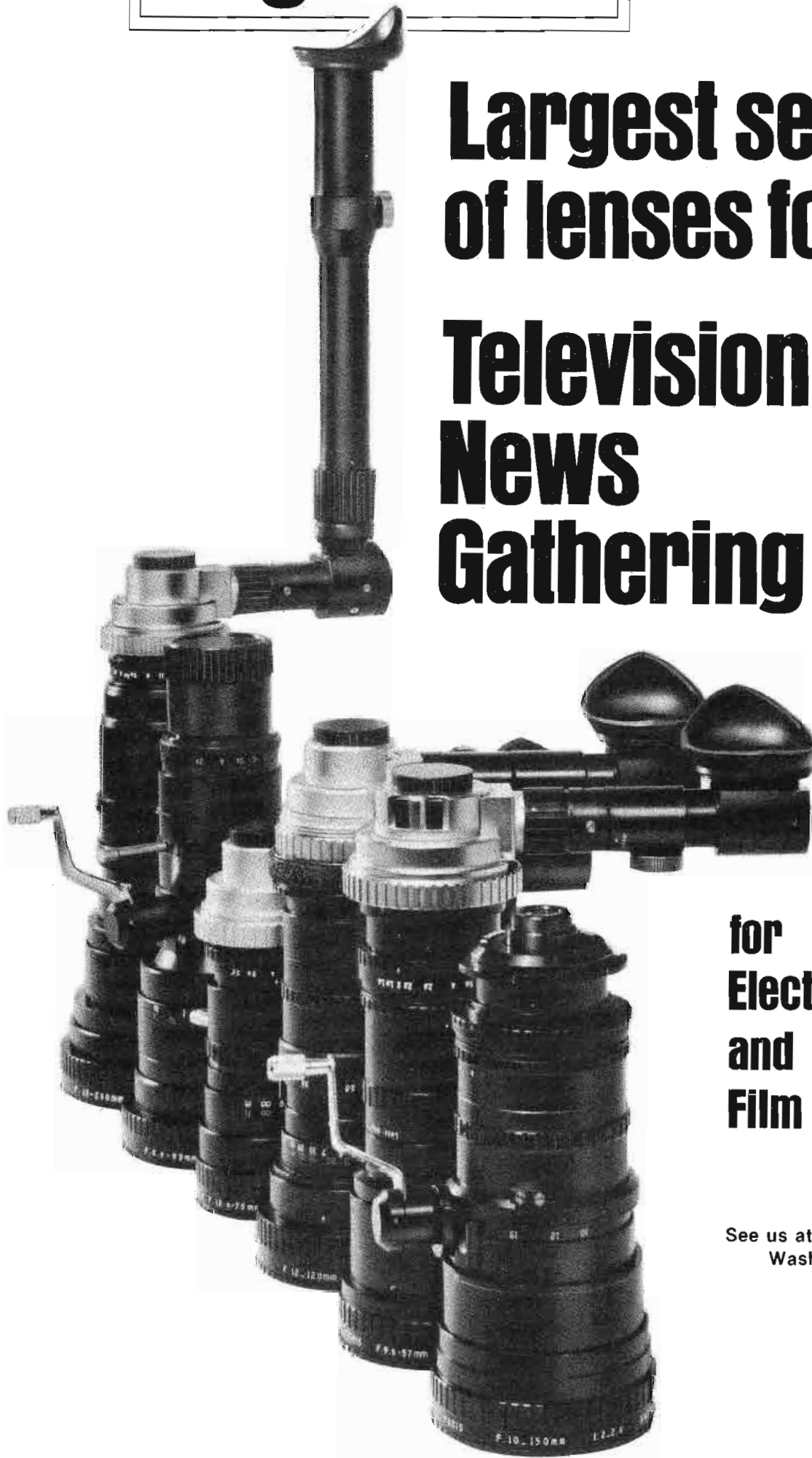
Write for more information or visit with us at the NAB show, booth 504.

For More Details Circle (162) on Reply Card

angēnieux

Largest selection of lenses for

Television News Gathering



for
**Electronic
and
Film Cameras**

See us at NAB—Booth 402,
Washington Hilton

angēnieux corporation of america

1500 OCEAN AVE., BOHEMIA, N.Y. 11716 • (516) 567-1800
13381 BEACH AVE., VENICE, CALIF. 90291 • (213) 821-5080

For More Details Circle (163) on Reply Card

SMPTE (Continued)

out that the segmented helical BCN format now offered by four companies (Bosch, RCA, IVC, Philips) had been introduced in Montreux in 1975, that 130 machines were already in operation and orders on hand would raise this number to 350. His comments were reinforced by Hans Groll from the same company who vehemently emphasized that Bosch/Fernseh had wasted over eight million DM (\$3 million) trying to build a single head helical non-segmented VTR (BCR) and had finally abandoned this approach in favor of their current BCN.

Carlos Kennedy of Ampex was equally positive of the validity of their one-inch single head helical format which he said Ampex introduced in 1965 and now have over 30,000 machines out. Their new VPR 1 is in production and deliveries began last month. Kennedy claimed that with the latest VPR 1 design and a technical innovation called AST, Ampex has eliminated all the admitted deficiencies of their older one-inch machines, but retained the format

for compatibility with the huge number of existing products.

Undaunted by his two predecessors, Mr. Yamakawa claimed Sony had developed their one-inch format recently to cater to broadcasters' needs and that the BVH-1000 had inherent advantages lacking in the other two. Among these were fast search editing, straight track geometry, an extra head for the vertical sync interval, and extra audio tracks.

On behalf of the networks, Auclair, Nilsson and Townsend expressed varying degrees of caution about a rapid changeover to a new format, although each admitted they are exhaustively testing all machines as they become available.

The CBC, with 220 quads and an average of 55 to 60 percent of their programming on tape, find these operations expensive and are looking for an alternative. One-inch machines could be the answer, but they don't know which one is the better as yet.

Swedish Broadcasting found the BCN both good and reliable, but they want to see what the operating features of the VPR 1 and BVH 1000 are before they make a

decision in this regard. If they do go to one-inch machines, they will start by replacing aging quads in the regional stations.

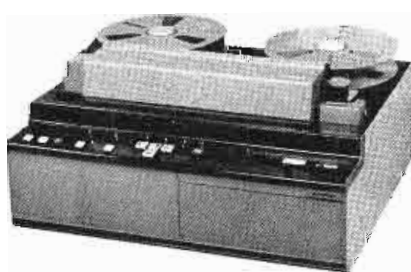
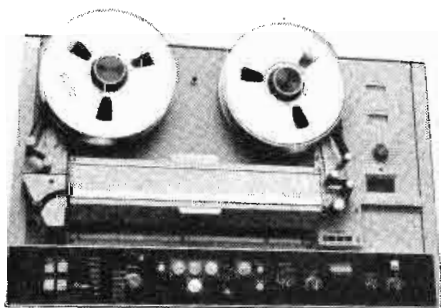
The IBA, according to Townsend, has very rigid technical codes of practice and will need a lot of persuasion that the present fully interchangeable quad one format should be abandoned. He sees the possibility that large British TV centers could afford two formats in house (one and two inch), but the small companies would probably rather stick with the quads they have now.

Dick Hill (CFI) felt his organization merely supplies what the customer wants. The direction in which they will go will be determined by the demand from clients who ask for tapes in specific formats.

Benson of Teletronics echoed Hill's comments on waiting to see what the marketplace wants. Currently, they are converting to Super Hi-Band quad with pilot and high energy tape to maximize present quad quality. Dudkowski pointed out the absurdity of using a \$3K to \$6K U-Matic recorder with a \$30K

Continued...

R-MOD ⇒ **INTELLIGENT VTR**



R-MOD now provides *AUTO-CUE*

R-MOD is the Reel-Servo Modification kit that makes old quads handle tape like the latest "intelligent" VTRs. Now with AUTO-CUE, R-MOD has the ability to remember, with frame accuracy, a cue point selected when the HOLD button on the timer is pressed. When the HOLD button is pressed again, anytime the VTR is not in play mode, R-MOD will search automatically and stop at the preroll position. Cost? This new feature is available at no increase in price to all R-MOD customers—past and future!

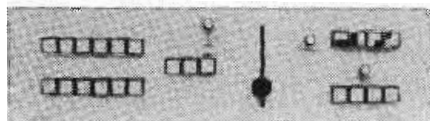
RECORTEC, INC. 777 PALOMAR AVE. SUNNYVALE, CALIF. 94086 TEL: (408) 735-8821 TELEX: 910 339 9367

21st Century Switching IS HERE!

from



AMERICAN DATA



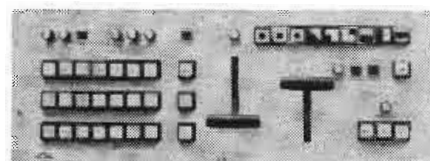
MODEL 2102

Now, more than ever, the need exists throughout the television industry for a video switcher that can deliver broadcast quality signals at cost-effective prices. Ideally, standards of quality for closed circuit, instructional, and commercial broadcasters should parallel each other. However, budget limitations often make it difficult to achieve both quality and economy.

The Model 2102 Color Production Switcher provides small studio and remote van operators with a broadcast quality switching system of unmatched versatility and economy.

Special care was taken to design a special effects package that would perform three basic effects functions: mix, wipe, and key. In addition to an additive A/B mix, the 2102 provides horizontal or vertical wipes and two corner inserts. The built-in luminance keyer is electronically independent from the effects generator, enabling the operator to mix or wipe to and from title keys.

For More Details Circle (165) on Reply Card



MODEL 2103

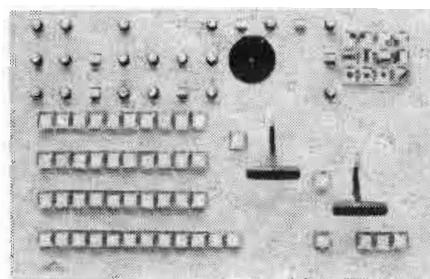
The Model 2103 Color Production Switcher is a perfect example of the imaginative design concepts and quality that are the foundation of this totally new approach to video systems flexibility. Its compact size and rugged

construction make the 2103 ideally suited for use in today's smaller remote vans. As an added bonus, the 2103 features an external reentry that allows the addition of another 2103 for a total switcher package of unparalleled capability and economy.

The special effects system provides control features frequently included only in more expensive switchers. In addition to the basic A/B mix, the 2103 produces 9 wipe patterns with controls for adjusting edge softness and pattern position.

The built-in luminance keyer will accept either internal or external sources to provide self-fill or color matte title keys from the internal color matte generator. Since the keyer is independent of the mixer, all keys, including optional chroma keys, may be dissolved in or out.

For More Details Circle (166) on Reply Card



MODEL 2104

Human engineering and functional flexibility are the forte of the 2104 Color Production Switcher which represents an unprecedented achievement in

state-of-the-art production switcher design.

The 2104 special effects generator provides 12 wipes with full range softness control. The limits of any wipe pattern may be preset so that the full travel of the fader will result in a wipe pattern that stops at the predetermined limit. A pattern modulator is included which utilizes sine wave, sawtooth, square wave, or external audio frequency drives. The electronic spotlight may also be hard or soft for producing vignettes and, like ordinary pattern wipes, may be positioned anywhere in the raster with the joystick control.

The 2104 also features independent effects key and mix key systems. A color matte generator is common to both systems which enables the operator to produce either self fill or color matte luminance keys. An optional RGB chroma keyer is available.

Built-in color background and black-burst generators are featured as separate primary inputs.

As an example of its overall production capability, the 2104 will enable the operator to mix to or from a luminance key over a chroma key, over a preset wipe or electronic spotlight. It can also wipe to or from a preset wipe behind a luminance key or chroma key.

For More Details Circle (167) on Reply Card

**INTRODUCTION AT NAB '77
VISIT US
FOR A DEMONSTRATION
SHERATON PARK: BOOTH 101**



AMERICAN DATA

401 WYNN DRIVE • P. O. BOX 5228 • HUNTSVILLE, ALABAMA 35805 USA • TELEPHONE 205 837-5180 • TWX 810 726-2125

ADC SOUTHEAST
705 Bowie Blvd.
Orange Park, FL 32073
904-269-2544

ADC MID-WEST
233 West Hill Ave.
Glenn Ellyn, IL 60137
312-469-6200

ADC MID-ATLANTIC
5504 Waterway
Rockville, MD 20853
301-460-1454

ADC WEST
445 S. New Hampshire
Suite 301
Los Angeles, CA 90020
213-387-7756

SMPTE

(Continued)

to \$40K color camera and be saddled with the limited U-Matic picture quality. As an independent producer, he wants a universal, easy to use, high quality format at a reasonable cost. (Ed. Note: Who doesn't?)

It was a lively discussion. However, the biggest surprise of the evening was the revelation that a "white paper" had been presented to the SMPTE on behalf of CBS and ABC that deplored the proliferation of one-inch formats and requested that the Society's VTR standards committee consider a newly proposed format as a compatible compromise between the Ampex and Sony one-inch formats. A precedent for such unusual action took place over seven years ago when the manufacturers of time code generators were starting to build five non-interchangeable code formats. An industry ad hoc group stopped this activity and through the SMPTE and IEC standards committees proposed and ratified a standard 80 bit address code that is now universally ac-

cepted and used.

Perhaps to avoid favoring either Sony or Ampex, the parameters and track geometry of the proposed non-segmented format in the "white paper" is different from either manufacturer's current format.

This topic was not expected to attract as large an audience as "Beyond ENG" because it is a very specialized technology at present. Nevertheless, the opening session ably chaired by William H. Orr of CMX Systems had a packed hall and standees at the rear. Joe Roizen, the program chairman, gave a short pictorial review of the current status of digital television with examples of most recent applications.

Likening present digital TV to the tip of an iceberg with the bulk of its future still shrouded below the surface, he predicted an increasing penetration of this technology until TV studios and production houses will be so digitized, the only analog devices left will be the people telling the computers what to do.

Roizen stated that four European countries now have "Magazine of the Air" transmissions using digital

signals inserted in unused lines of the vertical interval. He showed off-screen color images made in the U.K. of the BBC's Ceefax and the IBA's Oracle transmissions which, at the touch of a small keyboard on the home receiver, presented the viewer with alpha numeric (or graphic) news headlines, weather, stock quotations, theatre listings, horoscope readings or the recipe of the day.

Digital conversion and large capacity, solid state memories which can store a field or a frame of TV information have created a variety of very useful digital products that time base stabilize, synchronize and standards translate television signals for a wide variety of purposes. Roizen's illustrations of these applications showed camera-equipped mobiles and helicopters at the Montreal Olympics, RF minicams and the Goodyear Blimp at the Crosby Pro-Am, direct satellite transmissions from the People's Republic of China, all depending on framestore synchronizers and digital television methods.

To provide the audience with a

Continued...

To make an impression that lasts use GE large screen TV projection



The ever growing use of data processing is providing an important planning and analysis resource for executives in a broad spectrum of business: from bankers, to bakers, to candlestick makers.

The computer's expanding involvement with daily operations produces a wealth of information that often requires frequent presentation to groups of six, sixty, or six hundred or more people.

Illustrate your data bank

The most valued and versatile component in your information system could be the large screen color television projector... the incomparable General Electric PJ5000. Coupled to your computer facilities through suitable interface equipment, it can project Alpha-numeric data, graphic displays and computer generated images, in real time, for instant review and analysis. In addition, it can project information from all standard video sources.

Just visualize a 2 to 20 foot wide TV screen with fast breaking investment data, or sales information for immediate discussion and decision, being presented in color. Or corporate strategy ideas being immediately fed to the computer and their likely consequences projected as "war game" conclusions in TV graphs and charts.

All the advantages of utilizing computer data bank information as a decision making resource are greatly magnified by the use of large screen TV projection. The GE PJ5000 is designed to deliver a dependable professional performance with ease of operation. The GE exclusive single gun, single optical path system projects bright, natural color pictures with inherent color registration, on large screens for front or rear projection.

The PJ5000 is easily transportable and ready to move from your board room, to any other location, and it operates from standard 120v/20 amp appliance outlets. Its compact, self-contained Control unit can be removed from the projector, for remote set-up and operating control, with the addition of an accessory control cable.

The PJ5000 solid-state, high brightness, color video projector is engineered for excellent picture quality and power efficiency, with ease of operation, maintenance and service.

To find out more on how to present your data in a dynamic new light, call (315) 456-2562 or 456-2533 today, or write to:

Video Display Equipment Operation
General Electric Company
Electronics Park, 6-206
Syracuse, New York 13201

The GE large screen color TV projector... PJ5000

GENERAL  ELECTRIC

For More Details Circle (168) on Reply Card

WLW KNOWS EXACTLY WHAT THEY WANT IN A 50 KW AM TRANSMITTER.

SO DOES CONTINENTAL ELECTRONICS!



Award-winning agri-business programs; commuter traffic reports; news; live sports broadcasts to the Cincinnati / Three-State area . . . when Radio 7 . . . Clear Channel WLW speaks, America listens! And it's been this way from the start.

Innovator and pioneer in high-power broadcasting (remember their famous 500,000 watt transmitter built in the 1930's?) the WLW Engineering Staff designed all of their station's broadcast transmitters until 1976 when they turned to another pioneer and leader in high-power broadcasting for a new 50,000 watt AM transmitter: Continental Electronics.

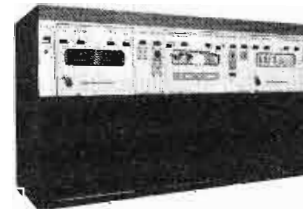
Mr. James Hampton, WLW Vice President Engineering, sums it up this way:

"First of all, we were looking for high reliability. Dead air is disastrous: when you're off the air, the audience loses confidence in you. Next, we wanted efficiency. Especially in the face of the increasing costs of

power. And then, we wanted a transmitter that was uncomplicated and easy to tune. Continental Electronics has a reputation for building reliable, very efficient high-power transmitters. So, naturally we checked their 317C over very carefully, along with the other brands. In my opinion, Continental's Screen/Impedance Modulation is excellent. We've been very happy with the 317C's modulation. And Continental's factory back-up is just first class. They know their work and are most cooperative. I think they are 'tops!'".

We congratulate WLW on their entire operation. They know exactly what they want in a 50 KW AM transmitter . . . so does Continental!

For information on the 317C, write Continental Electronics Mfg. Co., Box 270879, Dallas, Texas 75227.



Continental Electronics



Visit us at the NAB show Booth 220, Sheraton Park Hotel

For More Details Circle (169) on Reply Card

SMPTE (Continued)

technical grasp of the subject at hand, the SMPTE had arranged for a reprint handout of a glossary of digital TV terms which was printed in the January, 1977 Journal. In addition, at the suggestion of Bill Hedden, the incoming president of the Society, Frank Davidoff of CBS was specially invited to present an updated version of his tutorial paper on the subject which had been given previously at other SMPTE meetings and considered an invaluable primer in this field.

Walter Kester of Computer Labs gave a comprehensive review of the history of digital television developments and showed graphically the reduction in size, weight and cost of A to D converters. His slides of early converters made 5-10 years ago were by his own admission good boat anchors. However, the latest modularized units are compacted to a few cubic inches and similarly condensed to more affordable prices.

Gene Leonard of System Resources gave what was described by Fred Remley of the University of

Michigan as a "Think Piece" which extrapolated current digital techniques into a TV future full of digitized interactive devices. His most salient point that seems axiomatic in retrospect was directed toward the sudden burgeoning video games field and the future digital takeover of many television applications. Leonard pointed out that for the first time a consumer-oriented device would motivate technology toward low-cost components which are directly transferable into the broadcast industry.

Leonard's exercise in intellectual prognostication gave way to a very different type of pragmatic presentation by Dr. Its'hak Dinstein of Comsat. Dr. Dinstein reviewed his company's efforts to evaluate a variety of digital coding and decoding techniques and categorize the results on the basis of subjective evaluation by qualified observers. Applying numbers to a set of value judgments, viewers were asked to respond to test images reproduced on side-by-side color monitors on which the original scene and its digitized counterpart were visible. Various manipulations

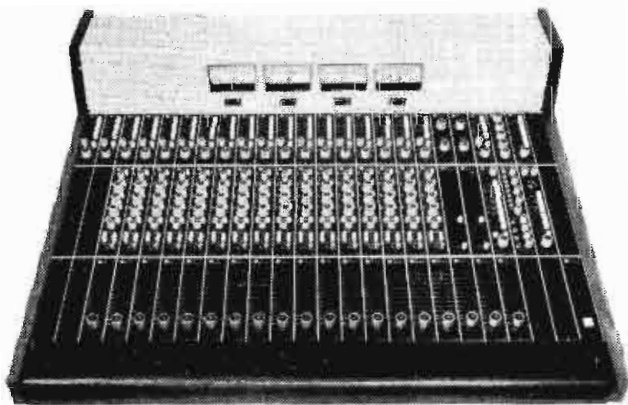
could be performed in the digitized channel with regard to bit rate, signal-to-noise ratio, etc. and the viewer could respond to variations in the test signal. These responses were computer correlated and served as the basis for Dr. Dinstein's charts which he used to verify the importance of various picture parameters toward adequate A to D conversion methods.

The afternoon session, which was well moderated by Louis "Dee" Pourciau of IVC started with a brief review of European digital standardization efforts given by Dr. Townsend of IBA. Because of the widespread use of two color standards in Europe, there is general agreement that it would be desirable to have a single digital sampling rate at four times PAL subcarrier frequency which would cover both. Dr. Townsend explained that Working Party C of the EBU is indeed working toward this goal and his organization (IBA) and the BBC in the U.K. are supporting such action.

In particular, there is the same concern in Europe as there is in the

Continued...

OKAY, YOU ASKED FOR IT AND GRANDSON HAS IT



"It" is more. That's what broadcasters have been asking for in production consoles. Flexibility. Capability. And totally unique Grandson has it all.

There is nothing else like it anywhere!

Equalization at each input position. Don't laugh. If you don't think it's needed, that's because you haven't tried it. EQ is only the most useful, creative tool in audio. And Grandson's EQ is something special. One major network has bought a bunch. That's special.

Monitoring and foldback flexibility to let you and the talent have separate monitor mixes! And changes of monitor mode at the push of a single button. Here's the key to fast, creative production.

Internal patch point, after mic preamp before fader, brought out to permit inserting special devices. How about plugging in a limiter just ahead of the pot for the screamer, or mic swallower. Think that would be neat? So do we. Grandson will let you do it!

Four reasons Grandson was selected by ABC-TV, Hughes Sports Network and WWL in the Superdome. There are more. None accidental. Because you said it's needed.

Grandson is "it." A totally unique approach. Want more details? Write or phone today.

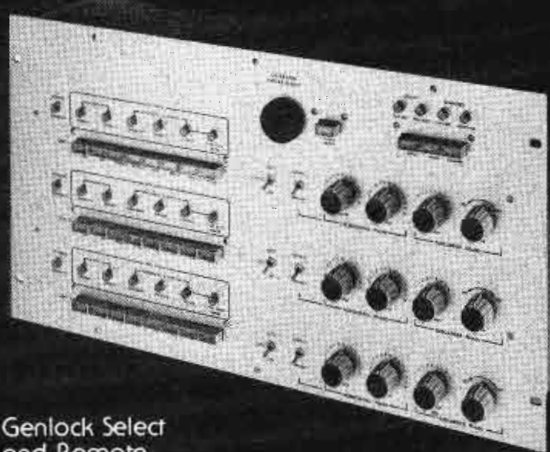
 **auditronics, inc.**

P.O. Box 12637 Memphis, Tn. 38112 901-276-6338

The closer you look, the better we look.

See us at NAB - Booth #435, Hilton

Advanced Leitch design creates the flexible color black switching system.



Genlock Select
and Remote
Phasing Panel



Color Black
Manual Assignment Panel



GVS-483
Genlock Video Selector



CSA-410
Sync Assignment Switcher

Leitch Video engineers have designed a series of components that bring reliability and flexibility to any switching system. Every unit fits into a standard rack allowing complete interchangeability for any number of design applications. While specifically designed for color black distribution to slave sync generators or drive decoders, other applications can be accommodated.

You tell us your specific requirements and we will provide the most economical system for you. A system that can be added to and modified at any time.

It allows you to upgrade now, even if the budget is tight. And you can keep on upgrading whenever more budget becomes available.

Call us or our nearest representative. We will be happy to quote on your requirements.

East Coast: Mr. Paul Milazzo

Leitch Video Incorporated, 230 Mineola Blvd.,
Mineola, New York 11501. (516) 248-4858

West Coast: Mr. David Hill

David Allen Hill Enterprise, 20 Laureldale Road,
Hillsborough, California 94010. (415) 342-0440

South-West: Mr. Gene Sudduth

Gene Sudduth Manufacturers Representatives,
2809 Raintree Dr., Carrollton, Texas 75006. (214) 242-2690

Mid-West: Mr. Jack Vines

Television Engineering Corporation, 519 Rudder Road,
Fenton, Missouri 63026. (314) 343-5606

Displayed at NAB
Booths 613 B & C



leitch video limited

705 Progress Avenue, Scarborough,
Ontario M1H 2X1, Canada. (416) 438-5060 Telex: 06-23604

For More Details Circle (171) on Reply Card

SMPTE

(Continued)

USA that the proliferation of digital television hardware not impose on broadcasters a wide range of differing interface devices which do not easily converse with one another.

A more widespread and contemporary use of digital techniques was described by J. Brian Matley of Micro Consultants, who started his paper with a short historical review of the key dates in framestore synchronizer development.

Matley described the progress made by his company and others in condensing digital field and framestores to manageable sizes with current models being easily transportable for remote applications. The roster of applications he illustrated looked like a "Who's Who" of tape events in television, the Montreal Olympics, both political conventions and the election, the Rose Parade, the Super Bowl and the Crosby Pro-Am being among them.

Matley explained that a framestore synchronizer is in effect an

infinite window for a remote television signal, permitting the lockup in perfect phase of any outside signal to any studio source without having to gen lock the studio to the remote. Furthermore, the field memory can freeze on a picture if the incoming video is interrupted or badly deteriorated.

The question of analog versus digital enhancement of video signals was also covered by joint authorship of a paper on this subject. Yves Faroudja of Yves Faroudja, Inc. and Al Swain, a private consultant, individually addressed each side of this question and Faroudja presented their conclusions.

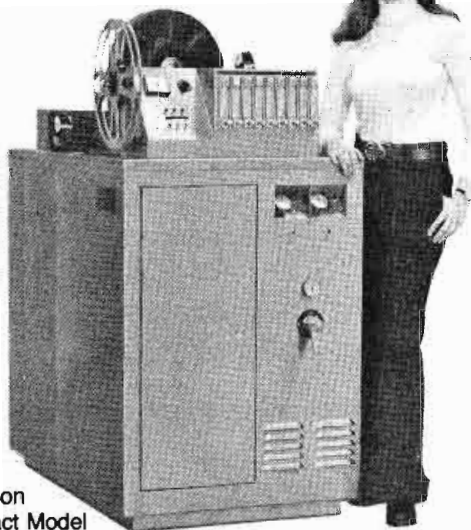
Charles Rhodes of Tektronix surprised the audience with his announcement of a new Codec developed by his firm which is not only extremely compact, but is being offered to digital equipment manufacturers at about half current Codec prices.

Built around this core, Tektronix have put together a video signal testing system that can be used to

verify proper performance of every device in the video chain. Rhodes described this digital tester as a rapid means of verifying all of the signal parameters normally inspected with the aid of a waveform monitor and vectorscope. Furthermore, a printout in accordance with FCC logging requirements makes this a truly automatic monitoring system. His claim is that this measurement device which he says would be approximately double the price of a waveform monitor and vectorscope combination would greatly simplify the proof of performance needs of any TV plant by providing a fast, accurate hard copy readout of the necessary signal parameters. If there was any doubt about the need of such a sophisticated video test tool, it was dispersed by the reaction of two audience members, Marcel Auclair of the CBC and John Lowry of Digital Video, who offered to buy serial numbers one and two.

Luigi Gallo of Ampex provided an insight into the design details of

Continued...



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

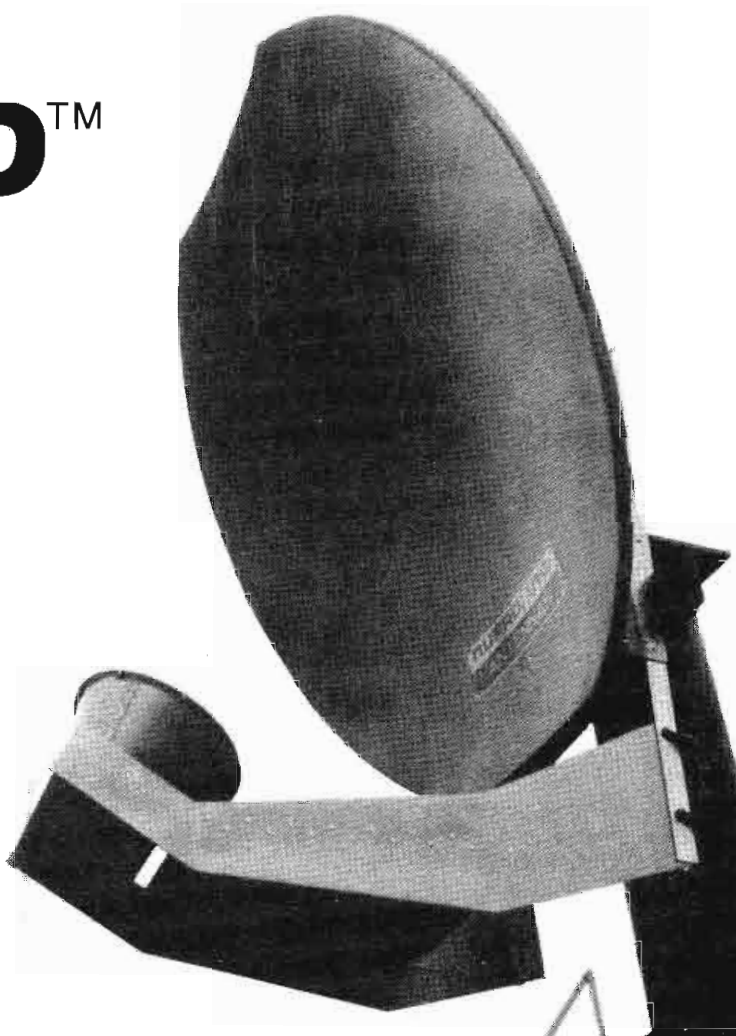
BE3 6911 Forest Park Rd. Dallas, TX 75235

NURAD ANNOUNCES THE NEW MODEL 20 SQ1

SUPERQUAD™

**MICROWAVE SYSTEM FOR
EXTENDED ENG/EJ OPERATIONS**

- ★ HIGH GAIN (23dBi)
- ★ QUAD POLARIZED
- ★ LOW SIDELOBES
- ★ PAN ONLY
(No tilting required)
- ★ DIGITAL CONTROL
(Remote operation optional)
- ★ RADOME ENCLOSURE



The 20 SQ1 SUPERQUAD™ was developed as a companion to the 2 GHz 20 QP1 QUAD, the "standard" receive antenna system in the United States, now in everyday use for live ENG/EJ operations at some 100 stations. By rejecting such multipath effects as ghosting or smearing and affording the operator the ability quickly and simply to obtain the optimum received signal through a selector switch, quad polarization maximizes the prospects of successful, high quality pickups.

The radome-enclosed 20 SQ1 SUPERQUAD™ enhances your ENG/EJ operations by providing line-of-sight coverage greater than triple the range of the 20 QP1 without increase in transmitter power. With its narrow beamwidth it minimizes the possibility of interference, while, with its CSC² elevation beam-shaping, coverage is assured from locations virtually underneath the antenna without elevation tilting. Thus the 20 SQ1 antenna need only be panned through its built-in rotating pedestal.

The operator is provided a control panel for polarization selection and panning. Optional digital remote control, including automatic features such as preselection of polarization and readout of azimuth angle and polarization mode, is also available.

See the SUPERQUAD™ at NAB Booth 230, Sheraton Park Hotel, Washington, D.C., March 27-30, or contact Nurad directly.

NURAD, INC.

ANTENNAS

(301) 462-1700

2165 Druid Park Drive Baltimore, Md. 21211

For More Details Circle (173) on Reply Card

ATS ... Automatic Transmission System

FOR AM & FM APPLICATIONS WITH LOCAL OR REMOTELY LOCATED TRANSMITTER PLANTS

Discuss your ATS requirements with the innovators of many remote control techniques...Moseley Associates...including the new TCS-1 Telecontrol System for ATS alarming and the new TFL-280 Audio Limiter tailored to SCA requirements.

Visit us in booth 203, Sheraton Park Hotel during NAB to discuss your complete ATS needs.



MOSELEY ASSOCIATES, INC.

SANTA BARBARA RESEARCH PARK
111 CASTILIAN DRIVE • GOLETA, CA 93017
Telephone (805) 968-9621
Telex 658448/Cable: MOSELEY

SMPTE

(Continued)

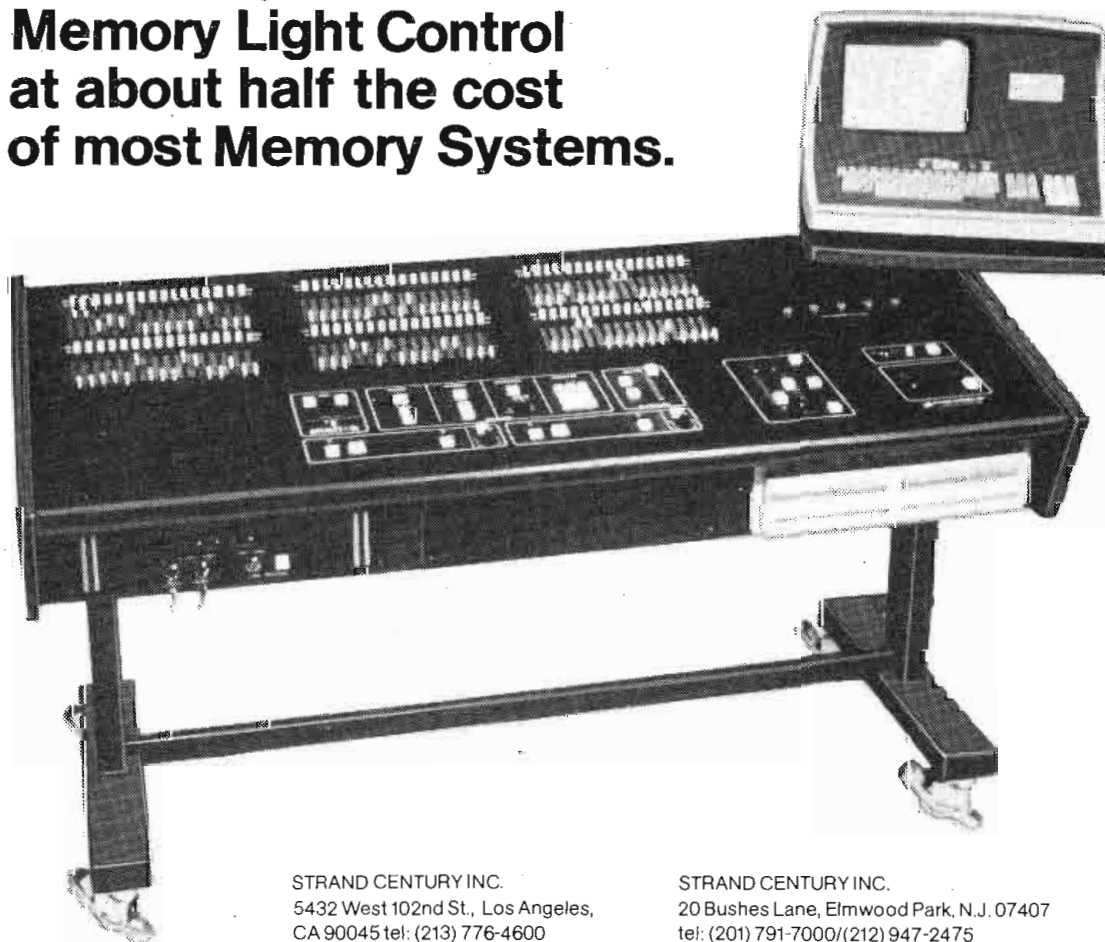
their Electronic Still Store, a random access disc-type magnetic recorder which can hold and retrieve a virtually unlimited number of television images using replaceable disc packs. Used by CBS for the recent presidential elections, it proved invaluable for the endless sets of graphs statistics, vote tabulations and other functions associated with the high density information needs of a major political event.

Charles Ginsburg of Ampex completed the day's paper roster with a review of the work of the SMPTE's digital standardization committee. First, he explained the problems being generated by an uncoordinated development of a variety of "black boxes" that perform Codec functions. As a result a number of separate devices in the video signal path may repeatedly digitize the signal, causing a detrimental cascade effect. As an example, he described the case of multiple VTR's with their own

internal digital circuits and outside time base correctors using wide window digital methods. Add to this the need for framestore synchronization and standards translation over a digital converter and it would be easy to accumulate six or seven sequential Codecs which process the signal.

As the mounting din of packing crates being hammered shut in the adjacent exhibit area permeated the lecture hall, Joe Roizen gave a short summary of the day's activities which included an expression of the Society's gratitude to the speakers and moderators for their contributions and to the membership for their attendance and support. On the question of speedy standardization of digital devices, he repeated an anecdote that Howard Steele, Director of Engineering of IBA, used in relation to the same question being raised at an EBU plenary session in Oslo last April. An Irishman being asked by an English friend if there is a word in the Irish language equivalent to the Spanish "mañana," replied that there are indeed several, but none with the same urgency! □

MULTI-Q Memory Light Control at about half the cost of most Memory Systems.



Multi-Q for efficiency and flexibility:

Now you can have a system with as few as 16 channels and still get the most advanced features.

- Individual controller for each dimmer.
- CRT dynamic video display.
- Fail safe back-up module.
- Remote master control.

Set your lighting for newscasts, weather, regular feature shows and Multi-Q remembers—your lighting returns every time without resetting. Remote Master Control can make lighting in any studio much simpler.

See us at the NAB, Booth 408
Washington Hilton Hotel
March 27-30

At STRAND CENTURY
we speak your language.



STRAND CENTURY

A COMPANY WITHIN THE RANK ORGANISATION

STRAND CENTURY INC.
5432 West 102nd St., Los Angeles,
CA 90045 tel: (213) 776-4600

STRAND CENTURY INC.
20 Bushes Lane, Elmwood Park, N.J. 07407
tel: (201) 791-7000/(212) 947-2475

STRAND CENTURY LTD.
6334 Viscount Road, Malton,
Ontario L4V 1H3 tel: (416) 677-7130

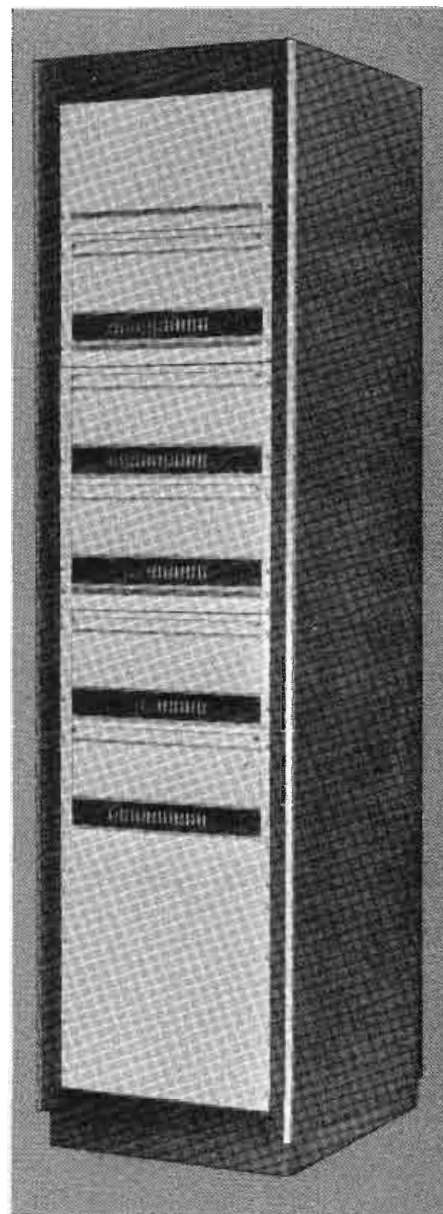
Shopping for a Distribution Switcher?

SAVE SPACE.

One of our competitors describes their 40 x 60 AFV switcher as occupying only two equipment racks. An equivalent TVS/TAS-1000 switcher takes about 2/3 of a single rack — without compromising performance specs (audio hum and noise measures -80 dBm on the TAS-1000 vs. -57 dBm on the competitive unit) and without use of single-source custom hybrid components.

SPEND LESS.

Another competitor boasts of video switching at less than \$30 per crosspoint. The TVS-1000 sells for as little as \$24 a crosspoint, and this price includes professional quality vertical interval switching, on-board electronic latching, and 100% computerized testing of all crosspoints.



40 x 50 AFV Switcher

SPECIFY THE SWITCHER WITH PROVEN RELIABILITY.

The TVS/TAS-1000 is more reliable because its simple design requires fewer active components in the signal path. This reliability has been proven at installations throughout the world in configurations ranging from 10 x 10 to 80 x 50. To find out more about the one switcher offering compact, cost-effective signal distribution with true broadcast quality and reliability, visit our booth at the NAB show (No. 421 — Washington Hilton) or contact the nearest TeleMation sales office.



 **TeleMation**
the discovery people

TeleMation, Inc. P.O. Box 15068, Salt Lake City, Utah 84115 (801) 972-8000. Other sales offices located in: San Francisco (415) 348-3322 • Los Angeles (213) 845-7831 • Washington, D.C. (301) 933-5250 • London

WEIGH ALL THE OPTIONS BEFORE YOU MAKE YOUR DECISION!



SONY CVM-1225

Weight: 42 lbs

Cost: \$660

SONY CVM-1720

Weight: 69 lbs

Cost: \$950

VACc Isolator
SONY KV1204

Weight: 29 lbs

Cost: \$571

SONY KV1711D

Weight: 55 lbs

Cost: \$691

Electro-optical isolators available for
most Sony receivers

EFP/ENG APPLICATIONS

Weigh all the options before you send your crew out for that ENG assignment. Will that lower-priced monitor/receiver your technical crew is using have that SONY performance and reliability? Too heavy you say... or maybe too expensive. Do yourself a favor... install a Video Aids electro optical isolator in a Sony receiver. In less than 30 minutes you have a high quality color monitor while still retaining the receiver function. You only add 8 ounces to the receiver's total weight instead of the typical 12 to 18 pounds most monitor/receivers add. Try it... not only will you like that solid reliability and performance... you'll save money... and your crews will love you for not having to carry those heavy monitor/receivers. Yes, weigh all the options before you make your decision...

Manufacturer's of:

Editor-Programmers

Cross Pulse Generators

Party Lines

Burst Phase Meters

Gen-Lock Color Sync Gen's

H-Phase Meters

Video Line Isolators

Black Burst Generators



VIDEO AIDS corporation

of colorado

phone USA (303)-667-3301

Toll free Canada (800)-261-4088

325 East 7th Street, Loveland, Colorado 80537

See us at NAB - Booth 511, Shoreham

PEOPLE IN THE NEWS

Salvatore L. Raia has been appointed National Sales Manager for Javelin Electronics, Division of Apollo Lasers, Inc....**Robert J. Anderman** has moved into the newly-created position of Broadcast Sales Manager for McMartin Industries.

Arthur Constantine will be responsible for the total marketing of Fidelipac® NAB Tape cartridges and accessories both domestically and internationally as Sales Manager of Fidelipac....**Thomas F. Rossiter** has joined Sharp Electronics Corporation as Manager, National Service Administration.

The Board of Directors of Richmond Hill Laboratories announces the appointment of **Fred W. Huffman** as President and Chief Executive....**Wayne Freeman** will handle the sales management for BGW's professional and consumer lines in his new position as National Sales Manager.

Arthur A. Silver joins CCA Electronics as Sales Vice President....**Robert D. Sidwell** has been appointed Vice President at CCA....**Leroy Wallace** rejoins CCA as Director of Television Products.

Don James has joined A. F. Associates as the Western Regional Sales Manager....**Frank J. Haney** joins A. F. as Systems Project Manager...**Mort Russin** has been appointed Vice-President for Sales and Marketing of Ikegami Electronics.

Central Dynamics announces the following staff changes and additions: **Howard Shephard** appointed Vice President and Director of North American Marketing....**Robert Faulkner** appointed Vice President and General Manager....**Davisson Spindle** joins as Midwest Regional Manager....**Kimi Akiyama** named Field Engineering Supervisor....**Kal Hassan** named Field Engineer.

Donald V. Kleffman has been promoted to Vice President-General Manager of the audio-video systems division of Ampex Corporation....**Steve Rand** has been appointed Vice President and General Manager of Superscope, Inc.'s wholly-owned subsidiary, Superscope Canada, Ltd.

Howard Webster Town, 47, prominent in the television broadcasting industry for 20 years, died at his home in Redwood City, California, November 21. At the time of his death, Town was Audio Engineering Section Manager for Ampex Corporation. As Director of Engineering, WTTW, Chicago, Town was instrumental in installing WTTW's television transmitting station on the Sears Tower, the world's tallest building. Town was a charter member of the Executive Board of the Society of Broadcast Engineers, the American Standards Association, chairman of the National Educational Television Engineering Committee, a member of the Michigan ETV Engineering Committee and the American Technical Committee of the European Broadcasting Union.

Continued on page 142

For More Details Circle (176) on Reply Card

TerraCom has closed the loop for Electronic News Gathering

The TCM-7 "Miniwave" Transmitter and the TCM-3 Programmable Receiver have joined the TerraCom team. They close the loop for highest performance microwave... from ENG camera, to O.B. van, to repeater, to studio.

Now you can enjoy the satisfaction and cost benefits of using an integrated family of equipment from one source. TerraCom.

The new TCM-7 and TCM-3 along with the field proven and time tested TCM-6 Series, tunable or fixed tuned transmitters and receivers, will meet all

of your microwave requirements at any frequency—2, 7, and 13 GHz.

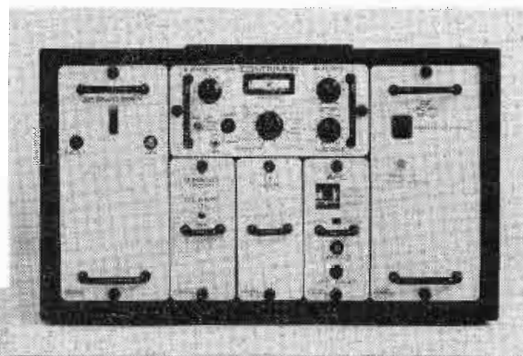
TCM-7 "Miniwave" is TerraCom's camera located transmitter. It is lightweight, easy to carry, simple to operate, and fast to set up. And it costs one-third less than the competition! Designed for broadcast quality transmission with plug-in circuit cards for maintainability, the "Miniwave" is a new dimension in ENG.

TCM-3 Series Programmable Receivers are an important innovation for ENG systems. Imagine the flexibility of a receiver that can be remotely switched to any channel within the band... instantaneously. You are able to make the maximum use of frequen-

cies assigned, or those with least interference, at any one time. All from local control, remote control, or with a telephone circuit.

TerraCom portable microwave equipment won user plaudits at the recent Olympics (both Montreal and Innsbruck), primary elections, the Democratic and Republican conventions, Rose Parade, Rose Bowl, Super Bowl and in thousands of other daily events. And we're in satellite earth stations too!

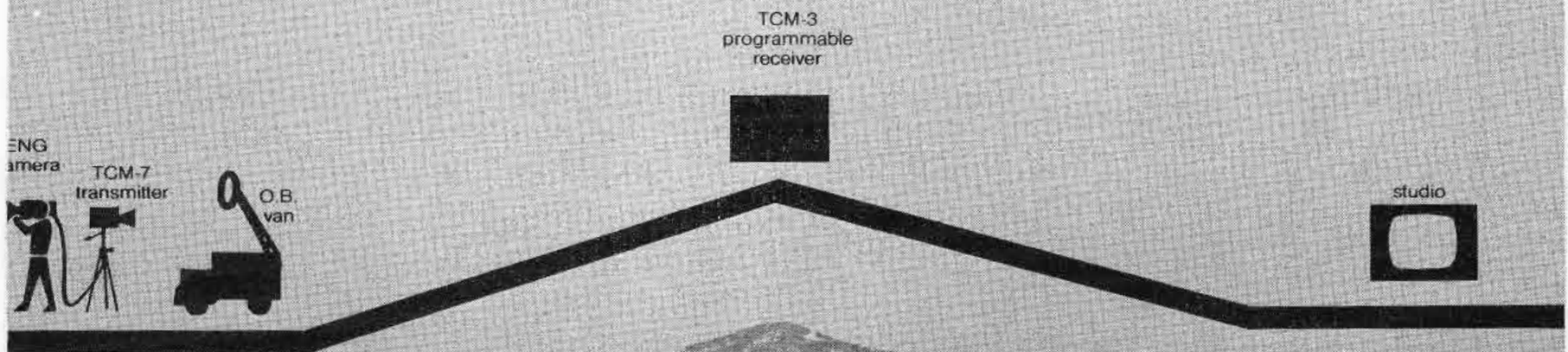
You can close the loop now by calling Bruce Jennings or Bob Boulio at (714) 278-4100. And get the best service in the industry while you're at it.



DIVISION OF CONIC CORP.
A LORAL SUBSIDIARY

9020 Balboa Avenue, San Diego, CA 92123

See us at NAB, Booth 608



For More Details Circle (177) on Reply Card

audio * Stereo MIXERS AMPLIFIERS! → turntables PRE-AMPS RUGGED

RUSSCO engineers design the broadcast equipment that works for you—Solid state stereo and mono 5-channel audio mixers, amplifiers and preamps, the finest turntables and precision tone arms. Using modern, trouble-free technology and RUSSCO-RUGGED construction, we bring you products you can really depend on. There's just no other name to consider for Top Quality and Economy!



• Write us for our brochures

RUSSCO

ELECTRONICS INCORPORATED

1070 BROOKHAVEN, CLOVIS, CALIF. 93612 Ph. (209) 299-2167

your BEST BUY

For More Details Circle (178) on Reply Card

People

Continued from page 140

Donald R. Beall, president of Electronics Operations of Rockwell International, has announced the appointment of four new presidents in that organization. They are: **C. I. Rice** appointed President of Collins Avionics Division...**G. W. Sullivan** named President of Collins Commercial Telecommunications Division...**D. J. Yockey** appointed President of Collins Government Telecommunications Division...**T. A. Campobasso** named President of a newly-established Electronics International Operations.

Yoichi (Joe) Shimada is filling the position of Sales Manager of the Professional Motion Picture Products Division of Canon U.S.A....Shimada fills the vacancy created by the return to Japan of **Yasuji Asai**, who recently completed his tour of duty in the United States.

Dan Roady has been promoted to Director of Engineering at CMX Systems, Inc., a division of Orrox Corporation...**Larry E. Zaiser** has moved to Automation Electronics, Inc. as President...**Louis G. Donato** is now filling the new post of Director, Video and Audio Services at RCA American Communication, Inc.

Martin Dunn has been appointed Vice-President, Industrial Sales at GBC Closed Circuit TV Corporation...**Allen H. Ecker** will be responsible for the administration of all corporate research and development projects on new products in his new position as Director of Research for Scientific-Atlanta, Inc.

Vic Paulsen retired from KSFO radio, San Francisco, on January 1, 1977. He had been an engineer at KSFO for 22 years...**Alexander H. MacDonald** was appointed Assistant Chief Engineer at WNEW-TV, New York.

Steven Russell Messer is now Station Chief Engineer of Standard Broadcast Station WAMM-AM, Flint, Michigan...**Bill Wilson** is the new Executive News Producer at WRTV, Indianapolis, Indiana.

Joseph J. Kilcullen, 53, Vice President and General Manager of WICZ-TV, Binghamton, New York, died January 12. Kilcullen was formerly Sales Manager of WGBI-AM-FM-TV, Scranton, Pennsylvania, and had been associated with Consolidated Molded Products Corporation before joining WICZ-TV, a division of Stainless Broadcasting Company.

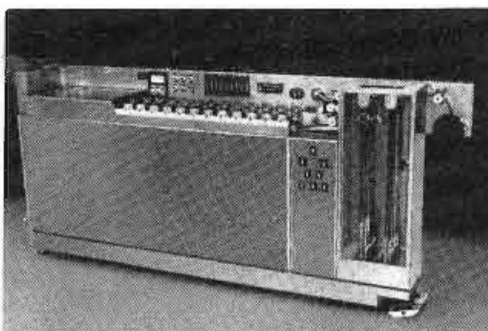
Robert W. Peters has recently been appointed Manager of Corporate Market Research and Product Planning at Orrox Corporation...**Henry J. Maynard** has joined Dynair Electronics as Vice President, Engineering.

Richard F. O'Brien, a pioneer in the nonbroadcast video industry in the U.S., has joined JVC Industries, Inc. as Vice President of Marketing.

A real sweetheart.

It's easy to love this new Houston processor. Exceptionally small and compact for such a great performer. Takes less than 22 sq. ft., of floor space and stands just 55" high. She's gentle, too — and good looking. 316 stainless steel throughout, except titanium in the bleach. Besides, she operates in the daylight.

This is one of the new series of Houston Compac-Line™ Processors, an advanced concept in efficiency and dependability, with 47 years of Houston know-how built in.



Considerably smaller than other machines that do the same job, they offer all the same Houston operating features and precision controls that assure optimum quality results. And they are designed to handle a wide variety of films, film sizes and processes. All priced

considerably under comparable machines. Call or write Houston Photo Products, Inc., 655 E. 20th St., Yuma, Arizona, 85364. Phone: (602) 782-3677. Telex: 669-450. Eastern Rep: U.S. Photographic Eqpt., 40-13 104th St., Corona, N.Y. 11368. Phone: (212) 672-3140. European Sales & Service: Jos DeJonghe, 8500 Kortrijk, Belgium. Phone: 56/2117.10. Telex: 85.185.

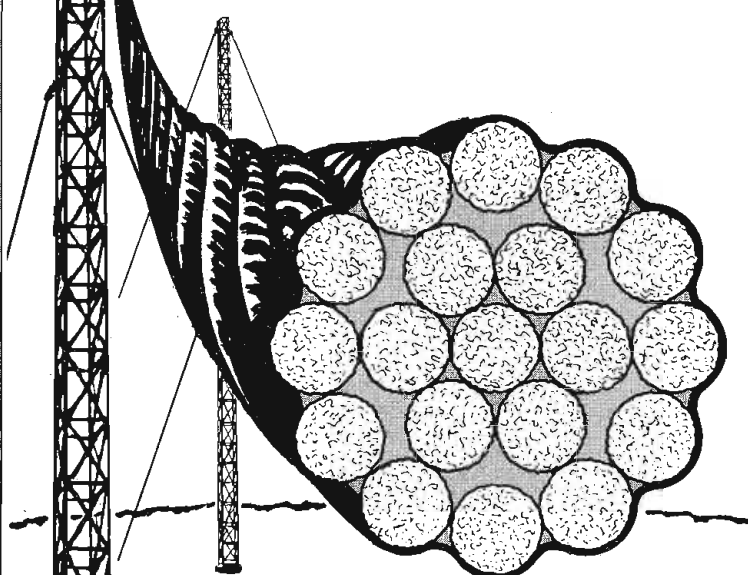
HOUSTON

PHOTO PRODUCTS, INC.
YUMA, ARIZONA



**LOOK AT A GUY THAT
OUTPERFORMS STEEL...**

PHILLYSTRAN®



PHILLYSTRAN eliminates the usual problems of RFI. Manufactured from impregnated KEVLAR* fiber and polyurethane, PHILLYSTRAN's non-metallic properties eliminate electrical problems yet provide tremendous strength and durability.

- **Non-interference**
Outstanding dielectric properties
- **Minimum stretch**
New designs substantially reduce creep
- **Corrosion proof**
Non-metallic construction: polyurethane jacket

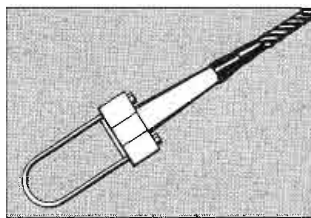
PHILLYSTRAN starts . . .
where steel left off.

®PHILLYSTRAN . . . proprietary resin impregnation process of Philadelphia Resins Corp.

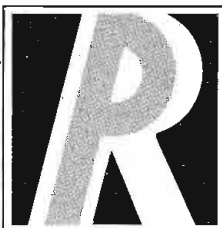
*duPont registered trademark

FACTORY ASSEMBLIES

End fittings expertly applied when specified.



manufacturers of Chockfast®, Phillystran®, Phillybond®, Phillyclad® and Phillygrout®



**PHILLYSTRAN®
ROPES AND CABLES**

PHILADELPHIA RESINS CORPORATION
20 Commerce Drive, Montgomeryville, Pa. 18936, U.S.A.
215/855-8450 • Telex: 84-6342 • Cable: PHILRES MMLL

For More Details Circle (180) on Reply Card



**SOCIETY OF
BROADCAST ENGINEERS, INC.**
P.O. Box 88123, Indianapolis, Indiana 46208

Certification

By mid-January, we had certified about 700 engineers. But please be patient. The flood of applications hit in December due to the deadline for Senior Engineer grandfathering.

The biggest single cause for denials has been a lack of total years experience required.

If you have questions regarding your application or other matters pertaining to membership, call Vince Flanders, 317-842-0836. The Society address is: P.O. Box 88123, Indianapolis, Indiana 46208.

If you need certification application forms in a hurry, scout up your June, 1976 issue of **Broadcast Engineering**. The certification article written by Ron Merrell includes a set of application forms.

Continued on page 146

NAB Asks For Monthly News

National Association of Broadcasters President Vincent T. Wasilewski, in a letter to Federal Communications Commission Chairman Richard E. Wiley, suggested that the FCC mail each month to all broadcast licensees, the text of new and amended FCC rules and regulations pertaining to the operation of broadcast stations.

Wasilewski said that one of the difficulties encountered by many licensees in keeping abreast of changes in FCC rules is the long delay in receiving revised regulations from the Government Printing Office. It is not unusual for notice to come six to eight months after the rules have become effective.

The NAB President suggested that the Commission include in the mailing a copy of Public Notices explaining changes in FCC rules and policies. In addition he recommended that the Commission institute a monthly newsletter consisting of brief summaries of Commission broadcast actions.

The Commission might provide a valuable information service, Wasilewski's letter continued, with a minimum of expense and effort. This would result in more efficient use of FCC staff time since there would be fewer inquiries and misunderstandings concerning current Commission policies. This would convince licensees that the Commission means business and is working for a more personalized and meaningful regulatory approach designed to better solve a licensee's problems and thereby provide an improved broadcast service to the public.

NAB Exhibits

The National Association of Broadcasters has announced that 203 associate members will exhibit their products during the Association's 55th annual convention in Washington, March 27-30. In addition, one national association will maintain an exhibit booth.



Sorry Barbara, It's the %!#? sync generator again!

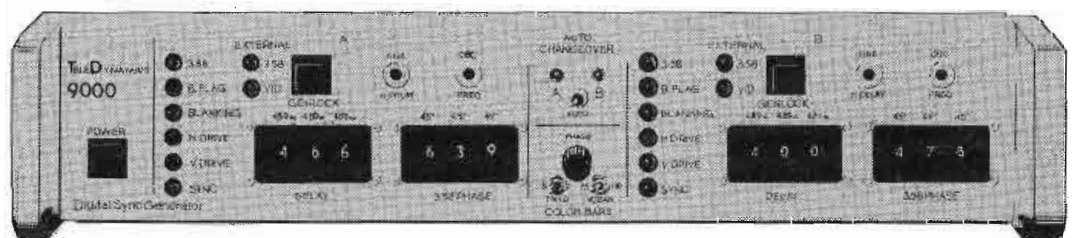
Well Barbara, rest assured you're not suffering alone. And, your engineer isn't trying to make you look bad either. It's just that everyone is using outmoded Sync Generators. Let's face it, most products available are minor up-dates of the ones we used when Uncle Milty was the biggest star around. He's passed into TV history... and so has your sync generator.

THE NEW TELEDYNAMICS 9000 A TOTALLY DEPENDABLE DUAL DIGITAL SYNC GENERATOR

The Teledynamics model 9000 is a completely new DIGITAL sync generator with automatic change-over to a self contained duplicate DIGITAL sync generator. It provides absolute stability in all modes of operation. Genlock specs on the 9000 set the stand-

ard of excellence for the industry. Sync jitter in normal or genlock mode is less than 1 nsec. Master sync generator and color

quality performance and super reliability yet it actually costs you less than the old fashioned units now in use.



standard exceeds EIA performance specs.

Simplified digital design and compact modular construction mean that servicing can be performed by inexperienced personnel. There are NO INTERNAL ADJUSTMENTS. And PLUG-IN CIRCUIT BOARDS provide for instantaneous repair.

THE BEST COSTS LESS

The TD 9000 gives you top

For More Details Circle (181) on Reply Card

Write today for complete information and specifications on the all new TD 9000 DUAL DIGITAL SYNC GENERATOR. Keep your Barbara happy.

TELEDYNAMICS

11140 Talbert Ave.
Fountain Valley, CA 92708
(714) 540-8424

**DISTRIBUTOR INQUIRIES
WELCOMED**

SBE

Continued from page 144

The First Exams

The first set of examinations for Associate, Broadcast, and Senior Broadcast Engineers will be given on or about June 15, 1977. The exams are scheduled to be held at most of the SBE chapters, if there is sufficient demand. Exact exam dates and locations will be announced.

The following locations are tentatively scheduled to be the testing

sites: Binghamton, New York; Wilkes-Barre, Pennsylvania; Topeka, Kansas; Atlanta, Georgia; Phoenix, Arizona; Boston, Massachusetts; New York, New York; Seattle, Washington; Minneapolis, Minnesota; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Spokane, Washington; Syracuse, New York; Madison, Wisconsin; Indianapolis, Indiana; Chicago, Illinois; Milwaukee, Wisconsin; Tucson, Arizona; Cincinnati, Ohio; Albuquerque, New Mexico; Louisville, Kentucky; San Diego, California;

Washington, D.C.; El Paso, Texas; Tampa, Florida; San Francisco, California.

Requests for SBE Examination forms should be sent to: Society of Broadcast Engineers, Exam Secretary, P.O. Box 88123, Indianapolis, IN 46208.

National Election

The ballots for the SBE National Elections are to be counted on March 5, 1977. The following are the candidates for the Executive Committee: President: Robert Wehrman, Atlanta, Georgia; Executive Vice President: James Hurley, Pittsburgh, Pennsylvania; Secretary/Treasurer: James Grinnell, Chicago, Illinois.

Five of the following seven candidates will be elected to the Board of Directors: Morris Courtwright, Jr., Yuma, Arizona; Steve de Satnick, Needham, Massachusetts; Ed Herlihy, Los Angeles, California; Howard Immekus, San Francisco, California; Robert Jones, La Grange, Illinois; Bart Paine, Tucson, Arizona; Larry Taylor, Elmira, New York.

Notice of Annual Meeting

The annual meeting of the Society of Broadcast Engineers will be held at the Shoreham Americana Hotel in Washington, D.C. on Sunday, March 27, 1977. The SBE Board Meeting will be held from 12:00 p.m. until 3:00 p.m. in the Press Room. The SBE Membership Meeting will take place at 3:00 p.m. in the Empire Room. There will be a reception at the conclusion of the meeting.

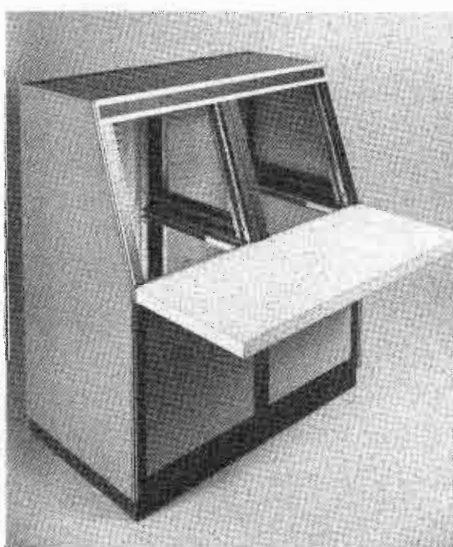
Chapter 1—Binghamton, New York

During our January 11th meeting, John Shipley presented a technical paper that discussed where our modern technology is going and what we need to keep up with it. The paper was presented at a past NAB and several SBE meetings, where it was also extremely well received. The subject did not center on AM, FM or TV; but discussed all in general. (Gary Simon, WSYE-TV, P.O. Box 314, Elmira, New York 14902, 607/733-5536.)

Chapter 3—Kansas

At the December 14, 1976 meeting, Bill Keegan, Program Chairman, introduced Carlson Farha,

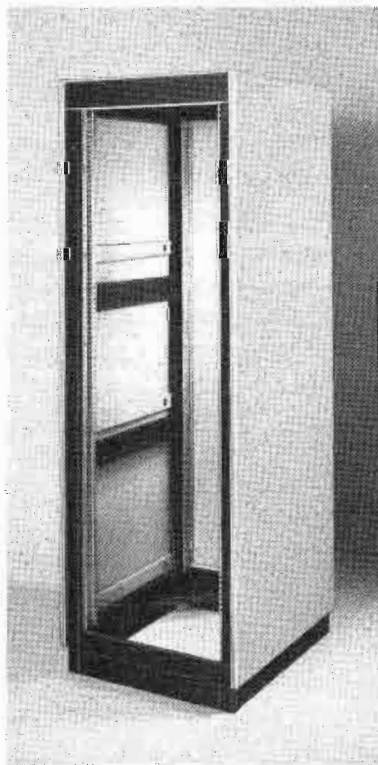
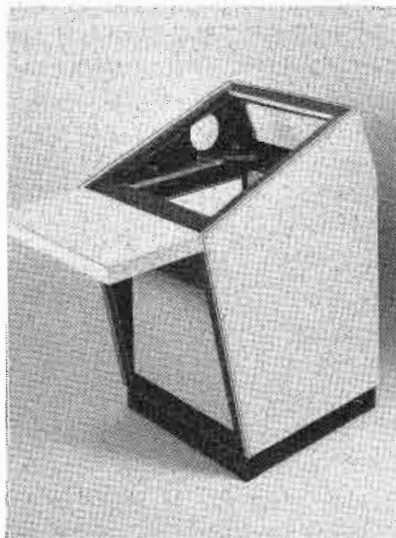
SHIPMENT WITHIN 5 WORKING DAYS



Verticals, Slopes,
Low Silhouettes

Over **700** Selections
NOW! Amco Quality
From Stock

Single or Multiple
Bay Consoles
Styled or Plain



Ask for your free Amco Catalog 500 & Price List
SEE US AT NAB-BOOTH 308



AMCO ENGINEERING CO.
7333 W. Ainslie St. Chicago, Ill. 60656
Phone: (312) 867-8500 TWX: 910-221-5192

regional Sales Engineer for Ampex (also a Kansas SBE member), who presented a slide and film program detailing the process involved in manufacturing magnetic recording tape, followed by a presentation of the care and maintenance of recording tape. The formal program was followed by a tour of the KVOE/KLRF transmitter facilities by the meeting's host, David M. Wiese, including his new "toy," a Harris MW-1 solid state 1 KW AM transmitter.

The program committee chairman on January 11th introduced Rea Bowman, Broadcast Consultant and SBE Charter member, who presented a program on AM antenna systems. The program is the first of a series on the subject, covering the history, development, theory, design, tuning, and maintenance of all kinds of AM broadcast antennas. After Bowman's presentation, Harold Kincaid, Chief Engineer of KLWN-AM/FM, the host of the meeting, conducted a tour of the facilities. (Bob Fulkerson, KPTS-TV, 352 N. Broadway, Wichita, Kansas 67202, 316/262-4461.)

Chapter 15—New York City, New York

The January 13th meeting was held at WQXR Presentation Theatre. After the usual business meeting, the program featured a technical and descriptive discussion of a new FM antenna with broadband characteristics by Bogner Broadcast Equipment Corporation which is solid and distributed by CCA Electronics. The speakers included: Art Silver, Vice-President, Sales of CCA Electronics Corp.; Don Powers, Headquarters Sales Manager; and George Blackmon, Marketing Service Manager. The new design concept offers a multiplicity of propagation as well as practical advantages for FM and TV antennas. The talk was complemented by a slide presentation and a question and answer session. (Larry Strasser, WTFM, 173-15 Horace Harding Blvd., Fresh Meadows, New York 11365, 212/357-8000.)

Chapter 16—Seattle, Washington

Chapter 16 met at noon on January 12, 1977 at the Swedish Club. Al Harwood presented a progress report on the NW Regional Convention scheduled for May 25

and 26. The convention will be at the Seattle Center. Bob Dietsch, FCC, reported that fees for FCC licenses were discontinued effective January 1, 1977. He also reported that for remote broadcast pickup applications, there is a new procedure. Instead of requiring a separate form for the base station and each remote, now the base station and all remotes can be included on one form. John Boor, a Seattle SBE Chapter member and long time broadcaster, described and presented slides on his experiences on a demonstration of TV satellite

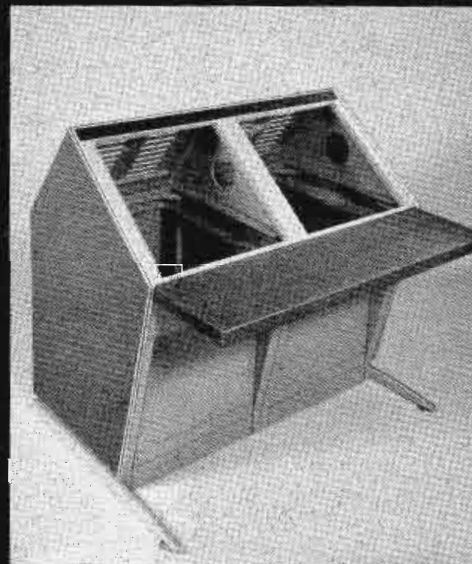
technology to developing nations which required world wide travel. It was a three-month U.S. Department of State project as part of an on-going effort to provide technical assistance to developing nations. (Al Saari, The Evergreen State College, Olympia, Washington 98505, 206/866-6270.)

Chapter 17—Minneapolis/St. Paul, Minnesota

The January 19th meeting took place at the University of Minnesota Media Resources Center. "New

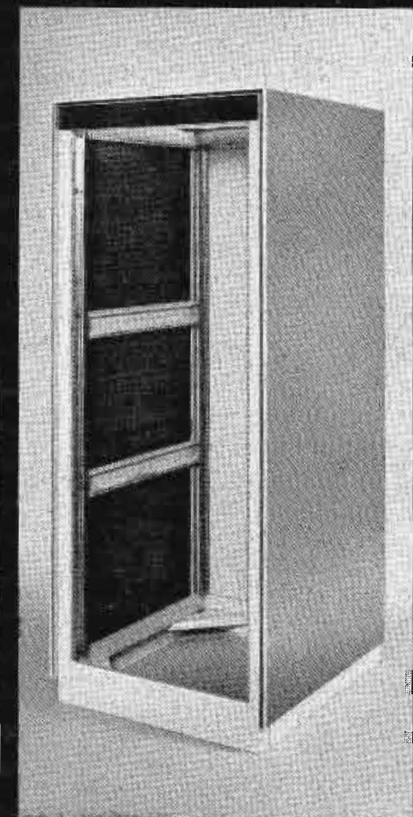
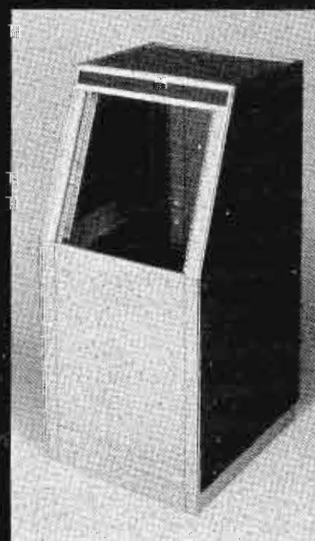
Continued on page 148

THE ULTIMATE IN SIMPLICITY



The most sophisticated cabinet system is now the simplest to order!

We've done the work for you. Ordering hours have been converted to minutes. Complete color console pictures in Amco Catalog 400-A. Eliminate the guesswork!



Ask for your free Amco Catalog 400-A & Price List
SEE US AT NAB-BOOTH 308



AMCO ENGINEERING CO.
7333 W. Ainslie St. Chicago, Ill. 60656
Phone: (312) 867-8500 TWX: 910-221-5192

NAGRA E

1/4" Non-Sync Tape Recorder for
RADIO BROADCAST

The Nagra E recorder is designed specifically for high quality and reliable Non-Sync sound recording for Radio Station work. It retains all the quality features of the Nagra 4.2 and Nagra S recorders, eliminating only the features that are essential to recording along with the film and/or tape picture. These changes have served to simplify the operation, decrease the weight thereby reducing the cost of the Nagra E.



Booth 606
NAB CONVENTION
March 27-30 • Washington, D.C.

United States Distribution — Service — Sales
NAGRA MAGNETIC RECORDERS, INC.
19 W. 44th ST., ROOM 715 • NEW YORK, NY 10036 • (212) 661-8066

West Coast Sales — Service & Technical Center
RYDER MAGNETIC SALES CORP.
1147 N. VINE ST. • HOLLYWOOD, CA 90038 • (213) 469-6391

AVAILABLE IN CANADA — BRAUN ELECTRIC CANADA, LTD.

For More Details Circle (203) on Reply Card

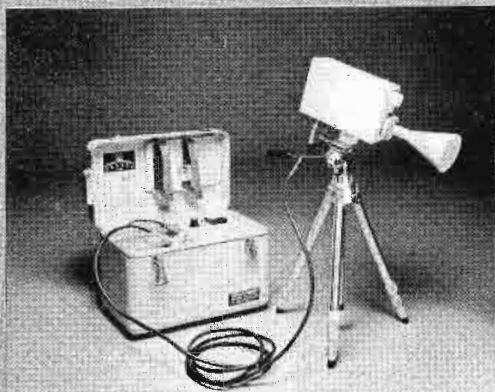
SBE

Continued from page 147

Test Equipment for Tape Recorder Maintenance," a talk/demonstration on the Ferrograph Recorder Test Set and Auxiliary Test Unit, was given by Russ Iverson, Engineering Supervisor, KUOM Radio, University of Minnesota. (Lance Raygor, Rte. 1, Box 337, Chisago City, Minnesota 55013, 612/373-4807.)

Chapter 24—Madison, Wisconsin

The January meeting of the Madison Chapter of SBE was held on January 27, 1977. Following a brief business meeting, Neal McLain, Chief Engineer for CCTV, gave an overview of the operation and led a tour of the facilities. The officers for 1977 who were elected at the November meeting are: Ken Dixon, Chairman; John McKenna, Vice Chairman; Jim Crooks, Secretary/Treasurer. (Ken Dixon, WHA, 821 University Avenue, Madison, Wisconsin 53706, 608/263-4088.)



EJ-1013

ALL SOLID STATE PORTABLE
MICROWAVE SYSTEM

SELF CONTAINED IN TWO
IDENTICAL BATTERY/AC
POWERED UNITS

**INTERNATIONAL
MICROWAVE CORP.**

33 River Road, COS COB, CT. 06807
(203) 661-7655 TWX: 710-579-2925

For More Details Circle (202) on Reply Card



UNEQUALED

- COLOR STABILITY
- LUMINANCE STABILITY
- CONVERGENCE STABILITY

Write for
detailed
Catalog



Distributed in USA by

**Rohde & Schwarz
Sales Co. (U.S.A.) Inc.**

14 Gloria Lane Fairfield, N. J. 07006
Telephone: 201-575-0750

For More Details Circle (184) on Reply Card

How a Panasonic VTR helps WISH-TV eliminate make-good headaches. FAST! FAST! FAST!



At WISH-TV, the CBS affiliate in Indianapolis, they're using a video tape system primarily designed to stop robbers... to stop another kind of loss—false claims for make-goods.

The system is the new Panasonic time lapse video tape recorder NV-8030. As Joe Missick, WISH-TV's director of engineering, explains it: "When an advertiser refuses payment because he says his commercial didn't run, or didn't go off right, we don't argue—we just show him a video tape.

"Now there is no question of what was run. There it is for our advertisers to look at, and there are no areas of contention. We have already saved the cost of the Panasonic time lapse video tape recorder in the first 30 days by eliminating false claims for advertisers' make-goods."

The Panasonic VTR not only verifies that the spots ran, but that the video reception was good.

In addition to high resolution, the Panasonic NV-8030 is versatile. WISH-TV also uses it for log verification, to check on commercial loudness and to pinpoint any transmitter interruption.

The NV-8030 can record pictures from an off-air monitor, continuously in different time sequences—9, 18, 72 and up to 108 hours (that's 4½ days) all on one reel of tape.

WISH-TV uses it in the 18-hour mode—so one tape monitors virtually an entire broadcast day.

Could the system work for you? The easiest way to find out is to call us. Or send us the coupon. That way, the next time one of your advertisers makes a false claim, instead of telling him he's wrong—you can show him.

Panasonic Company, Video Systems Division, Dept. 302
One Panasonic Way, Secaucus, N.J. 07094.

- Send me technical information on the NV-8030.
- Have a Panasonic video specialist call to demonstrate how the NV-8030 can be used at my station.

Name _____ Title _____
Please Print

Company _____

Address _____

City _____ State _____ Zip _____

Area Code _____ Phone Number _____

Panasonic
just slightly ahead of our time.

In Canada, contact Panasonic Video Systems Department, 40 Ronson Drive, Rexdale, Ontario M9W 1B6.

Visit Panasonic at NAB in the Military Room at the Washington Hilton.

**TENDEL FOR TENSION
NOW
MORE THAN EVER**



Shown measuring the critical supply tension on a Sony 2850

**FLAGGING?
SIGNAL DROP-OUTS?
INTERCHANGEABILITY?**

The TENTELOMETER tape tension gage can help isolate and correct these problems and others on your reel to reel and your U-matic machines by measuring dynamic tape tension. Priced from \$179.00 complete.

Send for Your FREE 8 pg. TENTELOMETER instruction and application manual or call today:



50 Curtner Avenue, Campbell, CA 95008
(408) 377-6588
See us at NAB-Booth #604

For More Details Circle (186) on Reply Card

**From
BLUE
BANANAS
to
SAG TAILS**

**Nasty National
Forest Reports**

The student operators at our high school FM station probably are responsible for as many "Blue

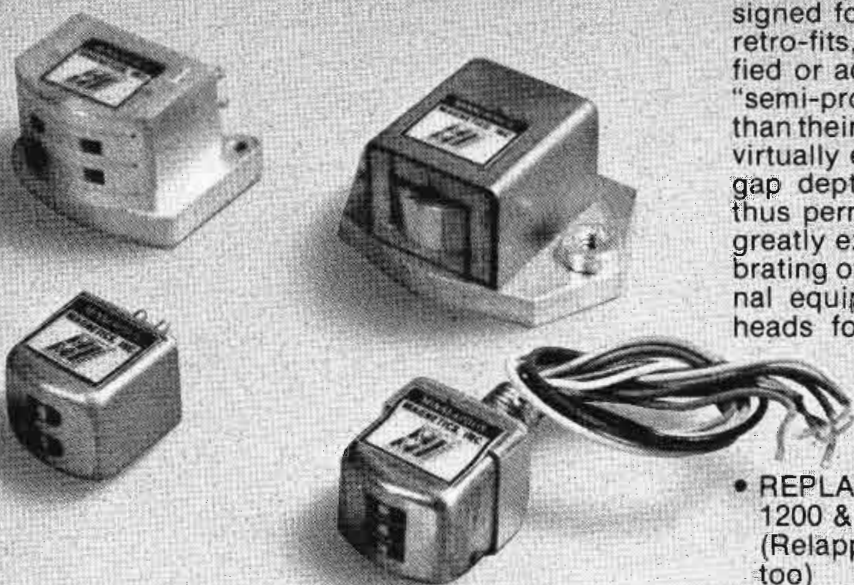
Bananas" as could be found at any other station. One budding announcer, mispronouncing the word "Ashley", wound up a weather report with an outro we'll never forget: "You've just heard today's weather report, courtesy of the Nasty National Forest." On another occasion, the aspiring DJ announced, "Those were the Beatles playing 'Junk'". This was immediately followed by several seconds of dead air while he tried to figure out if he had said what he thought he had said.

Another favorite incident occurred when I was visiting a nearby station and the announcer quipped, "Good luck to all you fishermen tomorrow on the first day of fishing season. If you don't catch anything, I know a good fish market near Pineview Reservoir." He then switched to a taped announcement, which, much to his dismay began, "I read about that in the journal of the American Medical Association."

Thomas W. Bridges
Station Manager, KUIB-FM
Vernal, Utah



- SYMBOL OF PROFESSIONAL TAPE HEADS



MMI Replacement Heads are professional heads — designed for the machines they will be used with — direct retro-fits, both mechanically and electrically — not modified or adapted heads originally intended for "home" or "semi-pro" recorders. But there is more to MMI Heads than their professional performance: An all-metal face that virtually eliminates oxide loading . . . More than twice the gap depth-of-metal of some original equipment heads, thus permitting relapping (under normal head wear) for greatly extended head life . . . Individual testing and calibrating of each head to insure meeting or exceeding original equipment specifications . . . MMI has 1/4-inch tape heads for Ampex, ITC, Magnequad, Revox A-77, and Scully. Professional heads for professional recorders — from MMI.

ALSO FROM MMI
(PROFESSIONALLY, OF COURSE) . . .

- REPLACEMENT AUDIO HEADS FOR AMPEX VR-1100, 1200 & 2000 VIDEO RECORDERS (Relapping and refinishing of the complete columns, too)
- HEAD ASSEMBLY REFURBISHMENT AND REBUILDING (Loaner Assemblies available for only the shipping costs)
- HEAD RELAPPING AND REFINISHING (No-Charge head evaluation)



(612) 884-7393

NEW! MMI HAS HEADS FOR CART MACHINES!

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 (187) on Reply Card

being aired our newsman dashed upstairs like a speeding bullet, pulled out microphone plugs, patch cords, turned off turntables, the tape machines and finally killed the sound after "Lions Club" was uttered. In the meantime the announcer on the board was potting up and down all the pots except the network line, where all the trouble seemed to lie.

As chief engineer, I investigated the situation and deduced that our production feed became the network line temporarily. The funniest thing about this was the production board was not patched into anything else to feed the control room. Somehow, somewhere the Mutual Radio line was temporarily crossed to our production studio line making it a potential hazard which came as Jimmy Carter was becoming our 39th president of the United States.

Fred Shetka
Chief Engineer
WIXK AM-FM
New Richmond, Wisc.

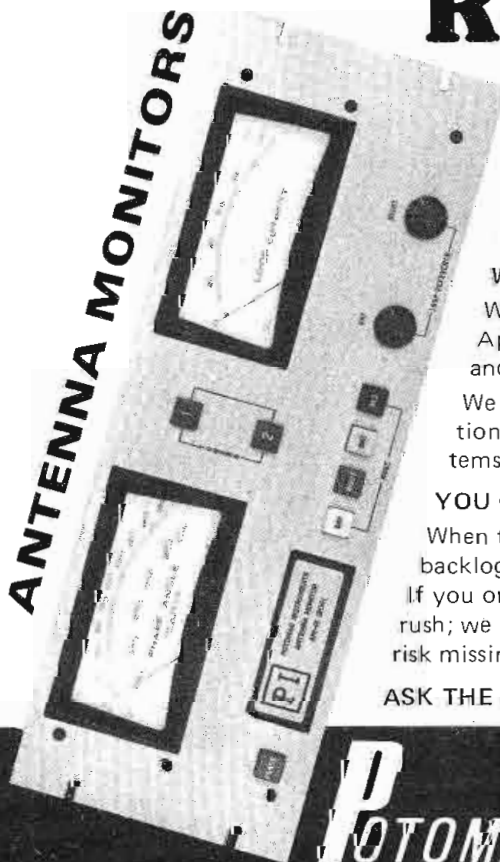
President Takes (testing 1,2,3) Oath of Office

Inauguration Day, January 20, 1977, had a Blue Banana added to Jimmy Carter's swearing in and beginning of his speech.

We are affiliated with the Mutual Radio Network and were carrying the festivities of the event. At the same time our sales lady was preparing to tape an interview in our production studio. As Jimmy Carter began to take his oath of office a blundering "testing 1,2,3" came over the monitor.

Our news director heard it in his office and thought someone left the pot open for the production room, and thought the announcer on the board knew where the problem was and rectified it. However to his dismay, and to ours, as Jimmy Carter began his speech once again we heard, "Today on our Kares program I am pleased to have as our guest, the president of the Star Prairie Lions Club." As this was

Just A Friendly Reminder



In case it happened to slip your mind and you are one of the few remaining directional stations yet to comply with paragraph 73.69 of the FCC Rules... you have until June 1, 1977 to have in operation a "Type Approved" antenna monitor.

WE CAN HELP YOU

We have supplied over 90% of all "Type Approved" antenna monitors (both meter and digital readout) now in service.

We invite your questions concerning installation, operation, remote control, sampling systems, etc.

YOU CAN HELP US

When the last deadline rolled around our order backlog resulted in an eight month delivery cycle. If you order now, you can avoid the last minute rush; we can deliver as required; and you will not risk missing the June deadline.

ASK THE EXPERTS!

POTOMAC INSTRUMENTS

932 Philadelphia Ave. • Silver Spring, MD. 20910 • (301) 589-2662

For More Details Circle (188) on Reply Card

**PROTECTION
ASSURED
AGAINST
LIGHTNING
1049 Stations Use
The Wilkinson
Line Surge
Protector
IT REALLY WORKS!**

WILKINSON
ELECTRONICS, INC. P.O. Box 738
Trainer, Pa. 19013
(215)497-5100

For More Details Circle (189) on Reply Card

**Wilkinson
Self Testing
Silicon Rectifiers
Replace Directly
Mercury Vapor
Tubes**

- * Self Testing — A neon indicator for each diode warns of failure.
- * Direct replacements available for all diode rectifiers — no rewiring necessary.
- * Repairable — any component can be replaced easily.
- * 200% Safety Margin on Voltage — 300% on Current.
- * Fully Guaranteed.

WILKINSON
ELECTRONICS, INC. P.O. Box 738
Trainer, Pa. 19013
(215)497-5100

For More Details Circle (291) on Reply Card

Industry News

Commission Approves SBS Satellite Plans

The Commission has authorized Satellite Business Systems (SBS) to construct and operate facilities to provide specialized domestic satellite communications services.

SBS is a partnership sponsored by COMSAT General Corporation (COMSAT General), International Business Machines Corporation (IBM) and The Aetna Casualty and Surety Company (Aetna).

The operating partners are COMSAT General Business Communications, Inc. (CGS), a wholly owned subsidiary of COMSAT General; Information Satellite Corporation (IBMS), a wholly owned subsidiary of IBM, and Aetna Satellite Communications, Inc. (ACS), a wholly owned subsidiary of Aetna.

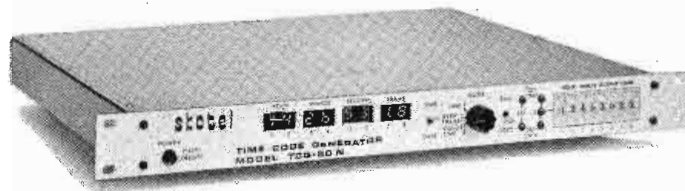
The SBS Proposal

The FCC said SBS's plan involves two major phases—a pre-operational program and an operational system.

The preoperational program, which is divided into two phases, is designed to evaluate, in an operating environment, the performance of equipment incorporating the new communications techniques to

Who Has The Time?

Skotel time code readers and generators. High performance timekeeping for greater flexibility in programming and commercial production. Models feature full user data facilities, high visibility LED display, low power consumption and cool reliable operation. Skotel is



compatible with all other SMPTE code equipment and options plug in with no special tests or tools required. Our reader reads 80 bit SMPTE code from any source at speeds from hand turn to 40X. Self-contained character generator gives precise, single frame accuracy.

Like to see more? We've got the time.

skotel | PO Box 310, Station Rosemont
Montreal, Canada H1X 3B8
(514)728-2285

For More Details Circle (324) on Reply Card

BROADCAST ENGINEERING

be used in the operational system, and to demonstrate its feasibility.

The first phase of the preoperational program will be a six-month developmental program limited to two earth stations located on prepared sites furnished by IBM at Poughkeepsie, N.Y., and Los Gatos, Calif. The facilities will be used in this phase only for evaluating equipment performance.

In the second phase of the preoperational program, the same two earth stations plus five others will provide private line communications services to IBM and others on a common carrier basis. The five new stations will be chosen from among the following: Gaithersburg, Md.; Manassas, Va.; Boca Raton, Fla.; Atlanta, Ga.; Lexington, Ky.; Greencastle, Ind.; Rochester, Minn.; Austin, Tex., and Boulder, Colo.

The SBS operational system consists of a satellite system for data, voice and image transmission, operating in the 12 and 14 GHz bands. This will be the first domestic satellite system in those bands and offering an all-digital transmission service.

The service in the 48 contiguous states will be on a network providing integrated digital transmission among a customer's geographically dispersed business locations. The question of service to offshore points has been reserved for further comment.

The operational system will use three satellites, two in stationary orbit and one a ground spare.

Continued on page 154



Now Absolute Dust Protection For VTR Equipment!

Increases Your Headwheel Life

Yes, you now can actually increase headwheel life on VTR equipment. Envirazone II, a specially designed laminar flow module, provides the cleanest possible conditions (Federal Standard 209B, class 100) at the video head and tape transport area where it really counts. By removing dust and other foreign particles from the air, abrasive action is greatly reduced—resulting in extended headwheel and video tape life.

ENVIRCO

P.O. Box 6468
Albuquerque, New Mexico 87107

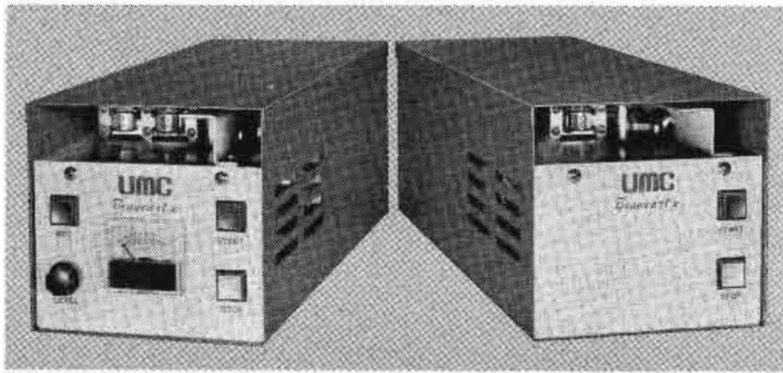
Coming through...
with even more ways to move words, power, pictures and songs

At Belden we're constantly coming through with new wire, cable and cord answers to meet an expanding array of broadcast system needs. Mike cable, control cable, coax and triax, power supply cords... We application-engineer wire products to fit specific on-the-job conditions. We put it up in UNREEL™ to save you installation time. And we back it up with service: from availability and fast delivery to custom designs. Let Belden come through for you. Get the new Belden Electronic Catalog today. Belden Corporation, Electronic Division, P.O. Box 1327, Richmond, IN 47374. Phone: 317-966-6661.

BELDEN  **Coming through...**
with new ideas for moving electrical energy

Copyright © 1976 by Belden Corporation 8-10-6

The frill is gone.



Beaucart II.

If you thought our original Beaucart® tape cartridge machines were something, just wait until you get a look at our new Beaucart II. Great features! No frills! And lower price! Meets or exceeds NAB specs, of course. Incorporates the unique Beau pancake motor and our own Beau audio heads. Mono Record/Playback or Playback only for A-size carts in a compact 5¾" x 15" x 5¼" machine.

Let us tell you all about Beaucart II today. Write for our free brochure or call (203) 288-7731. Beaucart will perform for you!

UMC BEAUCART DIVISION
UMC ELECTRONICS CO.

460 Sackett Point Rd. North Haven, CT 06473
See us at NAB, Shoreham Americana, Booth 562
For More Details Circle (223) on Reply Card

Industry News

Continued from page 153

PBS Moves Forward On Satellite Network Plans

Collins Commercial Telecommunications Division of Electronics Operations, Rockwell International Corporation, has received a \$25.5 million contract from the Corporation for Public Broadcasting (CPB) to provide an earth station system.

Collins will provide an earth station system comprised of 150 to 165 stations for the new nationwide satellite-based television system that will serve the Public Broadcasting Service (PBS).

Collins Commercial Satellite Communications, located in Dallas, and headed by R. L. Wolf, vice president, will have charge of the program.

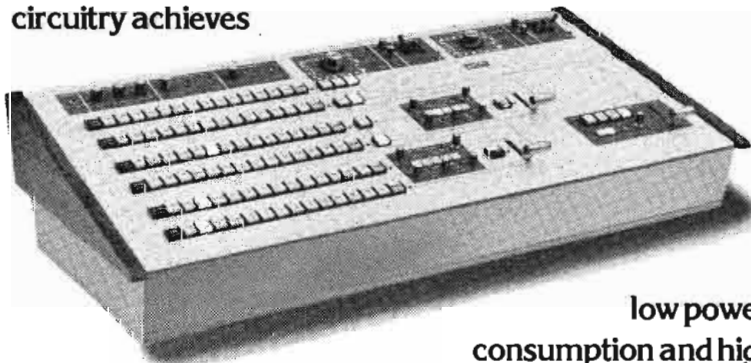
Collins will provide a turnkey system which will include receive-only ground terminals, interconnect links, and services such as frequency coordination and site selection, prototype and qualification testing, side preparation, construction, installation and long term maintenance support.

Wolf said the use of a three and later four-channel satellite interconnection system will enhance many of public television's basic program objectives.

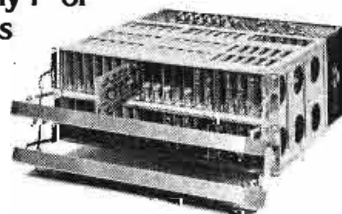
"With its new satellite system PBS can broadcast multiple programs to public television stations

Switch to the Ross family. It's a new generation.

Maximum production at minimum cost. It's ideal. To achieve it we came up with a new generation. Ross Video Production Switchers. Cost effective design gets the best and the most for less. State of the art CMOS circuitry achieves



low power consumption and high reliability—human engineering combines sophistication with ease of production and logical operating procedures. Space efficiency opens up a dramatic new range of applications. Look into the RVS16-6. 16 inputs, 6 buses, dual effects generators and more, much more. Complete production capability with an electronics and power supply package that occupies only 7" of rack space. The RVS16-4 features 16 inputs, 4 buses and effects generator—and for maximum production flexibility at minimum cost, there's our



new 10 input 4 bus RVS10-4. It's available in two formats: conventional remote control panel, or super compact, integrated electronics/control package at a super low price.

Ross Switchers are in use in major broadcast installations. Check our specs in the largest studio or the most mobile mobile, Ross Video Production Switchers are right at home.

Illustrated is our top of the line RVS16-6. Ask for technical literature on our full family of switchers.



ROSS BROADCAST PRODUCTS LTD
14 IROQUOIS PLAZA
IROQUOIS ONTARIO K0E 1K0
(613) 652 4889

Distributed by

Glentronix Ltd
160 Duncan Mill Road
Don Mills, Ontario M3B 1Z5
(416) 444 8497

simultaneously, enabling each station to decide which program to air and which one to tape for later showing," Wolf said.

"Also, the new system will enable PBS to provide additional channels to enlarge programming options for various groupings of its stations," he continued. "The new system provided flexibility and access to public television stations not previously financially possible, and expansion of the PBS interconnection using its new satellite system will be less complex and costly than at present.

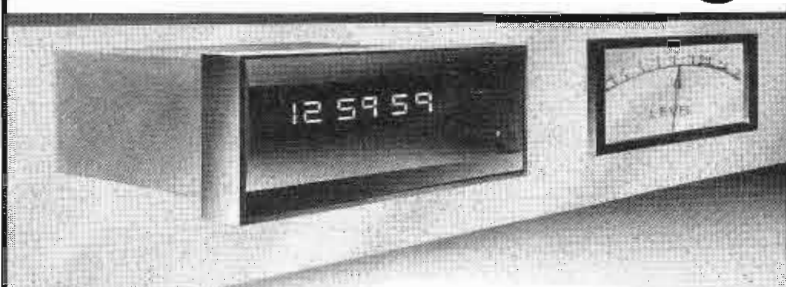
"Under present conditions linking up of a new public television station often takes two to three years. With the new system, PBS can have a new ground terminal installed as quickly as the equipment can be erected and frequency coordination requirements met," Wolf said. "Also, the costs of interconnecting new stations in the satellite mode are substantially less than such costs in the present terrestrial mode.

"And finally, signal quality will be improved with the new satellite system. A single signal will be picked up at approximately equal strength by each receive-only ground terminal. Distance has little significance and signal deterioration does not occur as it does in terrestrial systems."

The new public broadcasting satellite system will utilize three transponders of Western Union's WESTAR satellite to beam signals across the continental United States, and to Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands.

Continued on page 156

Perfect Timing



console mount clocks and timers

Reliable ESE clocks and timers are now available in compact (2" x 3.7" x 3.6") console mount enclosures with bright easy to read .33" red LED's. Provided with rear solder pins for connection to your own switching or the optional remote connector, 6' cable and pushbutton set. Other options include: BCD Output; Crystal Timebase; 220V-AC-50Hz; and Kit Form. In addition the ES-370 is available with Stop and/or Relay Contact Closure at Zero.

ES-172 12 Hour Clock	\$125.
ES-174 24 Hour Clock	\$125.
ES-370 100 Min. Up/Down Timer	\$180.
ES-570 60 Minute Timer	\$125.
ES-572 12 Hour Clock/Timer	\$150.
ES-574 24 Hour Clock/Timer	\$150.



Write, Wire or Call: (213) 674-3021
505 1/2 CENTINELA AVENUE • INGLEWOOD, CALIFORNIA 90302

For More Details Circle (225) on Reply Card

Look to ASACA for price and performance...

for price ... look at our Envelope Delay Measuring Instruments: the 763NA and new 201-1. Both feature large CRT screens, built-in sweep generators, and allow spot frequency delay measurements from 50KHz to 5MHz. Both are NTSC or PAL compatible. The 201-1 adds a built-in sync generator and blanking mixer—and operates with either AC or DC method.

for performance ... look over the unique 925C Video Noise Meter. The only instrument that measures chroma noise—even separates AM and PM noise. It also measures RMS voltage value and S/N ratio, and analyzes the frequency distribution of low-band noise.

for more information ... just fill out and mail in the coupon. Find out more about the price and performance of ASACA products.
ASACA Corporation of America
1289 Rand Road, Des Plaines, IL 60016
Phone: (312) 298-4380

763NA and 201-1 Envelope Delay Measuring Instruments—compare price and quality!



UNIQUE 925C Video Noise Meter—MEASURES CHROMA NOISE!

SHIBASOKU Instruments
—sister company of ASACA

ASACA[®]
ASACA CORPORATION OF AMERICA

Tell me more about ASACA's price and performance:
 763NA and 201-1
 925C

See us at the NAB Show in Washington, D.C. Booth 424 Hilton Hotel
For More Details Circle (226) on Reply Card

Holds all sizes of ENG/VTR equipment!

EDITING CONSOLE



See us in Booth 612
Shoreham Hotel

This totally modular console has every feature for editing efficiency—shelves that adjust on 1" increments, sliding pullouts for added working space and easy maintenance, total access to VTR's, editors, monitors and equipment. Rolls easily on large casters—even into a van to create a mobile unit!

*For full-line catalog of video consoles,
tape and film trucks, film and videotape
storage systems, call or write:*

The Winsted Corporation

8127 Pleasant Ave. So., Minneapolis, MN 55420
(612) 888-1957

For More Details Circle (227) on Reply Card

Industry News

Continued from page 155

The basic television receive-only earth station system will include 10 meter "nominal" antennas, low-noise amplifiers ranging in temperature from 50 Kelvin to 300° Kelvin and the new Collins 55U3-1SC frequency agile video receiver.

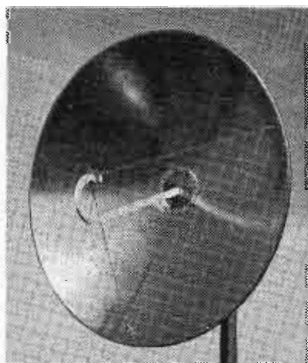
Globecasting

Plans to provide developing countries with information and education by means of television still often fail because of inadequate technical facilities.

For Africa, the time has now come to introduce educational television on a larger scale: The experimental German-French communications satellite "Symphonie" offers the possibility of broadcasting suitable programs, and a satellite receiving station developed by Siemens, with an antenna diameter of 4.5 m, can be installed quickly and easily anywhere to serve as an earth station.

The small earth station produced with substantial support from the Federal Department of Research and Technology was recently brought into service for the first time in Kigali, the capital of the

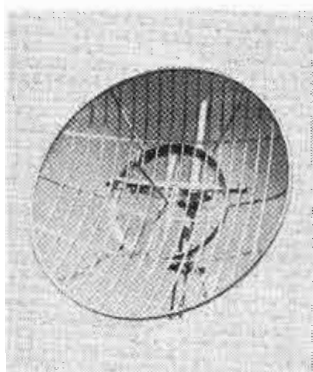
Anixter-Mark makes the best performing communications antennas.



Rugged center-fed feed antenna

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

Meets or exceeds EIA Standard RS-222B and RS-195A. Features a low profile for bulk crating, continuous polarization adjustment and is pressurable to 10 PSI. Feed guy wires included on all models 4 feet and larger.



Low Windload Grid Antenna

350-2700 MHz. Low profile design cuts tower construction cost with no sacrifice in electrical performance. Three-point mounting greatly reduces path alignment and installation time.

Ringbacks further improve already extremely low wind loading characteristics of dish type parabolas. Others available on special application. Nest 4 to a crate.

Visit us at Booth 569, Shoreham

Manufacturers of a Full Line of Point-To-Point Antennas • Microwave • Two-Way • Amateur • CB

ANIXTER-MARK

5439 W. Fargo, Skokie, Ill. 60076 / (312) 675-1500
Made in the U.S.A.

For More Details Circle (228) on Reply Card

African republic of Rwanda, where it is being used to improve reception (as compared with short-wave) of the programs broadcast from Cologne by the German radio station "Deutsche Welle."

The suitability of the new earth station for direct TV reception via "Symphonie" was recently demonstrated by Siemens at a four-day colloquium in Jaunde, the capital of Cameroon, which was attended by representatives from 19 countries (including 14 African countries). Excellent picture quality was achieved on up to 12 monitors simultaneously, both in the PAL and Secam color transmissions and in black-and-white large-screen projection. Even heavy tropical rain had no noticeable effect on the reception quality.

For Cameroon's educational television program "Esopo I", which is due to be introduced shortly, the earth station described above will probably be used. It can be transported by air and set up in a few hours, and it does not require steering. At the time of the demonstrations in Jaunde, Cameroon's neighbor Gabon expressed its intention to experiment with educational television via "Symphonie", and the representatives of Congo, Senegal and Uganda also showed considerable interest.

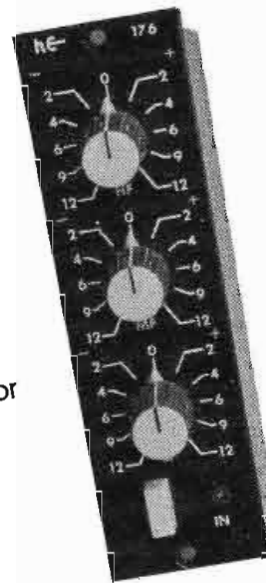
Try
Broadcast Engineering
Classified Ads

NEW!

Since 1966, Holland Electronics has been custom building systems for the major networks where we have earned an excellent reputation for Quality, Integrity and On-Time Delivery. The Model 176 Equalizer is the first in a line of standard products for the audio professional.

**MODULAR
EQUALIZER
MODEL 176**

- Transformer coupled Input and Output
- Detented Controls for Resetability
- Low Cost

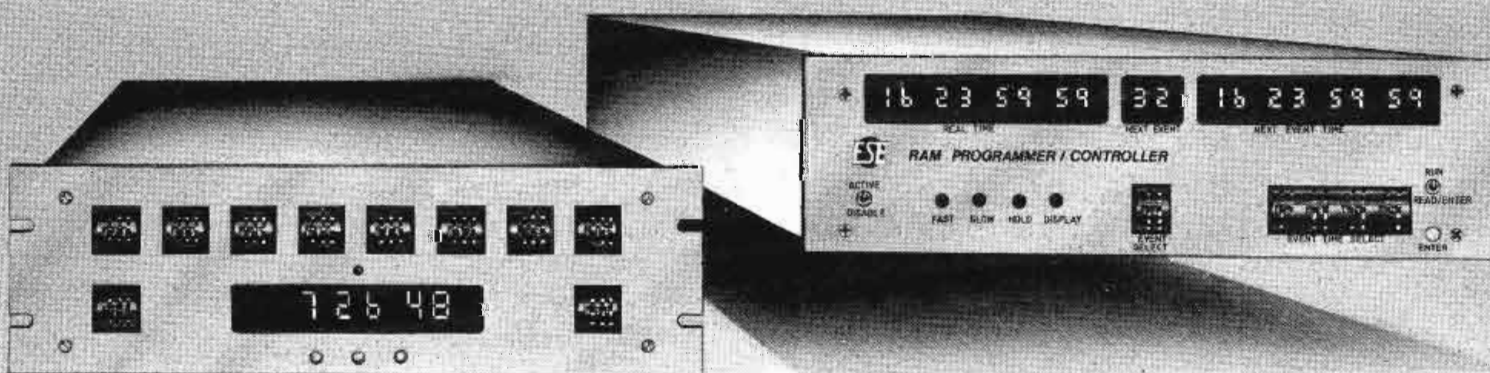


For complete information write:

HE HOLLAND ELECTRONICS, INC.
970 East 92nd St., Brooklyn, New York 11236

For More Details Circle (229) on Reply Card

PERFECT TIMING



Programmer/Comparators and Controllers

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



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

VIDEO PATCHING

- Self-normaling, no patchcords or plugs required for standard connections.
- Self-terminating, unused sources automatically terminated within the jacks.
- Non-interrupting, on-line monitoring of live circuits.
- Best frequency response and isolation specifications in the industry.
- Patented design in wide use by TV broadcasters, industry and government.



Patented COTERM[®] 22T jack
22 per 19" panel
1 3/4" or 3 1/2" high

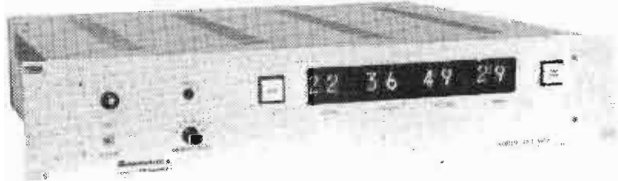
DYNATECH LABORATORIES, INC.
Cooke Engineering Division
900 SLATERS LANE, ALEXANDRIA, VIRGINIA 22314
TELEPHONE: 703-548-3889 ■ TELEX: 89-9119

For More Details Circle (231) on Reply Card

DATAMETRICS TIMING PRODUCTS

Precision Time Code Data
Indexing and Retrieval Equipment
now announces

**SMPTE - TV EDIT TIME CODE
GENERATOR AND READERS**



FEATURING

- Reader and/or generator models available.
- T.V. Monitor character generator option.
- Wide Dynamic AGC for amplitude variation and frequency response.
- Error by pass for fail safe operation.
- Drop frame or black and white operation.
- External or line synchronization.

Our application engineering group is at your prompt service to review your video editing problem and to offer our optimum solution. Request Bulletin SMPTE.



Gould Inc., Control and Systems Division
340 Fordham Rd. Wilmington, MA. 01887
Telephone (617) 658-5410
Manufacturer Of Datametrics Products

For More Details Circle (232) on Reply Card

New Products

Radio And TV Transmitters

The Broadcast Products Division of **Harris Corporation** will be displaying an unusually wide range of advanced state-of-the-art broadcast equipment at the 1977 NAB Convention. Highlighted will be the introduction of new innovations to the Harris AM transmitter, FM transmitter, IF Modulated TV transmitter and audio lines.

The BT-25L2 represents the new line of Harris IF Modulated television transmitters. Included in this transmitter is the exclusive MCP solid-state exciter with TSB (Transversal SideBand) filter. This filter requires no group delay and no tuning adjustments. Only 1 1/2 square inches in size, it is mounted on a PC board in the visual exciter. (Will be shown with visual exciter operating.)

The new MW-1A, all solid-state 1 kilowatt AM transmitter featuring Progressive Series Modulation (PSM), and the MW-5A and MW-50A, 5 and 50 kilowatt AM transmitters, with Pulse Duration Modulation (PDM), will also be introduced. Now included in these transmitters is a built-in audio processing circuit which increases modulation density. (The MW-1A will be in operation.)

In addition, Harris will introduce a completely new line of FM transmitters, with the FM-2.5 K, 2500 watt, and the FM-20K, 20 kilowatt FM transmitters. These transmitters employ a new solid-state FM exciter utilizing Digitally Synthesized Modulation (DSM). This exciter provides the highest stereo separation in the industry and allows a 2 to 6 dB increase in loudness with no signal deterioration. (The FM-2.5K will be shown with exciter operational.)

The advanced MSP-100 (Maximum Signal Processor) with tri-band Automatic Gain Control (AGC) and automatic attack and release time will also be introduced. This system will increase flexibility for varying formats and provide the highest possible modulation with minimum distortion. (Operating display.)

An Automatic Transmission System (ATS) will be demonstrated at the Harris exhibit. This system may be programmed with up to 1400 time functions to monitor the transmitter readings and initiate corrective action. (Will be shown in operation with an MW-1A.)

Audio equipment will include the Gatesway 80, the Stereo 80, the Mono 5 and the Stereo 5 audio consoles. Also on display will be the Criterion Compact-II, monaural record/playback cartridge system, the Criterion-III multicart tape system; and the new CB-1201, 12-inch transcription turntable.

Along with the BT-25L2 color television transmitter, Harris will display other television transmitting equipment including scale models of the Harris Circularly Polarized, Batwing, Helical and Zig Zag TV antennas. Harris CP antennas are available in both high and low band VHF.

For More Details Circle (292) on Reply Card

Band Reject Filters

A new series of modular multipole pair active band reject filters utilizing a newly patented state variable active filter design technique and featuring temperature stable, notch-like rejection of any user-specified single frequency between 50 Hz and 5 kHz is now available from **Frequency Devices, Inc.** Requiring no external tuning components or adjustments, these filters exhibit closely defined, extremely sharp rejection characteristics that are symmetric about the filter center frequency f_0 . The frequencies at which no less than 50 dB of attenuation exists are specified to occur at $\pm 0.835\% f_0$. The frequencies at which no greater than 3 dB of attenuation exists are specified at $\pm 5\% f_0$. These frequencies are specified accurate to within $\pm 0.05\%$. The filter transfer characteristics will remain within the specified bounds over the full 0°C to $+70^\circ\text{C}$ operating temperature range. Signals at frequencies outside the reject band are passed with an inverting gain of 0 ± 0.3 dB.

The extremely steep-skirted rejection characteristics of these devices make them ideal for interference elimination applications. Examples include the elimination of 50 to 60 Hz power line interference from the low level signals characteristic of EEG, EKG, and EMG biomedical measurements. In aircraft applications, 400 to 1200 Hz interference generated by the on board power source must often be eliminated.

The 783 Series meets this need to eliminate the large variety of commonly encountered interference signals: Under computer direction, OEM quantities of these devices are factory calibrated to sharply reject any user specified frequency between 50 Hz and 5 kHz. The user specifies the frequency to be eliminated—which corresponds to the center frequency or the f_0 of the filter—as a suffix to the basic model number. Efficient and innovative manufacturing techniques hold down the cost and the price of this application-specific service.

For More Details Circle (293) on Reply Card

Video Tape Conditioner

Recently introduced by Research Technology Inc. is the **RETEC** Video Tape Conditioner. Said to reduce tape dropouts as much as 70 percent and virtually eliminate head clogging, the machine burnishes and polishes the oxide surface, removing dirt, chips and loose particles. The RETEC VTC Conditioner can be ordered in a variety of formats designed to treat tapes 1.5 or 1.0 mils thick and $\frac{1}{2}$, 1 or 2 inches wide.

Straight-line threading and automatic shut-off at the end of the conditioning cycle are said to have made the RETEC VTC valuable to the professional user. The RETEC VTC machine conditions a 10½-inch reel of tape in less than four minutes without solvents and without harming the recorded program. Note widely known is the fact that pre-recorded tape performance can also be improved significantly by conditioning.

For More Details Circle (294) on Reply Card

Continued on page 160

Perfect Timing calculated for your pocket only \$39.95



Now you can compute Hours, Minutes and Seconds in the palm of your hand!

ESE INTRODUCES THE CANON 8T HIGH SPEED TIME CALCULATOR. Featuring one touch calculation of addition, subtraction, multiplication or division. Unique Time Keys for automatic chain calculations. "Auto" Input Switch for automatic entry of sexagesimal time data. And Conversion Keys which instantly change sexagesimal data to decimal data or vice versa!

SIZE: 2½" x 5½" x 7/16"
POWER SOURCE: 2 penlite dry batteries (size AA)
AC ADAPTER AVAILABLE: \$5.00



Write, Wire or Call: (213) 674-3021
505½ CENTINELA AVENUE • INGLEWOOD, CALIFORNIA 90302

For More Details Circle (233) on Reply Card

STOP GROUND-LOOP HUM!

VIDEO HUM STOP COIL...HSC 1

Will ELIMINATE HUM and other INTERFERENCE in Video Lines caused by differences in Ground Potential.

- For Color and Black and White.
- FLAT-DC to 6.5 MHz.
- No Low-Freq. or Hi-Freq. Roll-off.
- No Differential Phase Distortion.
- No Differential Gain Distortion.
- No Envelope Delay.
- Passive Device - Failure Free-Low Price.
- Small Compact Package 4" x 4" x 2-1/4".

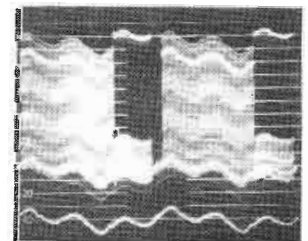
ELIMINATES HUM AND INTERFERENCE:

IN STUDIO

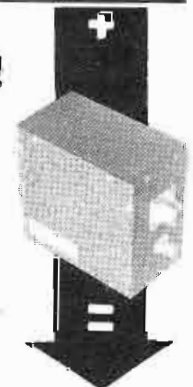
- Between Buildings
- On long runs in Buildings
- Between Studio and Transmitter
- On Incoming Telco circuits
- On Outgoing Telco circuits

IN FIELD

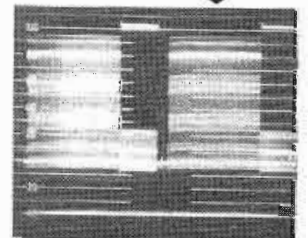
- Betw. Remote Truck and Telco
- Betw. Remote Truck and Microwave
- For Intertruck Hookup
- For VTR Units
- For Monitoring Lines



NEW!



\$140
F.O.B.
N.Y.



Available on
10 day free trial

AUDIO-VIDEO ENGINEERING COMPANY
65 Nancy Blvd., Merrick, N.Y. 11566
Tel. (516) 546-4239

For More Details Circle (234) on Reply Card

New Products

Continued from page 159

Cueing Receiver

The **Comrex** model CRA receiver has been designed for broadcast field and studio cueing applications. The CRA receiver is available on any frequency from 50 MHz to 550 MHz, including all VHF TV channels (for cueing during live broadcasts) and the remote pickup frequencies in the 150-174 MHz and 450-470 MHz bands.

The receiver is ruggedly constructed, pocket size (3"x5"x1") and operates on a replaceable 9 V battery. Comrex also manufactures a complete line of cueing transmitters.

For More Details Circle (295) on Reply Card

Audio Switching Module

Modular Audio Products new Model 4011 FET audio switching module provides four fully independent, remote-controllable audio switch circuits on a compact, plug-in PC card, with gold plated

edge contacts.

Ideal for use in high quality professional audio applications, Model 4011 may be utilized individually, to perform various switching functions in console mixing channels; or in multiples, to form large or small Matrix type switching/routing systems.

Designed for optimum performance in 600 ohm balanced or un-balanced circuits, Model 4011 features: High Speed—two microseconds from ON to full OFF state (-100 dB at 1 kHz input Nom.); Low Distortion—0.07% at +4 dBm output, 1 kHz; and High Input Level capability—+22 dBv max. Frequency response of the unit is extremely flat from DC to 20 kHz (0.1 db) max). Power requirements: ± 15 VDC at 10 mA max. per card. Dimensions: 2 $\frac{3}{4}$ inches high by 4 $\frac{1}{2}$ inches long by 13/16 inches wide.

For More Details Circle (296) on Reply Card

Three-Tube Portable Camera

Hitachi Denshi America, Ltd., will show its new and completely portable color camera, the FP-1020. The FP-1020 is a three-tube com-

act self-contained camera that weighs less than 16 pounds. It makes use of a Saticon tube for high resolution and uniform sensitivity.

Setup of auto white and black balance is done through digital memory. Reportedly, this camera will sell for under \$20,000.

For More Details Circle (297) on Reply Card

12 x 9 f/1.7 Lens

The lightweight (3 lbs.) **Fujinon** 12 x 9 f/1.7 (9-108mm) offers a wide angle (52°) and close focusing (31 inches). It also has macro focus, back focus adjustment, three-way servo zoom control, pan bar focusing capability with the following controls: auto iris switch, momentary auto iris, manual servo zoom delegate and VTR. Another added feature is that the zoom servo is the "plug-in" type.

This lens is perfect for $\frac{2}{3}$ -inch ENG cameras.

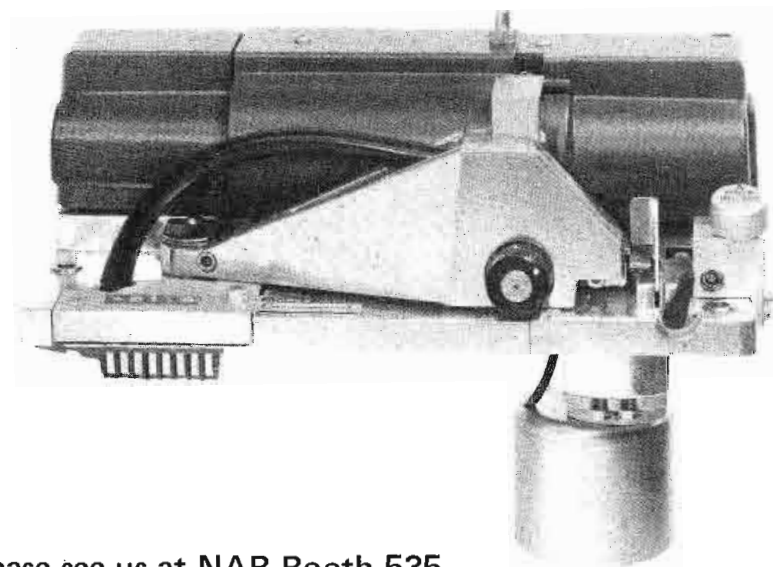
For More Details Circle (298) on Reply Card

Flying Spot Telecine

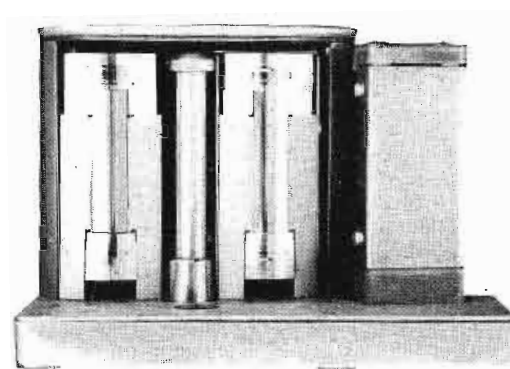
A new Flying Spot Telecine (MK III) featuring a system developed in

CMC Provides Unexcelled Services For:

- Refurbishing Video Head Assemblies - Mark III, Mark X, Shibaden Mark X, Mark XV, and Mark XX.
- Refurbishing Audio Heads for Ampex & RCA VTR'S.
- Immediate Delivery - Video Discs & Heads for HS-100.
- Line-by-Line Auto Equalizer for VR-1200 & VR-2000.



Please see us at NAB Booth 535.



For more information, please write:

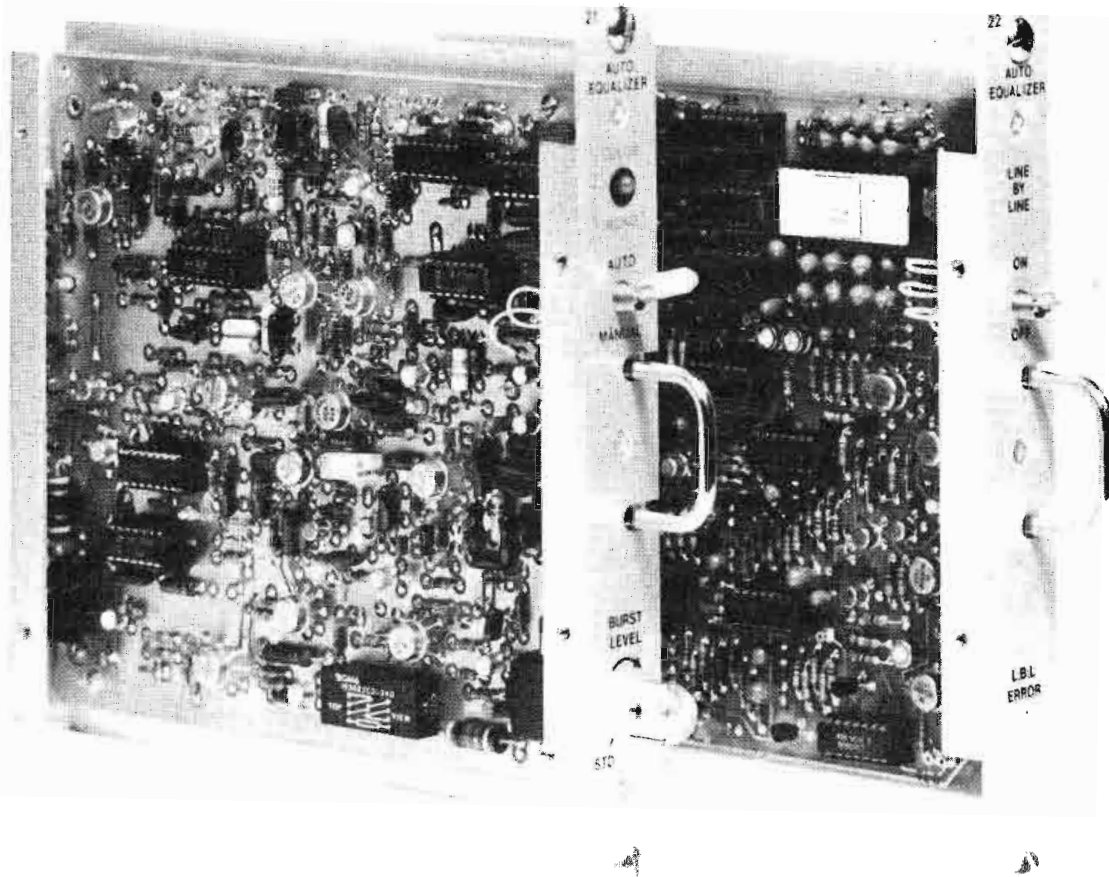
COMPUTER MAGNETICS CORP.

125 W. Providencia Ave.
Burbank, Calif. 91502
U.S.A.

(213) 843-6674

For More Details Circle (235) on Reply Card

Easily update your VR-2000 & VR-1200 to obtain full AUTOMATIC Line by Line and Channel by Channel Chroma Level Adjustment.



COMPUTER MAGNETICS CORPORATION

125 W. Providencia Avenue, Burbank, California 91502, USA: TEL: (213) 843-6674

For More Details Circle (236) on Reply Card

the United Kingdom by Rank Cintel is now being marketed in the U.S. by **Rank Precision Industries, Inc.** The Telecine will be demonstrated at the NAB Show, Booth #409, Hilton Hotel.

Unlike most film chains used here, the MK III uses a flying spot system which eliminates the camera together with the problems of lag, color registration and noise in the picture low lights. The single scanning tube utilizes a newly developed short afterglow phosphor with the high intensity required for reproducing dense material.

The MK III will handle 16mm or 35mm films on the same transport with rapid change between gauges. A simple attachment is available to display slides.

Of particular interest to the U.S. market is the machine's built-in capacity to reproduce 16mm or 35mm Cinemascope films full frame with electronic panning. The MK III offers a dramatic improvement in film reproduction, whether it be for transmission or film-to-tape transfer work or inserts into studio production. Its ability to handle

negative stock safety opens possibilities for grading direct from camera original to video tape for editing.

The film is driven by a capstan which replaces conventional intermittent sprocket or claw arrangements. The film travels through the mechanism at a constant speed and is scanned while in motion. The capstan drive, in addition to being extremely gentle in handling the film, is almost completely silent in operation. The Telecine modes of operation are still frame, normal speed forward, slow search or up to 10 times normal speed forward and reverse shuttle with a picture visible at all times. The drive capstan also serves as the sound head, giving runup times on both sound and vision of less than 100 milliseconds.

Threading of the mechanism is simple with no free loops to be formed or maintained, and the servo controlled spooling can accommodate 16mm or 35mm reels of up to 20-inch diameter.

Frame count information from the Telecine may be used to control a variety of preprogrammed systems

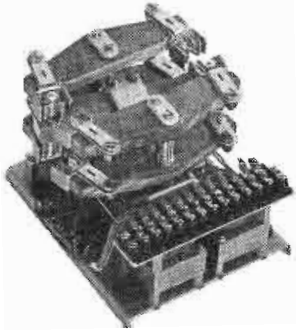
including automatic color correction.

The optical system features the minimum number of glass-to-air surfaces. The light source is an unmodulated raster on the seven-inch scanning tube, which is focused on the film emulsion by a single objective lens. Light modulated by the presence of the film is collected by a condenser lens and directed into a collimating system where it is divided into red, green and blue components by dichroic mirrors. These components are then collected by photomultiplier tubes, and fed to the vision processing. The machine will reproduce film contrast ranges in excess of 150:1.

The Telecine will operate on either 625/50 or 525/60 standards. On 625 lines 50 Hz field rate, the film travels at a constant 25 frames per second, and two rasters alternate in position to scan each film frame twice as it passes over the vision gate aperture. On 525 lines 60 Hz, the film travels at 24 frames per second, and film frames are scanned alternately three times and

Continued on page 162

RF CONTACTORS



Now in stock!

Manufactured under **Exclusive Rights** purchased from the E.F. Johnson Company, Multronics now has "in stock" the tried and proven 145-101 (SPDT) and 145-102 (DPDT) RF Contactors. These are rated at 17KV, 25 amp.

Other Multronics RF Contactors with ratings up to 50KV, 80 amps are available in 110/220VAC, DPDT/SPDT models.

OTHER HIGH QUALITY PRODUCTS

- Phasing Systems
- Isolation Inductors
- Fixed Inductors
- Variable Inductors



MULTRONICS, INC.

9005 Red Branch Road
Columbia, Maryland 21045
Phone: 301-730-1122

For More Details Circle (237) on Reply Card

New Products

Continued from page 161

two times. While the mechanism is in motion the raster height is half normal, the other half being made up by the motion of the film. When the mechanism is stationary, a normal 4 x 3 raster is generated. Frame position information is derived from a film driven sprocket fitted to each format gate. Electronic framing is provided by changing system phase. The entire transport and scanning system references to station syncs and is independent of power supply frequency.

The vision processing is based on the Cintel "Colorgrade" system, permitting the use of "joysticks" to color balance black, gamma and gain components. The equipment will reproduce color positive or negative, and seven positions of logarithmic masking are fitted. Gamma is continuously variable between 0.25 and 0.76, an RGB enhancer provides both horizontal and vertical correction. An electric automatic color corrector is available as an option.

The MK III Telecine is housed as a self-contained unit in a cabinet which is fitted with casters. The mechanism deck is protected by double-folding transparent covers. Local controls are fitted to the front of the machine, and full remote control from up to two alternate positions is possible.

For More Details Circle (300) on Reply Card

Record/Playback Cartridge Tape System

A full-featured record/playback broadcast audio cartridge tape system for NAB standard A, B and C-size cartridges has been announced by the **Beucart Division of UMC Electronics Co.**

The Beucart Type 20 record/playback unit incorporates features which have made the smaller Type 10 machine popular with broadcasters in the U.S. and Canada. In addition, the wider 3½ inches high by 10-1/8 inches wide by 13-1/8 inches deep units are customarily stacked one above the other in record/playback combinations for desk top or custom studio panel

Since you're already aware of RCA quality, it makes sense to find out what's inside this FM transmitter.

We believe you'll be impressed.

Because RCA quality can be seen as well as heard.

Our high power 5/10/20 and 40 kW Tetrode Transmitters are full of conservatively rated components for longer life. Exclusive linear power adjust of the IPA and PA make for low distortion at all power levels. Other features such as VSWR and under-power protection, filament adjust and extensive metering—all standard.

The low power 3/5 kW grounded grid transmitters are simple to operate and include many of the features found in the higher power units, such as vacuum capacitors, a large H.V. transformer, circuit-breakers, to minimize maintenance and down time.

Of course, all RCA FM transmitters are backed by 24-hour service on technical advice and parts distribution system that's a credit to the RCA name.

And if the RCA name means long-term quality to you, an RCA FM transmitter will confirm it. Send the coupon, today.

RCA Corporation
Radio Station Equipment Product Management
Building 2-5, Camden, New Jersey 08102

Dear RCA:
I'd like to find out what's inside this FM Transmitter. Send me complete details immediately.

Have your representative call.

Name _____

Title _____ Station _____

Address _____

City _____

State _____ Zip _____

I'm interested in:

3 kW BTF-3E1 FM transmitters

5 kW BTF-5E2 FM transmitters

5, 10, or 20 kW "expandable" FM transmitter systems

40 kW BTF-40E1 "Powerhouse" FM transmitters

For More Details Circle (238) on Reply Card

mounting. The Type 20 shares, with other units in the line, the patented Beau pancake hysteresis synchronous motor. The low silhouette motor incorporates permanently lubricated bearings, heavy zinc die cast rotor, electrolized shaft with 0.00015-inch T.I.R., and inside-out design. Other features of Type 20 reproducers include a silent, air-damped, Teflon coated solenoid and the unique tape head assembly produced by UMC's Beau Motor Division.

Type 20 playback modules were designed to provide all control switches, meters, and indicators right up front for simple, error-free operation. Available in mono or stereo, recorders incorporate a feature allowing manual application of the 1 kHz cue tone whenever required for specialized production formats. A defeat pushbutton manually prevents the automatic application of the cue tone when recording has begun. Meter switching is included for monitoring and maintenance of program bias level, peak recording level, and normal recording level. Type 20 systems have been incorporated into a

number of custom configurations for use not only by the broadcast industry, but in other aspects of the amusement and entertainment fields.

For More Details Circle (301) on Reply Card

Buried Cable Fault Locator

Rycom Instruments has introduced a buried cable fault locator, Model 2785A. It is designed for one man field use and comes complete with transmitter, receiver, headset, probes, all accessories and batteries. It locates path, depth, shield grounds, cut coaxial cables and in addition will locate pipes, power cables and telephone cables.

The frequency of the transmitter is 815 Hz \pm 2 Hz. Its pulse rate is 7-10 pulses/second. Size is 10.7 inches by eight inches by seven inches.

The frequency of the receiver is 815 Hz \pm 5 Hz. Filter rejection is greater than 100 dB at 540 Hz. The size is approximately 5.25 inches by 3.15 inches by 5.50 inches.

For More Details Circle (302) on Reply Card

Continued on page 164

WE HAVE THE OTHER HALF OF YOUR VIDEO SYSTEM.

Top-flight video is more than cameras, monitors and VTR's. To get the best results with the least effort, you need the right accessories, supplies and sundries. Test and lighting equipment, adapters and cables. Plus lamps, microphones and dozens of other items. In short, all the things you get here under one roof, by dialing our toll-free number. Call now for our free 64-page catalog.

Comprehensive
VIDEO SUPPLY CORPORATION
Northvale, New Jersey 07647 201-767-7990

CALL TOLL FREE:
800-526-0242
except in N.J. and metro N.Y.



For More Details Circle (239) on Reply Card

Since you're already aware of RCA quality, it makes sense to find out what's inside this Audio Processing System.

Behind those dials and light-emitting dodes is the reason for RCA quality: RCA technology. And it's pretty impressive.

The system shown here, for example, is our BA-145AGC amplifier and the BA-146/147 Limiter. All tops in AM, FM and TV Audio Control. Both have our unique Program Modulated Release (PMR) with automatic reset—for the latest approach to fast attack, with inaudible AGC or limiting action. And with RCA, fast limiting without a "thump" is certain—our non-temperature sensitive insulated-gate field-effect transistor (IG/FET) controlling element simply designs the thump out.

Of course, there's plenty more to see in an RCA audio processing system. And you're backed by RCA technical service, and RCA parts distribution, all the way. Send the coupon, today.

RCA Broadcast Systems
Radio Station Equipment Product Management, Building 2-5, Camden, N.J. 08102

Dear RCA: Okay. Tell me more about what's inside your audio processing systems. Send literature immediately. Have your representative call.

Name _____

Title _____ Station _____

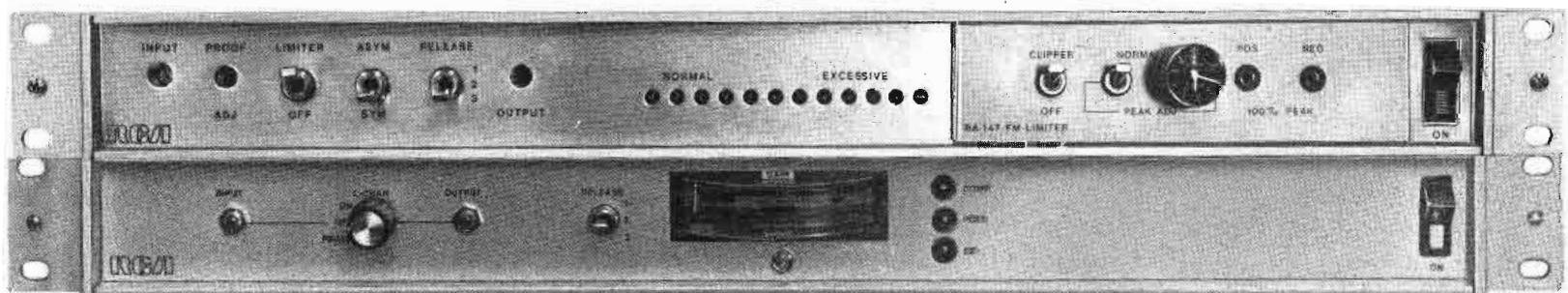
Address _____

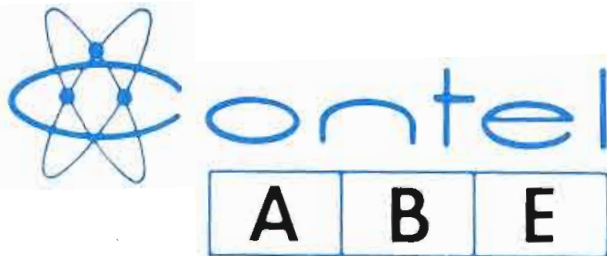
City _____ State _____ Zip _____

I'm interested in:

- BA-145 AGC Amplifier for AM, FM, or TV BA-146 Limiter for AM
 BA-147 Limiting Amplifier for FM or TV (use 2 for stereo)

RCA Broadcast Systems





**Advanced Broadcast Equipment
at a price you can afford**



**CONTEL model CT101R-B
cartridge tape
recorder-reproducer**



**CONTEL model CT101P-B
cartridge tape
reproducer**

FEATURES

- 100% solid state
- Exceeds NAB specifications
- Built in remote control facilities
- Economically priced
- All silicon transistors
- Premium core, metal faced hyperbolic heads
- Electronic tone cueing
- Optimum electromagnetic shielding
- Optional auxiliary trip cue
- Compact and modern design

—PREFERRED BY PROFESSIONALS—

CONTEL MANUFACTURING

A Division of
Continental Electronic Wholesale Corporation
1620 W. 32nd Place — P. O. Box 206 — Hialeah, Fla. 33012
Telephone: (305) 822-1421 — Cable: Contelco

For More Details Circle (241) on Reply Card

New Products

Continued from page 163

Stereo Monitor

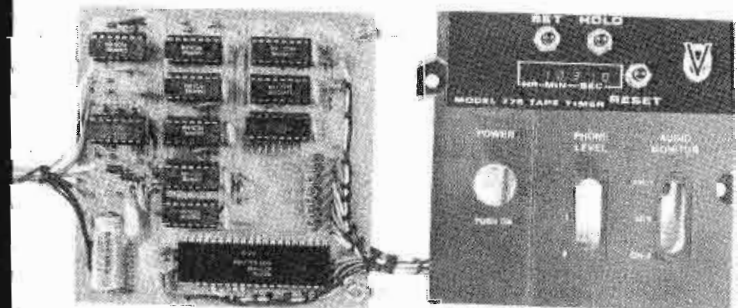
QEI Corporation has just added its new Model 771 "Add On" Stereo Monitor to its growing line of top quality broadcast station equipment. The FCC type approved Model 771 is used for measuring the modulation characteristics of FM stereo multiplex transmitters in the frequency range of 88 MHz to 108 MHz.

An all solid-state component that also incorporates ICs, the Monitor is available for mounting in a standard 19-inch rack. All operator controls are positioned on the front panel while AC power, composite inputs and Monitor outputs are on the rear panel. The front panel also includes a pair of 4½ inch left and right modulation meters calibrated in terms of percentage of modulation and dB. The Monitor can operate from 105/125 V, single phase 50 Hz/60 Hz AC power or 208/250 V, single phase 50/60 Hz sources. The component is clearly identified on the rear panel to indicate the power source to be used.

Front panel controls include a Function Switch, a left-right switch, a test decibels switch, and a de-emphasis switch. Demodulated left-right channel high impedance audio is available at one of three front panel jacks for distortion and noise measurements. There is also a "scope" jack. Whatever is displayed on the left or right meter is available here as a wide-

ANOTHER FIRST!

REPLACE the mechanical counter in your helical ENG machine with the NEW **Model 775 Digital Tape Timer**. Installs where old counter is removed. Calculator-style displays. **Special NAB introductory price: \$350.**



...from the **leader** in all types of timing devices for ALL 2" machines, IVC 800-900 series, ALL SONY types, JVC & most others.

SEE US AT NAB BOOTH #528, SHOREHAM



VAMCO ENGINEERING
Box 7512
Tulsa, Oklahoma 74105
(918) 252-4142

leadership through creativity in design

For More Details Circle (242) on Reply Card

BROADCAST ENGINEERING

bound signal. The remaining jack supplies a low impedance, high level composite signal for scope investigation.

The rear panel has a composite level control for attenuating the input composite signal to the level required by the Monitor. There is also a composite input jack functioning as the input signal connection to the monitor.

For More Details Circle (303) on Reply Card

Telecontrol System

Designed to provide independent command and status reporting capabilities, the **Moseley** Model TCS-1 Telecontrol System is capable of meeting requirements for automatic transmission systems (ATS) or similar applications, including operation of electronic news gathering (ENG) transmit/receive antennas.

Eight individual command functions and eight independent status channels are provided for control and observation of remotely-located equipment. Each command channel functions independently of all other channels.

The TCS-1 will function over a single leased telephone circuit or radio links. Provisions are incorporated to allow the operation of two TCS-1 Telecontrol Systems over a single 3 kHz telephone line, providing 16 individual dedicated commands and 16 independent status channels to a given remote location.

For More Details Circle (304) on Reply Card

Continued on page 167



COMPLETE MINI-STUDIO FOR ON-AIR, PRODUCTION OR REMOTE BROADCAST USE.

INCLUDES: 4-MIXER CONSOLE, TURNTABLES, SHURE SM61 MICROPHONE, SENNHEISER HD-414 HEADPHONES.

\$1,575.00, FOB BRISTOL, TENNESSEE.

COMPLETE INVENTORY OF NEW BROADCAST EQUIPMENT AND SUPPLIES.

BROADCAST EQUIPMENT & SUPPLY CO.
P.O. BOX 3141
BRISTOL, TENNESSEE 37620
(615) 968-7342

For More Details Circle (243) on Reply Card

March, 1977

In the market for FM broadcast antennas?

There are over 300 reasons to buy ours.

We have over 300 circularly and horizontally polarized FM broadcast antennas radiating signals daily in the U.S. alone. And, they're operating without difficulty or downtime. Still, you actually pay less for these remarkable antennas. Choose from 24 different types. Use an element as a single bay antenna. Use multi-element arrays. Your antenna ships complete, ready for installation with a tunable input transformer to match the antenna to the location.

Our new 20-page catalog has the complete story. Write for your copy today. Phelps Dodge Communications Company, Route 79, Marlboro, New Jersey 07746, 201 462-1880.

**phelps
dodge**
Communications Company

See us at NAB Convention, Booth No. 439,
Washington Hilton, Washington, D.C., March 27-30, 1977

For More Details Circle (244) on Reply Card

165

WHATEVER YOUR RECORD PROBLEMS, ACCURATE SOUND HAS THE ANSWERS!

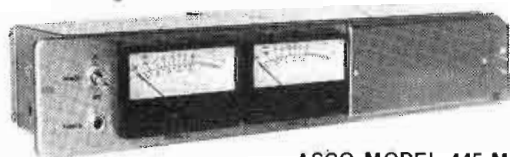
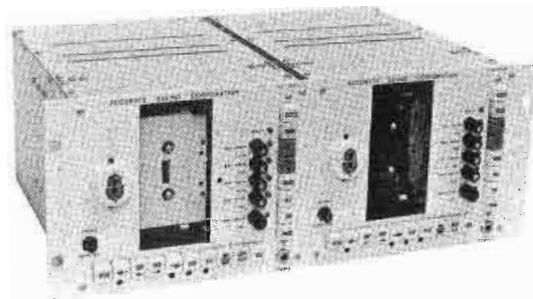


ASCO
INOVONICS



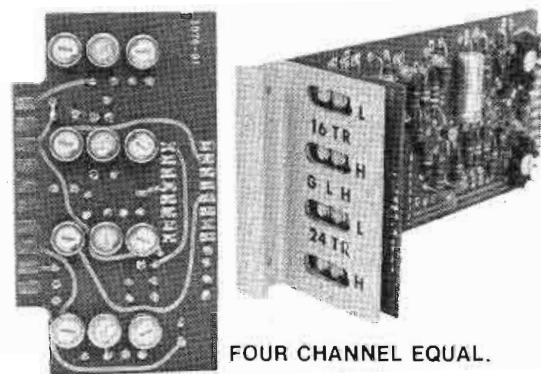
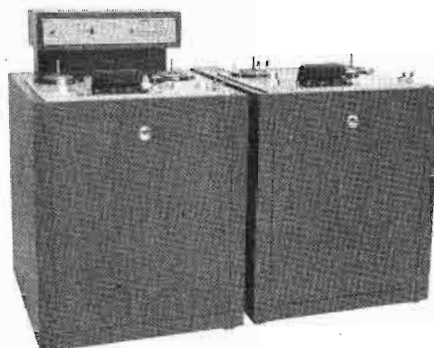
ASCO
MCI 2600

CASSETTE RECORDER



ASCO MODEL 445-M

ASCO 2400 DUPLICATOR



FOUR CHANNEL EQUAL.

ASCO 2600
TRANSPORT

...Whatever your problems: new equipment, rebuilt equipment, reconditioning or updating. ASCO's "Total Systems" capability can solve *your* problem.

RECORDER/REPRODUCE SYSTEMS

The Accurate Sound recorder/reproduce systems provide complete recording using Inovonics, three speed electronics, AG-440, Ampex 351, MCI JH5 or other electronics. The transports feature our new tape motion control box that eliminates the tape handling deficiencies typical of most older tape transports. Contact us about your needs and the system components you would like to use. Price: Systems shown...ASCO Inovonics 2600—\$5480.00, ASCO/MCI 2600-2c—\$3595.00.

CASSETTE RECORDER

This ASCO CRP-4T cassette recorder is designed primarily as an on-line logging recorder for broadcast use. It is a four channel recorder/reproducer with many transport functions including: skip-forward, skip-back (i.e. automatic fast motion to play mode)—automatic play with either continuous run or BOT/EOT sense—optional bi-directional play—optional capstan engage for search and cue—digital readout tape position indicator—any speed available between .5 and 20 ips with variable speed option—all functions remote controllable.

The system is packaged in a two module bay with provision for module to module dub function. The package size is 7" high x 19" wide x 12" deep.

Model shown is the ASCO AS4000—24RP
Price: \$4800.00

ASCO MODEL 445-M

Two channel reproduce only electronics, using standard 440 style cards. Available with or without front panel meters, in a 3½" rack mount chassis. Features a built-in power supply and two speed/ EQ settings. Provision is made for remote EQ selection. Transport power is derived from a rear panel jack. Output level: +4 or +8 dBm balanced. Price: \$495.00 without meters/ \$595.00 with meters.

ASCO 2600 TRANSPORT

The ASCO 2600 Transport features solid state "CMOS" techniques to provide the following: fast motion dynamic braking (i.e. braking is accomplished by reverse motor torque until reel stoppage, then normal brakes are engaged)—tape motion sensing that eliminates tape breakage by locking out the play function until tape has stopped—edit function—constant tension hold-back with optional constant tension takeup—optional constant torque holdback and takeup—access is provided for search and cue equipment interface—provision for tape lift function—delayed stop for "pop free" bias turn off—torque boost to accommodate high speed fast start—logic design provides access from any transport mode to any other transport mode—provision is made for logic level remote control of all functions—optional slow start capstan—capable of three speed operation—switch selectable tension settings to accommodate different tape

sizes. Available in ¼, ½ and 1" tape widths. Price as shown: \$1495.00.

ASCO 2400 DUPLICATOR

Designed especially for quality, high-speed reproduction of programming for automation. The ASCO 2400 now allows 60/120 ips duplicating speeds at comparable quality previously only attainable at real time speeds. Speed and phase accuracy demanded by stereo formats can now be achieved through our new technology. Features include: Automatic cue ... following duplicating run, the master stops the slaves and recues itself for the next duplicating run. During the recue cycle, the operator reloads the slaves in preparation for the next duplicator run—all transports feature plug-in head assemblies to facilitate rapid format changes—reproduce head assemblies include all playback amplifiers with equalization and level adjustments. All record head assemblies include bias and record level adjustments—hot-pressed ferrite heads are used throughout. Write for complete specifications. Price: Four Channel System as shown—\$8500.00

FOUR CHANNEL EQUALIZER

By slightly modifying your present 440 play card, this new plug-in equalizer will accommodate four different EQ settings with level adjust. Built-in binary logic allows simple remote selection of desired equalization. I.e. You can now select between two multiband head stacks at two different speeds in one compact package.



ACCURATE SOUND CORPORATION

114 5th Avenue
Redwood City, California 94063
415/365-2843

Send for our illustrated catalog with
new and used equipment listings.

For More Details Circle (245) on Reply Card

BROADCAST ENGINEERING

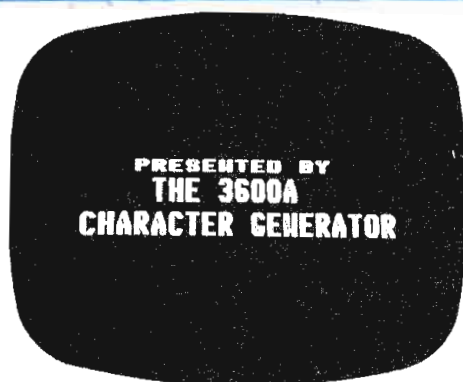


LAIRD TELEMEDIA INC.®

2125 SOUTH WEST TEMPLE • 801 487-6251
SALT LAKE CITY, UTAH 84115

**TELEVISION
CHARACTER
GENERATOR**

**MODEL
3600A**



PGM 1



PGM 2



KEYBOARD AND
DATA-CASSETTE RECORDER

- ★ SYSTEM EXPANDABILITY
- ★ 10 LINE 25 CHARACTER FORMAT
- ★ SIMPLIFIED KEYBOARD CONTROL
- ★ ADJUSTABLE WIDTH FONT
- ★ ADJUSTABLE HORIZONTAL EDGING
- ★ MULTIPLE FLAG FUNCTIONS
- ★ FORMAT POSITIONING
- ★ DATA ROLL AND CRAWL
- ★ NON-ADDITIVE MIX
- ★ UNLIMITED DATA STORAGE
- ★ COMPUTER INTERFACE
- ★ OPTIONAL COLOR BILLBOARD
- ★ OPTIONAL LOWER CASE FONT
- ★ TWO GENERATORS IN ONE

3600A

THE GENERATOR WITH CHARACTER

For More Details Circle (246) on Reply Card

New Products

Continued from page 165

Microwave Antenna Systems

Nurad, Inc. has announced a series of microwave antenna systems through which the broadcaster will be able to conduct two or more lives remote operations simultaneously and independently with a single set of quad-polarized receive antennas. The Nurad multi-channel systems are based on the 2 GHz Model 20 QP1 and 7 GHz Model 70 QP1 single-channel systems are now in everyday use for ENG operations throughout the country.

Nurad also offers versions of its quad-polarized ENG systems incorporating higher-gain receive antennas. Such systems are particularly attractive in cases where the area of desired coverage involves ranges beyond those ordinarily reached by the 20 QP1 or 70 QP1. The 20 QP1, for example, covers a line-of-sight range of approximately 40 miles in its standard configuration. With the new, high-gain quad-polarized antennas this

range can be doubled or even tripled without increasing transmitter power.

Both the 20 QP1 and 70 QP1 achieve 360° coverage through a set of four 90°-beamwidth, circularly polarized horn antennas mounted at the receive site. With this no-moving-part arrangement, there is no need to pan the receive antenna in order to "find the beam" of the signal from the mobile transmitting source. Thus, the ENG system can be effectively and reliably set up and operating within a few minutes of the time of arrival of the mobile van at the transmit site.

In its multi-channel quad-polarized systems, Nurad utilizes a single set of four antennas irrespective of the number of channels of operation in a given band (2 GHz or 7 GHz). Complete and separate controls for each operational channel are provided. Thus the operator can select the optimum received signal for each channel independently of the other. The system even accommodates the unusual case where the selfsame horn antenna with the same or with different senses of polarization is being used for two

or more channels simultaneously. In other words, it is the functional equivalent of multiple independent systems.

For More Details Circle (305) on Reply Card

Translators And Transmitters

Major advances in television translator and transmitter design, resulting in selectivity and performance levels never before attainable, have been announced by **EMCEE Broadcast Products**, a division of Electronics, Missiles & Communications, Inc.

With what is believed to be the first application of surface acoustic wave (SAW) technology to broadcast equipment, the company can assure significantly improved selectivity. Translators and transmitters employing the SAW devices offer unmatched frequency response without the group delay distortion normally associated with current filtering techniques, according to the company.

The SAW filters make possible rejection of adjacent channels, while maintaining a flat phase-linear

Continued on page 168

Aural Studio-Transmitter and Remote Pickup Links

SYSTEMS FOR

- 148-174 MHz
- 215-240 MHz
- 300-470 MHz
- 890-960 MHz
- Others on special order

- Solid State STL's for all applications — AM-FM-FM Stereo
- FM Stereo or QUAD on a single STL — a Moseley FIRST!

Second Generation Solid-State Remote Pickup Links

Systems for 160 MHz and 450 MHz, small sized, self contained, plus R.F. power amplifier... from the pioneers in solid-state remote pickup equipment.

See them in booth 203, Sheraton Park Hotel during NAB... or contact us for details.



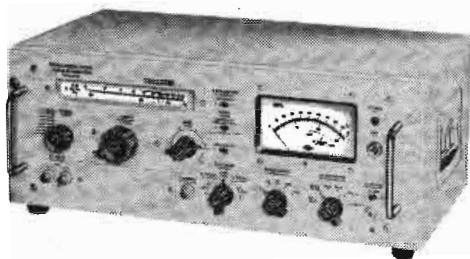
MOSELEY ASSOCIATES, INC.

SANTA BARBARA RESEARCH PARK

111 CASTILIAN DRIVE • GOLETA, CA 93017
Telephone (805) 968-9621
Telex 658448/Cable: MOSELEY

RADIOMETER COPENHAGEN

modulation meters



Accurate and easy measurements of AM modulation and FM deviation on RF carriers to 1 GHz.

- Narrow band and wide band models.
- Automatic level control.
- High resolution for residual AM and incidental FM measurements.
- Low internal distortion.

Contact us for complete information.



THE LONDON COMPANY

811 SHARON DRIVE
CLEVELAND, OHIO 44145
Tel. (216) 871-8900

221B

For More Details Circle (247) on Reply Card

New Products

Continued from page 167

bandpass response. This allows broadcasters more effective use of the frequency spectrum by increasing channel selections, particularly adjacent channel operation.

The integrated SAW device has no external adjustments and does not require tuning. This characteristic insures that broadcast equipment incorporating this circuit is easy to align, highly selective, and has long term stability.

Significant advances in performance—specifically, linearity—have also been made. New EMCEE design technology minimizes signal degradation.

The new circuitry incorporates the flexibility necessary to precisely match the inverse of an amplifier's transfer function, and will continuously correct for distortion generated over the entire useful range of powers for which the amplifier was designed. Thus, distortion products are not simply phased out at one power level; instead, linearity at all power levels is considerably improved.

According to EMCEE President Stephen Koppelman, these selectivity and linearity improvements are made even more significant by the fact that they have been achieved in current equipment and at current prices.

For More Details Circle (306) on Reply Card

Analog to Digital Converter

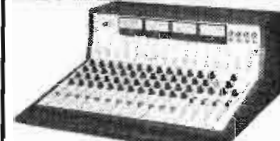
Micro Consultants announces the availability of a miniaturized high-speed analog to digital converter for digital television and radar applications.

Model 2700/3 is 33 percent smaller than its predecessor, Model 2700. A plug-in module, it measures just one inch wide by 2¾ inches high by 7½ inches long.

It incorporates a differential video amplifier, a sampler, and an eight-bit encoder. The sample-hold unit has an aperture uncertainty of 100 picoseconds to allow the video color subcarrier and fast pulses to be sampled with precision. Sampling jitter is held to less than 15 picoseconds.

The input amplifier meets the

FREE CATALOG & AUDIO APPLICATIONS



OPAMP LABS, INC.
1033 N. SYCAMORE AVE
LOS ANGELES, CALIF. 90038
(213) 934-3566

CONSOLES
KITS & WIRED
AMPLIFIERS
MIC, EQ, ACN,
LINE, TAPE, DISC,
POWER
OSCILLATORS
AUDIO
TAPE BIAS
POWER SUPPLIES

For More Details Circle (248) on Reply Card

FREE CATALOG

HARD-TO-FIND PRECISION TOOLS

Lists more than 3000 items: pliers, tweezers, wire strippers, vacuum systems, relay tools, optical equipment, tool kits and cases. Also includes ten pages of useful "Tool Tips" to aid in tool selection.

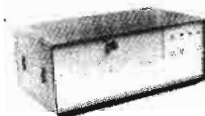
JENSEN TOOLS AND ALLOYS
4117 N. 44th Street, Phoenix, Ariz. 85018



For More Details Circle (249) on Reply Card

V-LOCK YOUR VTR or VCR

Reduces cable complaints.
V ALWAYS IN PHASE
1/2" - 3/4" - 1" VTRS
VTR or Player
Easy hook-up



oregon magnetics P.O. Box 13374
(503) 233-8295 Portland, OR 97213

For More Details Circle (250) on Reply Card

BUILD A BETTER STUDIO

Call Aderhold Construction Company. A complete construction management team of architects, builders, engineers and designers. No problem too large or too small. 404/233-5413.

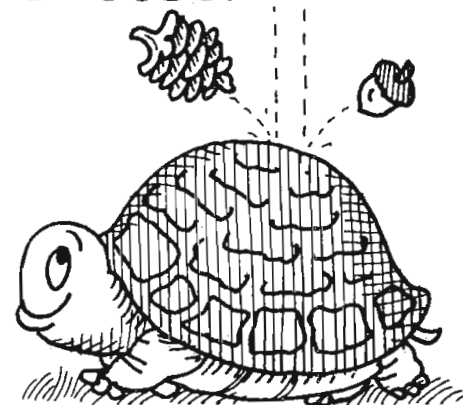


Aderhold Construction Company

3384 Peachtree Rd. NE / Atlanta, Georgia 30326

For More Details Circle (251) on Reply Card

There's no natural Protection



Birth defects are forever. Unless you help.

March of Dimes

THIS SPACE CONTRIBUTED BY THE PUBLISHER

The Optek Visual Transmitter Demodulator

- ★ Broadband — no tuning
- ★ Stable gain — entirely passive
- ★ Sound notch
- ★ Vertical interval chopper
- ★ Feeds automatic video correctors
- ★ Low Cost \$1,095.00

Call or write for no obligation demo

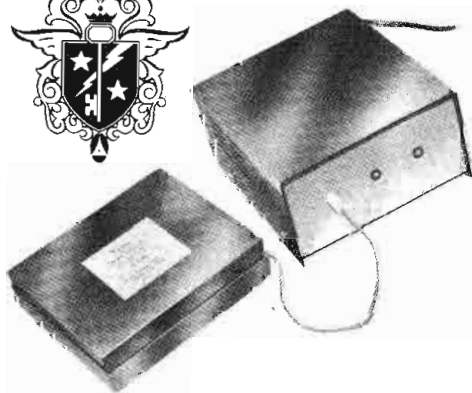


OPTEK

5526 E. La Palma Ave.
Anaheim, CA 92807 (714) 528-2321

For More Details Circle (252) on Reply Card

NICKEL CADMIUM ENG. BATTERIES AND ONE HOUR AUTOMATIC CHARGERS



For **ALEXANDER** Nickel-Cadmium **REPLACEMENT BATTERIES** For...

**SONY (BP20) — JVC (PBP-1)
AKAI (PACK) — etc.**

CHARGERS WILL AUTOMATICALLY CHARGE IN 1 TO 4 HRS. DEPENDING ON CAPACITY... (SWITCHES TO TRICKLE)

Write Wire or Phone

ALEXANDER manufacturing co.

Box 1645 Mason City, Iowa 50401
Phone (515) 423-8955

For More Details Circle (253) on Reply Card

March, 1977

stringent requirements of color television in respect to differential phase and gain. Differential input is one volt full scale and can be terminated in 50 or 75 ohms. Digital noise generated by the system is virtually eliminated by a high common mode rejection. Sine wave response extends to 20 MHz, rise time is 20 nanoseconds, and full scale setting time is 50 nanoseconds.

Sampled analog data is applied to an encoder which produces a binary coded digital output in a 66-nanosecond conversion time. Throughput may be up to 15 MHz. The encoder is double buffered and the parallel data is available for the whole of the conversion time except five nanoseconds when the output register is updated. Output appears as both true and complement data in a form suitable for driving matched twisted pair or coaxial lines. The unit will drive into standard MECL or TTL line receivers.

The 2700/3 meets digital television requirements. When used in conjunction with Micro Consultants' digital to analog converters, studio broadcast television images can be digitized and reconstituted into standard video of broadcast quality.

The new unit also meets requirements of digital radar systems. The short sample aperture time (100 picoseconds) coupled with the small jitter (15 picoseconds) enable the effective detection and use of small phase and amplitude differences. Operation covers a wide sampling frequency range.

For More Details Circle (307) on Reply Card

Compact Color TV Camera

A new compact color TV camera, a complete electronic newsgathering equipment package, a completely solid-state radio transmitter, and other equipment will be featured at the **RCA Broadcast Systems** exhibit at the NAB Convention.

The RCA displays of equipment and systems, which will cover approximately 7,500 square feet of floor space in the Washington Hilton Hotel, also will include dramatic demonstrations of the capabilities of TV cameras, tape

Continued on page 171

New in AM from Harris

Transmitters
with an

AM Audio Processor

A built-in audio processing circuit is now included in the new MW-1A, all solid state 1 kw AM transmitter featuring Progressive Series Modulation (PSM), and the new MW-5A and MW-50A, 5 and 50 kw AM transmitters with Pulse Duration Modulation (PDM). This circuit is designed to increase modulation density.

for
**Innovations
in
AM, FM, TV
& Audio**
see you at our
**Sheraton Park
NAB Exhibit**

If you are not planning to attend the NAB Convention this year, write for full details of our new AM transmitters, as well as FM transmitters, TV transmitters and MSP-100 to: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

BOOTH 205

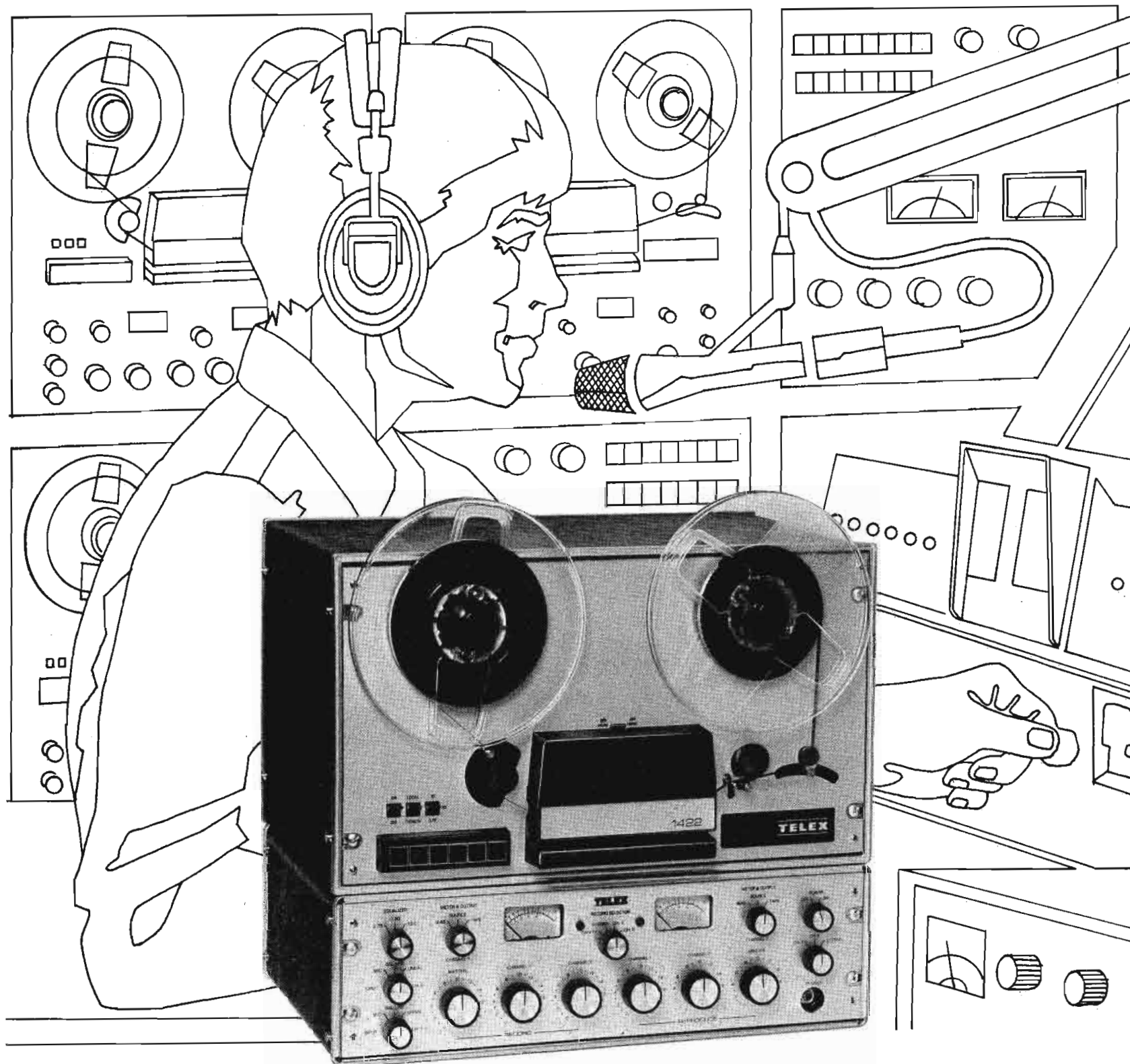


HARRIS

COMMUNICATIONS AND
INFORMATION HANDLING

For More Details Circle (254) on Reply Card

169



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 8¼ 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: 3¾ - 7½ - 15 ips. New catenary head block for straight tape loading, the con-

venience 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:

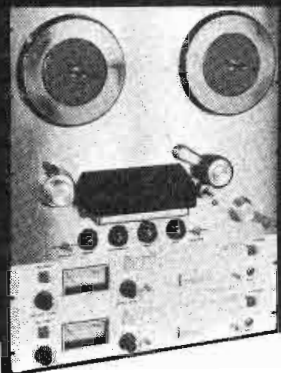
PRODUCTS OF SOUND RESEARCH

TELEX[®]
COMMUNICATIONS, INC.

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

For More Details Circle (255) on Reply Card

sound dynamics delivers



for as
little as
\$70000

Replace your old, tube amps with Inovonic's Model 375 Tape Recording Electronics. Features solid-state circuitry, plug-in options and exceeds recording studio specifications, all for as little as \$7000.00.

Specializing in audio equalizers, cartridge accessories, limiters, magnetic tape heads, microphones, mixing consoles, recorders, recorder electronics, reproducers, speakers, tape degaussers, test tapes, tonearms and turntables.

**FOR ALL YOUR AUDIO NEEDS
CONTACT:**



(408) 926-3588

**sound
dynamics, inc.**

P.O. Box 32055, San Jose, Ca. 95152

For More Details Circle (256) on Reply Card

New Products

Continued from page 169

recording and editing systems, and new radio broadcast equipment, according to Neil Vander Dussen, Division Vice President and General Manager.

Camera demonstrations will highlight a new-design model, designated the TK-760. The new compact color broadcast camera, ideal for either studio or field use, is intended for the budget conscious, quality minded TV studio operator interested in developing new programming potentials, Vander Dussen said.

"Commercial broadcasters, corporate communicators, medical facilities, closed-circuit color TV operators, cable companies, educational TV stations and universities all are expected to find extensive programming uses for this high quality, economically priced camera," he added.

The TK-760, along with RCA's complete line of TV cameras, will be demonstrated in the exacting setting of a TV studio kitchen, where true rendition of colors and operation under varying lighting conditions are critical. The TK-46 studio model, the TKP-45 portable production camera, and the TK-76 electronic newsgathering unit will operate side-by-side with the new TK-760.

For the radio broadcaster, RCA's exhibit will feature an all-new completely solid-state 5-kilowatt AM transmitter.

The radio equipment display also will include items from RCA's line of studio and transmitting equipment, including audio consoles, cartridge tape handling systems, and signal processing devices. Equipment for implementing automatic transmitting systems for AM and FM outlets, as now approved by the Federal Communications Commission, also will highlight the RCA radio demonstrations.

For broadcasters interested in the growing field of electronic newsgathering, RCA will demonstrate a complete equipment package, including the TK-76 camera, portable video tape recorders, time base corrector, digital video frame synchronizer, and other associated equipment.

Continued on page 172

New in FM from Harris

DSM Digitally Synthesized Modulation®

Harris introduces a new line of 10 watt to 40 kilowatt FM transmitters, featuring the exclusive MS-15 solid-state exciter employing Digitally Synthesized Modulation (DSM). DSM, with overshoot compensation, allows a 2 to 6 dB increase in loudness with no signal deterioration. These new transmitters also provide 40 dB minimum stereo separation, offering the finest audio quality in the industry.

for Innovations in AM, FM, TV & Audio see you at our Sheraton Park NAB Exhibit

If you are not planning to attend the NAB Convention this year, write for full details of our new FM transmitters, as well as new AM transmitters, TV transmitters, and MSP-100 to: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

BOOTH 205



HARRIS

COMMUNICATIONS AND
INFORMATION HANDLING

© Patents applied for

For More Details Circle (258) on Reply Card

G.E. & Sylvania STAGE - STUDIO & Projector LAMPS

Please Don't Give Us Lamp Orders
At List. We'd Rather Give You
42% TO 48% OFF

Compare Sitler's Prices:

TV Production Lamp No.	List Price	6-23 42% Off	24-47 45% Off	45 up 48% Off
FAD	\$16.75	\$ 9.72	\$ 9.21	\$ 8.71
FHM	21.00	12.18	11.55	10.92
CYX	61.50	35.67	33.83	31.98
DXW	23.25	13.48	12.79	12.09
FON	17.00	9.86	9.35	8.84
FDF	20.00	11.60	11.00	10.40
EGJ	37.75	21.90	20.76	19.63
DTJ	27.60	16.01	15.18	14.35
FCX	24.00	13.92	13.20	12.48
IMT12-2	22.00	12.76	12.10	11.44
500T20-64	20.75	12.03	11.41	10.79
750T20P- SP	20.00	11.60	11.00	10.40
Q1000T3/4	21.00	12.18	11.55	10.92
Q2000T11- 4CL	61.50	35.67	33.83	31.98
Q500T3/4	17.00	9.86	9.35	8.84
Q500T3- 4CL	20.00	11.60	11.00	10.40

You may assort for best price. Many other numbers in stock not shown above. All transportation prepaid on \$100.00 or more net orders. Minimum order, \$25.00 net. Your satisfaction guaranteed. Order today, or write for our complete price sheet!

Sitler's SUPPLIES, INC.

P.O. Box 10-A Washington, Iowa 52353
702 E. Washington St. Ph. 319-653-2123

For More Details Circle (257) on Reply Card

major broadcasting stations & networks on five continents are now specifying

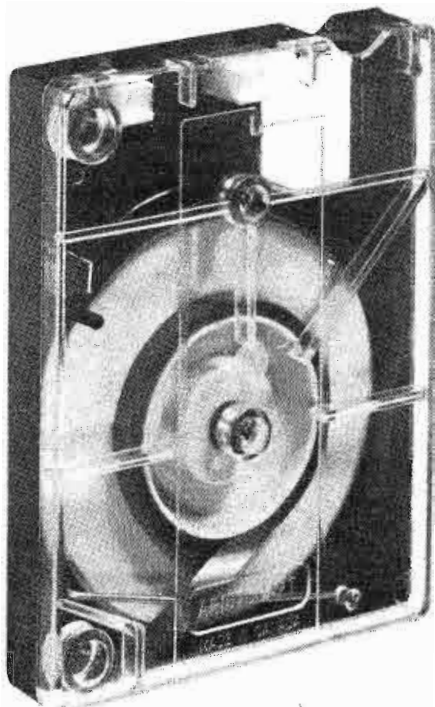
ARISTOCART

No, we won't name them, but some of the best known broadcasters in the business have now switched to our cartridge for better sound reproduction in major markets from Chicago to Capetown — from Sydney to Stockholm.

There are some good reasons:

Aristocart is the only cartridge that guarantees you reel-to-reel fidelity (20 Hz to 15 kHz) and FM broadcast phase stability (better than 90° to 12.5 kHz). Aristocart is the only cartridge individually checked for phase, frequency response and overall performance.

WE'LL REPLACE ANY ARISTOCART CARTRIDGE WHICH FAILS TO PERFORM WITHIN ADVERTISED SPECIFICATIONS ON PROPERLY ALIGNED EQUIPMENT.



ARISTOCART

THE CARTRIDGE FOR PEOPLE WHO CARE HOW THEY SOUND

DISTRIBUTORS IN ALL MAJOR U.S. MARKETS

For the one nearest you, contact

ARISTOCART DIV. WESTERN BROADCASTING LTD.
505 BURRARD ST., VANCOUVER, CANADA V7X 1M6
TEL: (604) 687-2844 TELEX: 04-54639

For More Details Circle (259) on Reply Card

New Products

Continued from page 171

Also included in the total ENG system will be the RCA TACTEC hand-held two-way radio, and the newly introduced VEETAC line of RCA mobile vehicular radios. The lightweight compact portable radio is ideal for coordination of news and production personnel on site, and the higher power mobile units can be used to maintain communications with home base, Vander Dussen said.

RCA's video tape display will feature multi-media demonstration of the editing capabilities of the TR-600/AE-600 combination. The AE-600 editing system, built into the TR-600 tape recorder, can control one record TR-600, up to eight playback TR-600s and three external devices, for sophisticated time code editing.

In TV film, RCA will demonstrate the TK-28 telecine system with built-in automatic controls for uniformly high quality broadcast pictures, along with the FR-35A servo-controlled 35mm film projector and the PM-86SL magnetic sound recorder/reproducer.

In the transmitter area, RCA will display 25-kilowatt VHF TV transmitters for highband and lowband use, as well as UHF transmitter equipment. TV antennas, designed for circularly polarized transmission signals, also will be exhibited.

For More Details Circle (308) on Reply Card

Camera Stabilizing System

Cinema Products announces the availability of a new "Universal Model" Steadicam camera stabilizing system, which allows the camera to be easily removed from the system, and permits the use of one Steadicam system interchangeably with either a handheld 16mm or 35mm motion picture camera, or a handheld video camera.

Steadicam releases the moving camera from the constraints of dollies, tracks, and heavy camera platforms—delivering steady handheld moving shots of dolly-quality smoothness.

Steadicam is intended for use in the filming of motion picture features, documentaries, television

The Optek 7400C Automatic Bulk Tape Degausser

- ★ Most powerful — degausses 3/4" cassettes
- ★ Fully automatic
- ★ Selectable flux pattern
- ★ Rugged — built for broadcasters
- ★ Adapters for ACR25/TCR100 and 3/4" cassettes

Price \$2,695.00



OPTEK

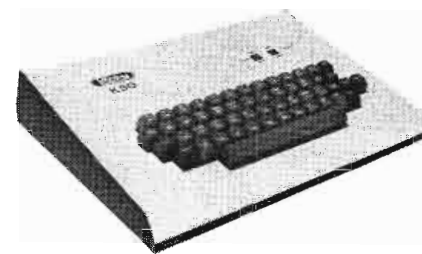
5526 E. La Palma Ave.
Anaheim, CA 92807 (714) 528-2321

For More Details Circle (260) on Reply Card



LOW COST TITLING UNIT

It's still a KNOX
but now it's \$995



the K50

- 4 full pages
- Large letters
- Edit channel
- Crawl Option

Title live or tape
inexpensively!

16021 Industrial Drive
Gaithersburg, Md. 20760
(301) 840-1930

For More Details Circle (261) on Reply Card

TRANSMITTING TUBES
EIMAC RCA EEV
AMPEX VARIAN

Guaranteed Lowest Prices

Factory-Fresh New Tubes.

Guaranteed Fastest Deliveries

All Tubes in Stock.
Immediate Deliveries.

Ask for complete details
on our Exclusive Price
Insurance Policy.

CALL TOLL-FREE
(800) 221-6844
For lowest prices, fastest
deliveries.

**CALVERT
ELECTRONICS, INC.**
220 East 23rd Street
New York, N.Y. 10010

For More Details Circle (262) on Reply Card

SAVE ABOUT 50% OF POWER TUBE COSTS

**IF YOU USE 3CX2500,
4CX5000, 4CX10000, 4CX15000
AND SIMILAR TYPES**

NEW: 3,000 HOUR WARRANTY!

Freeland Products offers expert repro-
cessing of certain types of thoriated
filament tubes. Our service is backed
by a warranty and over 30 years ex-
perience.

Send today for descriptive brochure
and price list. Freeland reproprocessing
assures FULL AVERAGE EMISSION
LIFE of new tubes—yet you'll save up
to 50% of original cost!

Scores of Satisfied Customers

WAOK	KHOU	WRUF
KBCL	CJRC	WSMB
KALB	WHAS	WTAE
WBKH	WHB	WTIX
KCIJ	WWL	KVOL
CBC	WJCW	WGTX
WCCO	WJDX	WWST
WCMJ	WTAI	WPRS
WDAE	WAMX	KNOE
KCMO	KLCN	WGSO
WTAI	KOUL	WMPS
KFDA	WSUC	WHBC
WQRC	KOKE	WDWS
KGBC	KOMA	WBTM
WGAC	KHYM	WGAF
KEEL	WPLO	KMLB
KUPK	WQAM	KOAX
WERC	WQMV	KFMI

And Many More!

Freeland Products Co.

3233 Conti St. • New Orleans, La. 70119
504/822-9223

For More Details Circle (263) on Reply Card

March, 1977

specials and commercials, as well as
for taping live concerts, interviews,
"on-the-spot" TV commercials,
theatrical and sports events, and
other special video coverage.

With Steadicam, the operator
can boom up or down nearly three
feet, he can pan a full 360° and tilt
up or down to 60°. By filtering out
low as well as high frequency vibra-
tions, Steadicam turns any vehicle
—car, boat or aircraft—into a
camera platform.

The basic features of the Steadi-
cam camera stabilizing system re-
main unchanged. The complete
system consists of a body brace (a
padded close-fitting harness-like
jacket), with a support arm at-
tached to the body brace at one
end, and (through a free-floating
gimbal) to the camera system at the
other end. The exoskeletal-type
articulated support arm parallels
the operator's arm in any position,
and almost completely counteracts
the weight of the camera system
with a carefully calibrated spring
force. Due to the human engineer-
ing and special configuration of the
body brace and support arm,
virtually the entire weight of the
system (including camera and lens)
is comfortably supported at the
operator's hips.

Two-eyed viewing is provided by
means of a special three inch high-
intensity monitor using a special
kinescope tube that produces over
4000 footlamberts on the screen of
the tube (10X the brightness one
would get from a standard monitor)
before passing through a special
filter which is designed to eliminate
any reflections on the face of the
tube from all ambient light sources,
including direct sunlight.

The flat, sled-like lower portion
of the camera assembly contains all
the electronics for the video view-
finder, and the battery pack power-
ing both the camera and the view-
finder system. Attached to the
"sled" are two vertical members
which support the camera mount-
ing platform.

The "Universal Model" configu-
ration makes it possible to remove
the camera from the platform and
use it independently from the
Steadicam system, handheld or on
a tripod. It also makes it possible
to mount the camera on a tripod
adjacent to the "sled," drawing

Continued on page 174

New in TV from Harris

TSB

Transversal SideBand Filter

Harris introduces a new line of
1300 watt to 220 kilowatt TV
transmitters featuring IF
Modulation. These transmitters
now employ the exclusive MCP
solid-state exciter with TSB
(Transversal SideBand) filter,
offering improved color
performance with fewer
adjustments.

**for
Innovations
in
AM, FM, TV
& Audio
see you at our
Sheraton Park
NAB Exhibit**

If you are not planning to attend the
NAB Convention this year, write for full
details of our new TV transmitters, as
well as new AM transmitters, FM trans-
mitters and MSP-100 to: Harris Cor-
poration, Broadcast Products Division,
Quincy, Illinois 62301.

BOOTH 205



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

For More Details Circle (264) on Reply Card

173

MARTI

Gives You Radio

ENG Power
ENG Power
ENG Power
ENG Power
ENG Power

- ★ Automatic Repeaters
- ★ Mobile Repeaters
- ★ Encoders and Decoders
- ★ Broadcast-Quality Hand-Carried Portable Transmitters
- ★ Broadcast-Quality Portable/Mobile Transmitters 25, 30, and 40 Watts
- ★ Base Stations
- ★ Complete Antenna Packages

Also . . .

ATS COMPATIBLE

Digital Remote Control and Status System

Also . . .

For the new generation of audio processing ideas . . . the

FLEXIBLE AURAL STL

For complete details, phone, write, or see us at the **1977 NAB SHOW**, March 27-30, Booth 207, **Sheraton Park Hotel**, Washington, D.C.



For More Details Circle (265) on Reply Card

New Products

Continued from page 173

power from the "sled" system and using the three inch monitor as an added video-assisted viewfinder.

Also available for the Steadicam system is a full range of accessories, including a follow-focus unit operated by remote control (through cable connection or by wireless transmission).

Cameras presently available for use with the "Universal Model" Steadicam include the CP-modified Arri IIC 35mm camera, the CP-16R reflex 16mm camera (equipped with Cinevid) and RCA's TK-76 color video camera. (All of these may be purchased from Cinema Products as part of a Steadicam package offer.) Most other hand-held cameras—video, 16mm and 35mm—of approximately the same weight class can also be adapted for use with the Steadicam system.

For More Details Circle (309) on Reply Card

High-Speed RF Monitor/Control

Series 3170 is a new Bird high-speed monitoring system for remote or on-location supervision of transmitters and ancillary services. The two most important features of the new designs are a shortening of response time down to 200 microseconds—much faster than equipment protection requires—and a remote reset capability.

The 3170 series WATTCHER RF Monitoring Systems warn a remote operator 1) Of low power due to detuning, component deterioration, AC line difficulties 2) Of high VSWR due to antenna icing, transmission line moisture or deformation, sudden accidents or lightning, etc. 3) And—after audible and visual alarms are activated—the system will switch to a backup transmitter and antenna if the original equipment performance is impaired below a predetermined set of parameters. Because of the WATTCHER's high reaction speed, this switching is not audible to the listener.

If, on the other hand, the disturbance was not catastrophic and the equipment returned to acceptable operating conditions, the alarm system can be reset from miles away. An engineer need only

IF YOU NEED ATTENUATORS YOU NEED THIS CATALOG!



AUDIO AND RF ATTENUATORS TO MEET ANY REQUIREMENT

Here in one compact and informative 24 page booklet is all the data you need to select a Precision Audio and RF Attenuator for your application.

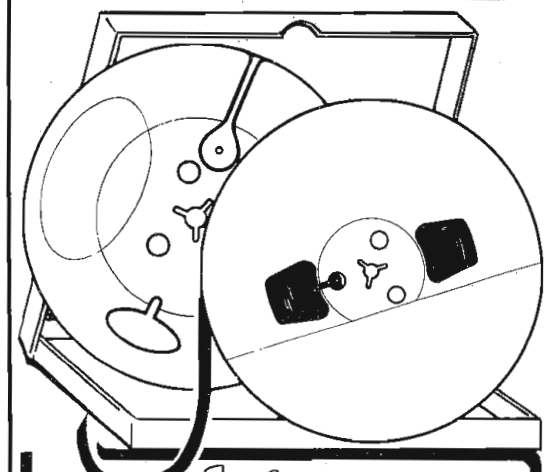
Reference Charts, Circuit Diagrams, Types and Uses, Current and Voltage Ratio Tables, Ratings, Etc., make this a handy and invaluable reference.

SEND FOR YOUR FREE COPY TODAY.

TECH LABS, INC.

Bergen & Edsall Blvds.
Palisades Park, N.J. 07650
Tel.: (201) 944-2221

For More Details Circle (266) on Reply Card



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



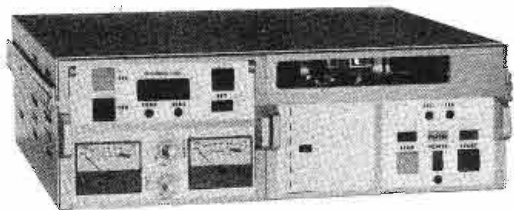
Call or Write for Details/Prices
Recording Supply Co.

DIVISION OF POLYLINE CORP.
1233 RAND RD. • DES PLAINES, IL 60016
312/297-0955

For More Details Circle (267) on Reply Card

NAB 1977

See and Compare
MODU-CART 100 Series
 New "SUCCESS STORY"
 in Cartridge Equipment



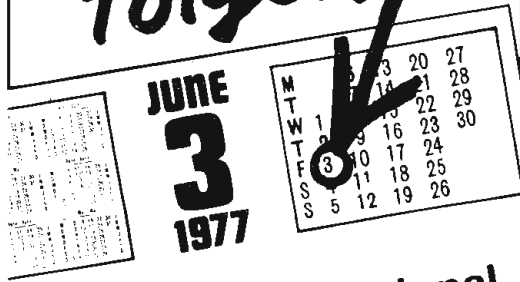
Audi-Cord invites you to visit us in BOOTH 565, Shoreham Americana. See the Audi-Cord Factory Engineers and skilled Sales Representatives:

TOM AYE & ASSOCIATES —
 Tom Aye, John G. Humble
 BROADCAST SUPPLY WEST —
 Irv Law, Fred Harkness
 MASTERTONE COMPANY — Vic Blacketer
 NORTHEAST BROADCAST EQUIPMENT —
 John Ring, Bruce Burke
 ROSCOM, INC. — Robert P. Stewart
 SAVCO — Nathan Hughes
 TELESCO INTERNATIONAL CORP. — Jerry Lanier

AC AUDI-CORD CORPORATION
 1845 W. Hovey Ave., Normal, IL 61761
 "Design Innovators — Quality Manufacturers"

For More Details Circle (268) on Reply Card

Don't forget!



**Montreux International
 Television Symposium
 and International
 Technical Exhibition**
 Montreux-Switzerland,
 June 3-10, 1977

For special travel arrangements,
 apply to: Fred Waldhorn, Swissair,
 608 Fifth Ave.
 New-York, NY 10020
 tel. (212) 262-2041

Information: Montreux Symposium
 P.O. Box 97
 CH-1820 Montreux
 Switzerland

For More Details Circle (269) on Reply Card

be dispatched, if the alarm can not be silenced by the remote reset.

The 3170 WATTCHER® System also provides inputs for four external sensors, for detection of malicious break-ins, water flow levels, site temperature or signal levels in any portion of the equipment. The new system will be introduced at the NAB Show (Booth 311 Sheraton Park Hotel), along with **live RF measurement demonstrations** using a feed from an adjacent transmitter exhibit.

For More Details Circle (310) on Reply Card

TV Demodulator

Rohde & Schwarz Sales Company has announced the availability of the Barco VSD2 demodulator in the U.S. This TV demodulator is used for monitoring a remotely operated broadcast transmitter; for relaying; for remodulating well-defined carriers—for example, HF-wired TV networks and CATV antenna sites; for accurate videotape recordings; as a reliable signal source for CATV studios, etc. The VSD2 frequency coverage is 47-860 MHz. It features .1 mv sensitivity, has a separate input or UHF/VHF, two video and two sound outputs, and a video and sound level meter. It also provides monostandard multichannel overall gain independent of the picture content. It is a solid-state and modular design with very good K rating on 2T and 12½T pulses.

The VSD2 demodulator also features an efficient and almost parasitic-free AGC circuitry providing stable video/sync levels, independent of picture content. The AGC controls only the variable field strength due to propagation and selection of different transmitters. It also stabilizes the level of the back porch in the line blanking through a special by-pass control circuit, so that the subcarrier frequency information, inserted in the back porch (as for color transmission), is not changed.

The AFC-action on the local oscillator provides tuning stability and a constant video output.

For More Details Circle (311) on Reply Card

Decoder-Synthesizer

An integral part of the Sansui line of advanced 4-channel compo-

Continued on page 176

New in Audio from Harris

The MSP-100

Harris introduces the advanced MSP-100 (Maximum Signal Processor) which combines tri-band Automatic Gain Control (AGC) and a limiter which automatically adjusts attack and release time based on music content. Incorporated into a single unit, this system will increase flexibility for varying formats and provide the highest possible modulation with minimum distortion.

for
**Innovations
 in
 AM, FM, TV
 & Audio**
**see you at our
 Sheraton Park
 NAB Exhibit**

If you are not planning to attend the NAB Convention this year, write for full details of our new MSP-100, as well as new AM transmitters, FM transmitters and TV transmitters to: Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

BOOTH 205



HARRIS
 COMMUNICATIONS AND
 INFORMATION HANDLING

For More Details Circle (270) on Reply Card 175

control by phone



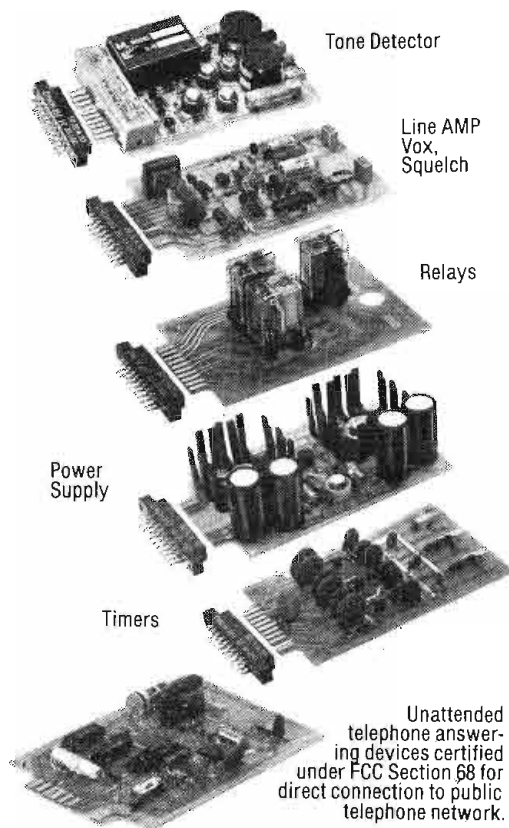
Use a regular touch button telephone to control:

- Cable TV circuits
- Pollution sampling equipment
- Microwave transmitters
- Call diverters and automatic answering devices
- Antenna systems
- Telephone equipment
- Radio/telephone inter-connection equipment
- Pumps, motors, overhead doors

Use Monroe Electronics plug-in circuits to construct your own custom system with off-the-shelf ready to use circuit cards.

Accessories include power supply 12 V from 115 V AC line.

THESE CIRCUIT CARDS AVAILABLE FROM **\$49 TO \$99**



Circuit card Enclosures are offered for 1 to 12 cards

M **MONROE ELECTRONICS, INC.**
100 House I Ave., Lyndonville, N.Y. 14098

For More Details Circle (271) on Reply Card

New Products

Continued from page 175

nents is the Model QSD-2 decoder/synthesizer. Intended primarily for sophisticated home listening systems or an inexpensive broadcasting application, the QSD-2 utilizes the same vario-matrix IC's as the professional Model QSD-1, and functions not only as a QS decoder, but also as a synthesizer, as well. In its QS decoder mode, the Sansui QSD-2 has an adjacent channel separation of 20 dB and diagonal channel separation of 30 dB. Additionally, it contains a phase-matrix circuit for decoding SQ sources.

The QSD-2 has a frequency response of 20 Hz to 30 kHz, with a total harmonic distortion of 0.1% at the rated output of 730 mV. Maximum output (0.5% THD) is 5 V at the 4-channel jacks and 130 mV at the tape outputs. Input sensitivity is 130 mV (3 V maximum) at the 2-channel and tape monitor inputs.

Approximate nationally advertised value of the Sansui QSD-2 is \$140. For complete information on Sansui's line of audio processing and 4-channel broadcast equipment, visit the Sansui Electric Co. Ltd. exhibits at the Shoreham Hotel, Booth No. 602, during the NAB.

For More Details Circle (312) on Reply Card

ENG Color Cameras

Two new ENG color cameras by Ikegami reflect state-of-the-art improvements to the Ikegami ENG cameras used by all three networks at the 1976 Democratic and Republican conventions and Summer Olympics. The new models are smaller and lighter, as well as improved in performance over Ikegami's earlier ENG units.

The HL-77 "Ike" is an all-on-the-shoulder, 21-pound ENG camera using three PbO pickup tubes in a design that maximizes image stability and picture quality, yet minimizes weight and power consumption. The use of f/1.4 prism optics with a 1½-inch electronic viewfinder, automatic iris control, and registration stabilized against terrestrial magnetism and temperature combine to ensure an optimum image on pickup tubes. A bias light for reduced lag, coupled with an

HighSpeed WATTCHER® RF Monitoring System



Offers Remote or On-Site Supervision of transmitters with 200 microsecond switching option to back-up plant. Visual and audible alarms are remote-resettable, if RF power loss or high VSWR conditions cease.

See the new 3170 series WATTCHER® and live RF feed/measurement demonstration at **Booth 311** Sheraton Park Hotel NAB.

BIRD

30303 Aurora Rd. Cleveland (Solon) Oh. 44139
Phone 216-248-1200

For More Details Circle (272) on Reply Card

COMARK INDUSTRIES, INC.

THE COMPLETE BROADCAST R.F. HOUSE

- TV DEMODULATORS
- ENG REMOTE CONTROL SYSTEMS
- DIPLEXERS; COMBINERS, FILTERS
- POWERMETERS, COUPLERS
- AM-FM-TV RF SWITCHES
- FM ANTENNAS
- RF CONSULTING

YOUR PROBLEMS ARE OUR BUSINESS

VISIT US AT NAB BOOTH #614 or our hospitality suite at Shoreham Americana during the NAB 77 Convention.

COMARK IND., INC.
P.O. Box 196
West Field, MA 01085
(413) 568-1870

For More Details Circle (273) on Reply Card

PULTEC®



EQUALIZERS & FILTERS

Twenty years of capable, dependable service in radio & TV stations and recording studios. U.S. and overseas. Picture is solid state Model EQP-1A3 Audio Program Equalizer.

PULSE TECHNIQUES, INC. 1411 Palisade, Teaneck, N.J. 07666. Tel. (201) 837-2575
Cable: PULTEC, TEANECK, NEW JERSEY

For More Details Circle (274) on Reply Card

BROADCAST ENGINEERING

MARTI

Gives You Radio

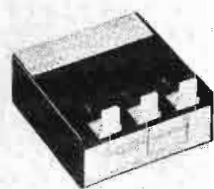
ENG Power

For complete details, phone, write, or see us at the **1977 NAB SHOW**, March 27-30, Booth 207, **Sheraton Park Hotel**, Washington, D.C.

MARTI Electronics, Inc.
Box 661 • 1501 N. Main • Cleburne, TX 76031 • 817/645-9163

For More Details Circle (275) on Reply Card

SOLID STATE TOWER FLASHERS



A new series has been added to SSAC's line of "B-Kon-Flash". The new devices with a load current rating of 300 Amperes Inrush will operate up to four beacons at 230 VAC, two beacons at 120 VAC. Also available are auxiliary units for synchronous operation of additional beacons on separate lines or for alternating flashing of beacons.

Lamp Life is increased by approximately 10 X due to Zero Voltage Switching. Device measures 2 x 2 inches and is completely encapsulated. Price in 1-9 quantity, \$34.60 each, FOB Factory. For more information call John Arnold at 315/457-9610.

SSAC Inc.

PO Box 395, Liverpool, NY 13088

For More Details Circle (276) on Reply Card

TERRIFIC DISCOUNTS ON CAMERA TUBES

(Save Hundreds of Dollars)

Lead-Oxides—I.O.'s—Vidicons

2000 Hour Unconditional Guarantee

XQ1020 or equal	\$675.00
XQ1025 or equal	860.00
4536 or equal	950.00
8673 or equal	895.00
55875 or equal	625.00

(Prices Subject to Change Without Notice)

- Major brands only.
- 10% lower on quantity orders.
- We also stock other camera tubes, transmitting tubes, Klystrons, Quartz & Halogen Lamps, Semiconductors & I.C.'s—G.E., RCA, Sylvania, Eimac, Etc.

Prices & Catalog on Request
Toll Free: 800-221-8376
New York: (212) 978-5896
Telex: 125237

TEMTRON ELECTRONICS LTD.
138-69 Francis Lewis Blvd.
Rosedale, N.Y. 11422

For More Details Circle (277) on Reply Card
March, 1977

improved signal-to-noise ratio in the preamplifiers achieve high sensitivity that makes this ENG camera an outstanding performer even at low light levels.

A built-in preheater ensures quick starts, and +6 dB and +12 dB video gain switches enable the camera to work at the low ambient light levels often encountered in ENG circumstances. With a signal-to-noise ratio of 48 dB and a bandwidth of 4.5 MHz, the HL-77 delivers a center-screen resolution of 500 lines, registration quality less than 0.1% of the 80% picture height, and I and Q encoding to U.S. standards. Sync generator, shading corrector, and microphone amplifier are incorporated. Power is from a belt-type battery pack or from 50-60 Hz ac lines.

The HL-37 "Mini Mate" is a two-piece version with performance specifications identical to those of HL-77. In this format the weight of the camera head is reduced to 14 pounds, complete with zoom lens. The shoulder-strap pack containing various circuitry including processing amplifiers, encoder, and sync generator weighs seven pounds.

For More Details Circle (313) on Reply Card

Stereo Limiter/Compressor

Orban/Parasound announces the availability of their Model 418A stereo limiter/compressor. The 418A features program-controlled attack and release times, which enable the device to work quite subtly with all types of program material without the necessity of critical manual adjustment.

The 418A is a complete limiting system consisting of a pair of stereo-ganged broadband compressor/limiters with exceptionally smooth and subtle characteristics, followed by a high frequency limiter with four different time constants, user-selectable by means of a front panel switch. This variable time constant feature is unique in the industry and permits the characteristics of the high-frequency limiter to be tailored to the recording medium following the limiter, such as disc, cassette, or 7.5 ips tape.

The 418A is a modification of the highly-successful Orban/Broadcast

Continued on page 178

ATS

The Widget Works, Inc. announces the installation of its prototype microprocessor based

AUTOMATIC TRANSMITTER OPERATOR

On the most powerful FM Transmitter in the Country

WDBN / STEREO 94.9

Medina, Cleveland, Akron, Ohio

WHO'S NEXT?

For product, pricing, or delivery information call or write:

THE WIDGET WORKS, INC.

P.O. Box 564
Ashland, Ohio 44805
(419) 289-3122

Gordon DuVall
Vice President, Sales
6838 North Ottawa
Chicago, Illinois 60631
(312) 774-5115

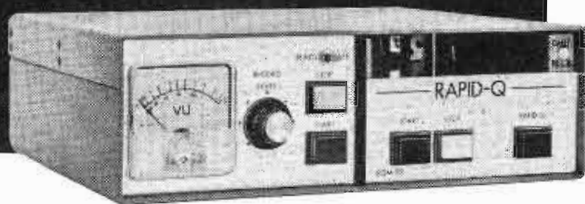
James C. Beebe
President
134B Ivy Hill Lane
Medina, Ohio 44256
(216) 725-6245

C. Fred Mullins
Director of Engineering
1293 Center Street
Ashland, Ohio 44805
(419) 289-2766

THE Widget Works INC

For More Details Circle (278) on Reply Card

RAPID-Q™



Record, playback; mono, stereo.
Custom 3000 Series: for "A" carts.
RQ-71 Series: for "A", "B" and "C" carts.

EDCO PRODUCTS, INC., 680 Bizzel Drive, Lexington, Kentucky 40504

For More Details Circle (279) on Reply Card

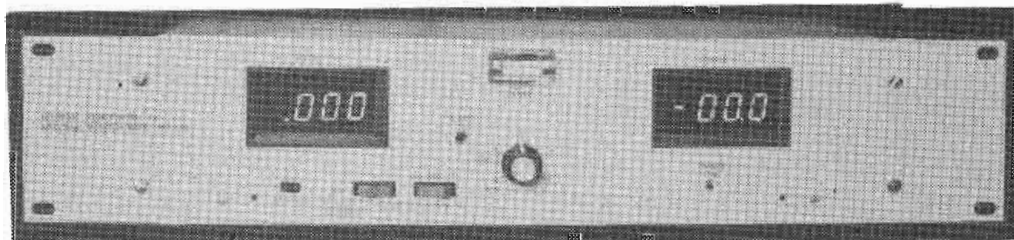
SPACE-SAVING CARTRIDGE TAPE EQUIPMENT

Automatic super-fast
 forward

Exceeds NAB standards

IEC and CCIR
 standards available

PRECISION DIGITAL ANTENNA MONITOR—\$1390



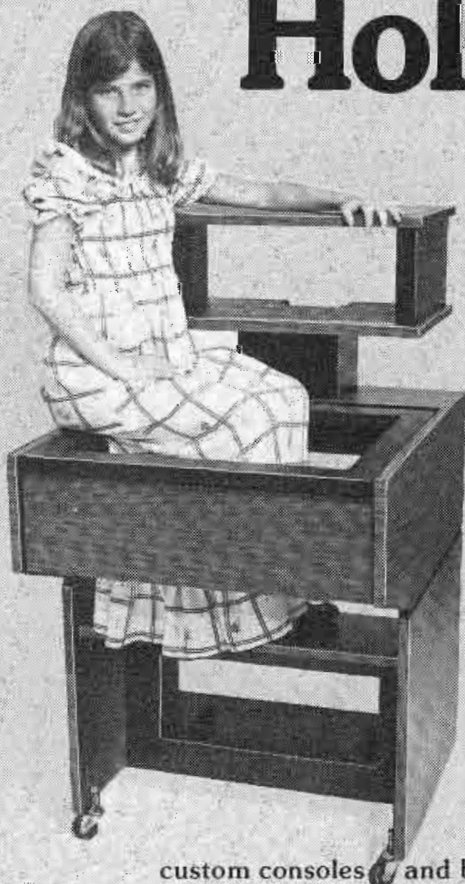
FCC TYPE APPROVAL NO. 3-239

Precise, high resolution measurements of phase, true ratio, and relative amplitude, in a compact 3½" rack mounting chassis. DA-1 or DA-2, up to five towers. Continuous phase sign display. Accepts 1.8-15 VRMS sample signal; compatible with existing sampling systems. Choice of N or UHF receptacles, 50 or 75 ohm termination. For stations that will take antenna monitor readings at the transmitter site.

GORMAN-REDLICH MFG. CO. • 6 Curtis St., • Athens, Ohio 45701 • 614-593-3150

For More Details Circle (280) on Reply Card

Holds any model



Ampex, MCI, Scully, Tascam, Otari and any other 19" x 15¾" tape transport fits our RL 500 console. Constructed with the same care as the Scully consoles which we have manufactured for the past 12 years, the RL 500 incorporates the newest design features, including front panel removal for deck access in both horizontal and vertical positions and a rear shelf for your power supplies. Add these advantages to Rus Lang's reputation for quality, and the RL 500 becomes the best value on the market. Ask for details and pricing.

custom consoles and broadcast studio furniture

Rus Lang Corporation

247 Ash Street, Bridgeport, CT 06605 Tel: 203 384 1266

DEALER INQUIRIES INVITED

For More Details Circle (281) on Reply Card

New Products

Continued from page 177

Optimod-FM Limiter, which is being used by many top FM stations and has been acclaimed for its highly "natural" and clean sound.

Because of the operating simplicity of the 418A, it is particularly well suited as a "mixdown machine", to be used in situations where time is a problem. Most decisions are made for the operator on the basis of an automatic analysis of the input program, therefore the 418A can be used effectively for rough mixes, broadcast production, commercials, and the like. It is also ideal for cassette duplication and for single-channel limiting chores.

The 418A comes in a 19 inch rack panel.

For More Details Circle (314) on Reply Card

Marketing Advisory Service

Industrial Marketing Advisory Services (IMAS) now provides the convenience and efficiency of a single marketplace for buyers and sellers of all types of electrical and electronic products. By acting as a computerized clearinghouse for bids and quotes currently in excess of one million dollars per week, IMAS provides the buyer with the opportunity to shop the country whether the need is for computers, electrical equipment, communications gear, components or test equipment. Just one phone call sets IMAS machinery in motion at no cost or obligation to the buyer.

Buyers begin the cycle by calling toll free 800/336-3045 with their purchasing requirements. An interactive answering system records their name, company affiliation and the details of their order. IMAS can also be placed on an organization's bid list so purchase orders can be mailed directly into the system. Upon receipt, IMAS edits the information so that it can be categorized, matched and sent out to their subscribers in the form of sales leads on a regular weekly basis. Leads are segmented into product categories as well as regional categories. This allows the

subscriber maximum flexibility as he can receive any combination of products from all over the United States.

IMAS does not intervene in the selling process, as subscribers contact buyers directly with no fees or commissions. IMAS does save the buyer time and effort in searching the country for sources of supply. IMAS increases the buyer's options and allows him to purchase according to his own decision criteria: fast delivery, low price, high quality, etc.

There is no other sales generating program like the IMAS system, either in terms of concept or cost-effectiveness. At the low trial rate of \$75.00 for 50 leads, subscribers receive weekly a constant flow of current prequalified sales leads for the products they sell. These sales leads can be an important supplement to any company's marketing strategy, because IMAS leads are ready for immediate contact.

For More Details Circle (315) on Reply Card

Portable Oscilloscope

A compact 15-MHz portable oscilloscope featuring A+B and A-B capability has been introduced by **Philips Test & Measuring Instruments, Inc.** The dual trace PM 3226P has a 2 mV sensitivity and includes comprehensive triggering facilities.

The 9.5 pound portable oscilloscope has compact dimensions of 4.72 inches high by 10.8 inches wide by 12.5 inches deep. It features adjustable level triggering, automatic triggering, line triggering and automatic TV line and frame sync pulse triggering. External triggering is also possible. Input impedance of vertical and horizontal channels is 1 MOhm//25 pF, and rise time is 25 ns. Dynamic range is 24 div. for sinewave signals up to 1 MHz.

18 sweep speeds from 500 nsec. to 0.2 sec., are available with chopped and alternate display possible for all timebase settings, with a 400 kHz chopping frequency. Power supply can be 110, 127, 220 or 240 V $\pm 10\%$ at 46-440 Hz.

X-Y displays are performed with the Channel B input used for the horizontal signal so that X-Y displays at maximum sensitivity in

Continued on page 180



8 powerful formats for automated or live radio. Complete Library Service • Mono or Stereo

Call (213) 776-6933

CaVox Stereo Productions, 502 S. Isis, Inglewood, CA 90301

See us at NAB Sheraton Park Hotel Suite C-240

For More Details Circle (282) on Reply Card

MASTER AUDIO METER™

The meter that meters what matters

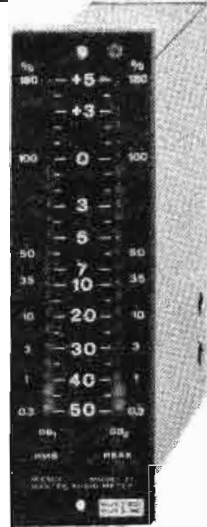
Master Audio Meter...the precision dual-channel panel meter can indicate both PEAK and RMS (VU) levels with exceptional resolution and accuracy on smoothly flowing bars of light.

Use the two channels in full stereo or for monaural program/preview, or to monitor before-and-after-limiters for maximum undistorted signals.

Master Audio Meter lets you get the utmost out of the audio processing chain — with precision — from console to transmitter.

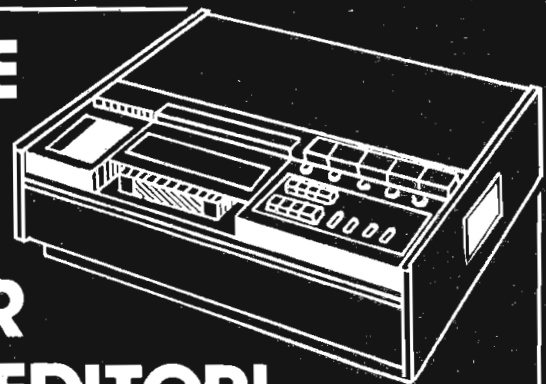
MICMIX Audio Products, Inc.
9990 Monroe Drive - Suite 222

Dallas, Texas 75220
(214) 352-3811



For More Details Circle (283) on Reply Card

GET THE RUBBER BANDS OUT OF YOUR EDITOR!



Video Associates Labs has just developed a Direct Drive DC Drum Servo Kit that does away with the drum belt in your Sony VO-2850. That means improved ability to follow an unstable input, hence considerably reducing editing whip. The Kit makes it possible to maintain second generation edited material within \pm one line; and completely isolates your machine from the effects of powerline surges and frequency changes (in mobile units). We will install the Kit in your machine or sell you a new one with the modification complete. It is backed by our no risk 15 day money-back trial period. For more information write or call

VIDEO ASSOCIATES LABS

A DIVISION OF VIDEO ASSOCIATES, INC.

8301 Balcones Suite 313 Austin, Texas 78759

Also inquire about our XLR, BNC, Auto-select Ext. 3.58, D.O.C., and hour meter modifications for both 2850 and 2850 A's.

For More Details Circle (284) on Reply Card

TO CORRECT FOR MONO SUM ERROR



Affects phase only . . . does not degrade stereo signal.

EDCO PRODUCTS, INC., 680 Bizzel Drive, Lexington, Kentucky 40504

For More Details Circle (285) on Reply Card

Through these terminals pass some of the best sounds around.



Install Shallco attenuators for reliable performance. Replacements available for most all consoles.

Request catalog 102

Shallco

Shallco, Inc. P. O. Box 1089
Smithfield, N. C. 27577 919/934-3135

For More Details Circle (286) on Reply Card

New Products

Continued from page 179

both axes can be seen.

A fully enclosed metal case and built-in carrying handle give the instrument an attractive durable finish. The PM 3226P comes with a protective front cover.

A functional control panel provides all similar function controls on the same level allowing the operator to concentrate on the display rather than on set-up.

For More Details Circle (316) on Reply Card

Cartridge Storage Unit

A digital cartridge storage unit, a random-access cartridge memory designed for use with the 3M Data-vision D-2000 and D-3000 television character generators, has been introduced by **3M Company**.

The Model DCS-1 is a one-piece, desk-top unit which connects to the character generator by means of a 25-pin cable, and uses Scotch brand DC 100A data cartridges capable of storing 300 240 character pages per cartridge. An address

THERMODYNE

**INDESTRUCTIBLE
LOW COST**

**TRANSIT
CASES**



- Light-Weight Impact And Dent Resistant High Density Polyethylene
- Designed To Meet ATA Specs
- Impervious To Water And Most Solvents
- Shock Absorbing Foam Lining
- All Around Sealing Gaskets
- Recessed Heavy Duty Hardware
- Spring Loaded Handles
- Ribbed For Added Strength
- Lock Hasps
- Unique Removable Casters

FOR YOUR HIGH COST VIDEO EQUIPMENT

Originally designed to Military Specifications to provide dust tight and air tight protection for delicate electronic equipment, THERMODYNE has developed a complete line of low cost, high quality demo and shipping cases for most SONY, PANASONIC, IKEGAMI, JVC, RCA and PHILIPS television equipment. With a selection of more than 60 standard sizes, custom cases are available on request. National field offices in over 20 cities provide instant response to your packaging needs.

Rest Your High Cost Equipment In Our Low Cost Indestructible Cases

Represented by

video components, inc. 601 so. main street, spring valley, n.y. 10977
914 356-3700 telex: 996534

**THERMODYNE
INTERNATIONAL LTD.**

12600 Yukon Ave., Hawthorne
California 90250. (213)679-0411



keyboard on the unit's face controls the system, and a three-digit alphanumeric display indicates its present status.

The DCS-1 operates in 32 playback modes, displaying either one-, two- or three-line titles, or a full 10-line page of characters, in any of eight pre-programmed playback rates, ranging from eight to 1,000 characters per second. Of special interest is a built-in tape formatter for automatically recording address information onto a new cartridge.

Measuring 15½ inches wide by 4½ inches high by 12½ inches deep, the cartridge memory unit has a 10-page-per-second search rate and features a "search ahead" mode to minimize effective search time.

The cartridge utilizes an elastomeric drive band which permits bidirectional operation from a single motor up to 60 ips, thereby maintaining a constant tape tension and assuring longer cartridge life.

The DCS-1 operates on 110/117 VAC Single Phase, 50/60 Hz, 70 watts.

For More Details Circle (317) on Reply Card

ANNOUNCEMENT

Model 6445 Five Channel Stereo Console
 Model 6445 Five Channel Monaural Console
 Models 6400A and 6401A Phono Preamplifiers
 Model 2580 Automatic Antenna Heater Control
 The System D Newsdesk, a News Production Package

To be shown at NAB booth 219 or call 413 536-3551 for complete details

MICRO-TRAK CORPORATION

620 RACE ST., HOLYOKE, MASSACHUSETTS 01040

For More Details Circle (288) on Reply Card

Electric Rain Gauge

Model 525

Now you can report minute-by-minute rainfall amounts and not get wet! This new, low cost, remote-reading gauge shows announcer rainfall accumulations in 1/100 inch increments. Transmitter can be located several hundred feet away and is completely automatic—needs no service or attention. Ask for Spec. Sheet, Model 525. Free.

Also, a complete line of
Texas Weather Instruments
Electronics, Inc.
 P. O. Box 7225B
 Dallas, Texas 75209



For More Details Circle (289) on Reply Card

PROFESSIONAL SERVICES

Applied Video Electronics, Inc.

STUDIO SYSTEMS DESIGN AND INSTALLATION ENGINEERING. REFURBISHING/MODIFYING COLOR CAMERAS AND QUADRUPLEX VIDEO TAPE RECORDERS.

Post Office Box 25
 Brunswick, Ohio 44212
 Phone (216) 225-4443

W. H. BRADLEY, P.E. B. L. BRADLEY, BS/EE

Consulting Radio Engineer
 Engineering Applications
 & Field Engineering

Phone: 918-245-5444
 300 West 41 Street,
 SAND SPRINGS, OKLAHOMA, 74063

MIDWEST ENGINEERING ASSOCIATES

Consulting Engineers

6934 A N. UNIVERSITY
 PEORIA, ILLINOIS 61614
 (309) 692-4233
 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

James Tiner, President

TINER COMMUNICATIONS SERVICE, INC.

"We Specialize in Towers"
 Complete Tower and Antenna
 Installation and Service

P.O. Box 3827, 15201 Hickman Road
 Des Moines, Iowa 50322 (515) 278-5501

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

MERL E. RINEHART, P.E.

CONSULTING RADIO ENGINEER
 Applications and Field Engineering

P.O. BOX 162, WOODLAND PARKWAY
 STATE LINE, PENNSYLVANIA 17263
 (717) 597-9160

Joseph & Donna Roizen VIDEO CONSULTANTS

International TV Systems
 Marketing/Technical Writing
 800 Welch Rd., Suite 354
 Palo Alto, Ca. 94304
 Tel: (415)326-6103

For More Details Circle (290) on Reply Card

advertisers' index

A.F. Associates, Inc.	27	Kay Industries Inc.	26
AMCO Engineering Co.	146, 147	Knox Ltd.	172
Accurate Sound Corp.	166	LPB Inc.	52
Acrodyne Industries, Inc.	125	L-W International	32
Aderhold Construction	168	Laird Telemedia Inc.	167
Alexander Mfg. Co.	169	Russell Lang.	178
Allied Broadcast Equipment	114	Leitch Video Ltd.	135
American Data Corp.	131	London Co.	80, 168
Ampere Electronic Corp.	47	McCurdy Radio Industries	11
Ampex Corp.	7	Marconi	51
Ampro Corp.	101	Marti Electronics	174, 177
Angenieux Corp. of America	129	Memorex Corp.	15
Andrew Corp.	89	Micmix Audio Products, Inc.	179
Anixter-Mark	156	Micro Consultants Inc. (MCI)	109
Aristocart Div.	172	Microtime	77
Arvin/Echo	53	MicorTrak Corp.	181
Asaca Corp. of America	155	Mincom Div., 3M Co.	41
Audi-Cord Corp.	175	Minneapolis Magnetics, Inc.	150
Audio Designs & Mfg.	31, 99	Monroe Electronics, Inc.	176
Audio-Video Engineering Co.	159	Montreux International TV Symposium	175
Auditronics, Inc.	134	Moseley Associates Inc.	80, 106, 138, 168
BCS/Kaman Sciences	122	Multronics, Inc.	162
BGW Systems, Inc.	61	Nagra Magnetic Recorders, Inc.	104, 148
BTX Corp.	92	Nurad, Inc.	137
Beucart Div. (See UMC Electronics)		O'Connor Engineering	50
Belar Electronics	123	Opamp Labs, Inc.	168
Belden Corp.	153	Optek	169, 172
Berkey-Colortran Inc.	67	Orban/Broadcast	82
Beston Electronics Inc.	128	Oregon Magnetics	168
Bird Electronics Corp.	176	Otari Corp.	93
Bogner Broadcast Equip. Corp.	102	Pacific Recorders & Engineering	66
Broadcast Consultants Corp. (David Green)	96	Panasonic	149
Broadcast Equipment & Supply Co.	165	Phelps Dodge Communications Co.	165
CCA Electronics Corp.	95	Philadelphia Resins Corp.	144
CMX Systems	1	Phillips Broadcast	43
Cablewave Systems Inc.	65	Phillips Test & Measuring Instruments	97
Calvert Electronics Inc.	173	Potomac Instruments Inc.	151
Canon Video	59	Pulse Techniques Inc.	176
Capitol Magnetic Products	117	Quick-Set Inc.	42
CaVox Stereo Productions	179	RCA Communications Systems Div.	162, 163
Central Dynamics Corp.	115	RCA Electro Optics	69
Cetec Broadcast Group	5	Ramko Research Inc.	81
Chyron Telesystems	17	Rank Audio Visual Ltd.	55
Comark Industries Inc.	176	Recording Supply Corp.	174
Communication Medias	116, 120	Recortec Inc.	130
Communications Technology, Inc.	20	Robins Industries Corp.	18
Comprehensive Video Supply Corp.	163	Rockwell International, Collins Div.	45
Computer Magnetics Corp.	160, 161	Roh Corp.	64
Consolidated Video Systems	23	Rohde & Schwarz	148
Continental Electronics Mfg. Co.	133	Russco Electronics	142
Continental Electronics Wholesale Corp. (Contel)	164	SSAC Precision Products	177
Convergence Corp.	24, 25	Scully Recording Instruments	56, 58, 79
Cooke Engineering (See Dynatech Labs)		Sennheiser Electronics	60
D & S Corley Ltd.	114	Shalco, Inc.	180
Datatek Corp.	46	Sintronix Corp.	78
Datatron, Inc.	63	Sitler's Supplies, Inc.	171
Delta Electronics Inc.	87	Skotel	152
Dynair Electronics, Inc.	83	Sony Corp. of America	72, 73
Dynasciences Video Products	52	Sound Dynamics, Inc.	171
Dynatech Labs	158	Sound Technology	21
Edco Products, Inc.	178, 180	Stanton Magnetics Inc.	103
EMCEE Broadcast Products	107	Storeel Corp.	30
ES Enterprises	121, 155, 157, 159	Strand Century	138
Electrohome Ltd.	10	System Concepts Inc.	29
Electro-Voice Inc.	105	Taber Mfg.	94
English Electric Valve No. America	14	Tech Laboratories Inc.	174
Envirco	153	Tektronix Inc.	57
Farinon Electric	71	Teledynamics	145
Fidelipac	16	Teledyne Energy Systems	94
Flash Technology	54	TeleMation, Inc.	139
Freeland Products	173	Tele-Measurements, Inc.	121
Frezzolini Electronics Inc.	16	Television Equipment Associates	106
Fujinon Optical, Inc.	111	Telex Communications, Inc.	91, 170
GBC Closed Circuit TV Corp.	19	Temtron Electronics	177
General Electric Co., Video Display Equip. Operation	132	Tentel	150
Glentronix Ltd.	154	TerraCom	141
Gorman-Redlich Mfg. Co.	178	Texas Electronics, Inc.	181
Gould, Inc.	158	Thomson-CSF Laboratories	127
Grass Valley Group	3	Time & Frequency Technology, Inc.	76
Harris Corp.	169, 171, 173, 175	Townsend Associates, Inc.	92
Hitachi Denshi America, Ltd.	113	UMC Electronics Co., Beucart Div.	28, 154
Holland Electronics	157	Vamco Engineering	164
Houston Photo Products, Inc.	143	Vega, div. Cetec	70
ITT Jennings	30	Video Aids Corp. of Colorado	140
Ikegami Electronics (USA) Inc.	12, 13	Video Associates	179
Industrial Marketing Advisory Services, Inc.	112	Video Components Inc.	180
Inovonics	85	Videomagnetics	119
International Microwave Corp.	148	Videomax	9
International Tapetronics Corp.	48, 49	Vital Industries Inc.	Back Cover
Jamieson Film Co.	136	Ward-Beck Systems, Ltd.	Inside Back Cover
Jensen Tools & Alloys	168	Westlake Audio	Inside Front Cover
		Widget Works, Inc.	177
		Wilkinson Electronics, Inc.	152
		Winsted Corp.	156
		World Video Inc.	60

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, St. Louis, 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 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

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 \$1.25. 2nd class \$2.50, 1st class \$1.60. Free catalog. Ameco Publishing, 275G Hillside Ave., Williston Park, N.Y. 11596. 8-72-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

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

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

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

SERVICES (CONT.)

USED BROADCAST EQUIPMENT sold on consignment. Catalog updated and mailed free bi-monthly. David Castellano, 3232 McNutt Ave., Walnut Creek, Calif. 94596. 11-76-6t

TRANSMITTER TUBES—Save 50 to 50%. 3CX2500, 4CX5000, 4CX10000, 4CX15000, 4CX35000 and many others. Write for details: FREELAND PRODUCTS CO., 3233 Conti St., New Orleans, La. 70119. 504-822-9223. 11-76-12t

WANTED

WANTED: All surplus broadcast equipment especially clean A.M. & F.M. transmitters, capacitors, 112 Clark & Potomac Phase monitors, Field 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

WANTED: Pre-1926 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, Ca. 92054, (714) 722-6162. 3-76-tf

77D or BK5, 7548 30th NE, Seattle, Wash. 98115. 2-77-4t

VIDEO SWITCHER, Color Bar Generator, RCA TM6C Master Monitors, TP15 Multiplexer, Slide Projector, 2GC Microwave receiver, Ampex VR1000. 315-677-7511. 3-77-1t

TRANSMITTER BUILDING BURNED DOWN—want used one and 10 KW AM transmitter and support equipment—good condition only. David Armstrong, KEYH, 3130 SW Freeway, Houston, Tex. 77098. 3-77-1t

TAX DEDUCTIBLE donations desired. Need ATC record/playback units, audio and video amps, CCTV units, anything appreciated. We'll pay shipping. David Wall, Engineer, Merrimon Avenue Baptist Church, 283 Merrimon Avenue, Asheville, NC, 28801. 3-77-1t

EQUIPMENT FOR SALE

IVC 870C VTR's (2) rack mount with 3M DOC interface. Both 2 years old, excellent condition. Spectra-vision backspacer included to make complete editing system—\$12,000. Bay Hayes, Audio Visual Services, Aetna Life & Casualty, 151 Farmington Avenue, Hartford, Connecticut 06156. (203) 273-3951. 3-77-1t

HOUSTON FEARLESS camera pedestals and heads. A limited number of discontinued PD-9, PD-7 Pedestals and MCH-1, MCH-3 and SSW-2 Heads are available. Also "Hi-Hat" bases. Contact Houston Fearless 76, Inc., 833 East Walnut, Carson, California, 90746, (213) 538-4930. 3-77-1t

TRANSMITTER PRESENTLY IN USE, available March, 1977. GE-TT-32-B, 50 Kw, Filterplexer on Channel 12, notch diplexer, heat exchanger, spare parts, and power tubes—\$25,000. Bill Moore, KBMT-TV, 713/883-7512. 3-77-2t

IVC-960CD, 1" TAPE MACHINE—Totally refurbished—\$15,000. Bill Moore, KBMT-TV, 713/883-7512. 3-77-2t

DON'T PAY \$150.00-\$280.00 each for VIDEO or PULSE distribution amps. You can save your organization a few thousand dollars, if you have someone who can solder and follow simple instructions. I supply ALL parts, including pre-drilled and etched epoxy card, for building a six output, BROADCAST video or pulse amp. AVAILABLE ONLY PER THIS AD. Will ship prepaid, COD or P.O. from credible CO. TELE-TEC, 8688 ROYAL DRIVE, NOBLESVILLE, INDIANA 46060. VIDEO 3601-VDA PULSE 3601-PDA, complete with instructions, \$25.00 each. 3-77-3t

CBS LIMITERS: 411 FM volumax—\$850.00; Audimax model 4450—\$850.00. Both Stereo. Contact Greg Lindell, KXRX, P.O. Box 167, San Jose, Calif. (408) 292-5080. 3-77-1t

IVC 870 VIDEO TAPE RECORDER—Purchased new from IVC, used less than 10 hrs. Local TV station added VTR to play our 3/4" cassette masters. Must sell. Highest offer above \$6,000. Patten Bible College, 2433 Coolidge, Oakland, CA 94601. (415) 533-8300, Dan Coryell. 3-77-2t

EQUIPMENT FOR SALE (CONT.)

SWITCHCRAFT: QC center amplifier selector (631-4A), QC center program selector (630-4), QC center speaker selector (632-4). RMS Sound, 2250 N. Federal Hwy., Boca Raton, Fla. 33431, (305) 392-5824. 3-77-1t

IVC 960 VTR AND TBC. Priced right. 3617 W. Broad Rock Rd., Richmond, Va. 23224. (804) 231-7277. 3-77-1t

HARRIS GATES—LD Logging Decoder, LE Logging Encoder, LEC Logging Encoder Control, Premier 5 digit Logging Printer. In recent service—relatively good condition. \$1000—complete. Valley Communications Inc., Box 159, Skowhegan, Me. 04976. 207-474-5171. 3-77-2t

AMPEX AMTEK time base corrector, excellent condition—\$950. (213) 980-5027. 3-77-1t

ONE EASTMAN SUPER-8 Video Film Projector TV-M100A, price \$1,275. One Eastman CT-500 16mm Motion Picture projector, price \$14,500. Both projectors in mint condition. Call Robert Blair 201-797-7400. 3-77-1t

(3) RCA TK-42 COLOR CAMERAS, with cam heads, CCU's, remotes, racks, approx. 600' camera cable. Two have RCA/Houston Fearless TD-9B-C motorized pedestals, one with RCA/Fearless tripod and dolly. With RCA color monitor, manuals. Call 815-964-4191 or 815-965-9600. 3-77-3t

(2) RCA TR-22 QUADS, high band color VTR machines, with Monitors, rack equipment, manuals. Call 815/964-4191 or 815/965-9600. 3-77-3t

RCA SWITCHERS—two Custom RCA PMS 10 Switchers for both production and operations use, incl. rack equipment and cable. Call 815/964-4191 or 815/965-9600. 3-77-3t

IVC 1" VTR MACHINES—one 870C, one 760, with TRI Editor. Low hours. Call 815/965-4191 or 815/965-9600. 3-77-3t

SPARE COLOR TUBES for TK-26 film chain camera (no optics) and TK-26 CCU. Best offer. Call 815/964-4191 or 815/965-9600. 3-77-3t

AUDIO—AMPEX 601 2-track with two amp/speakers. Four SHURE 565 dual-impedance mics, mic stands, 500' mic cable, RCA studio monitor speaker. Call 815/965-9600. 3-77-3t

UHF TRANSMITTER—30 KW GE television transmitter. Call 815/964-4191 or 815/965-9600. 3-77-3t

UHF TV TRANSMITTER—12 KW by GE. Call 815/964-4191 or 815/965-9600. 3-77-3t

SWITCHER—American Data ADC 556 with Chroma Key. Call 815/965-9600 or 815/964-4191. 3-77-3t

6-1/8" RCA TRANSMISSION LINE, used, brass, universal lengths. Call 815/964-4191 or 815/965-9600. 3-77-3t

IGM 500 STEREO AUTOMATION. Four Years Old, excellent condition with spare parts. Available February 1. Consists of five rollouts, ten voice and music channels, one mono 48 tray Instacart, 500 step DA MOS memory with battery backup, remote control, 364J logger, SMC 382A time announcer, two SMC 250 sequential carousels, remote control, logger encoder, ten step music sequencer, silence sensor, three racks, 500 control unit. Price: \$28,900 cash. Contact Robert Royster, CE, KIFM, San Diego, (714) 560-9836. Reason for sale—going Live. 3-77-1t

EXCESS INVENTORY SALE—Brand new in box: 4 LDH-1 Studio Color Camera Systems including FCC Encoder, Local Control and Genlock Modules—\$8,500 each. Lenses, Plumbicons, Remote Control, Cables etc. available as required, new or used. Ask for details. Also available 3 complete Studio/Remote Systems Type LDH-1/20 including Canon PV10x15, Plumbicons, Viewfinder, Remote Unit, Cable and Dolly—\$20,000 each. Canyon Associates, 1355 Driftwood Drive, Palm Springs, Ca. 92262. Telephone (714) 327-3330. Telex 67-6341. 3-77-1t

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.

TAPECASTER TCM, INC., Box 662
Rockville, Maryland 20851 1-72-tf

EQUIPMENT FOR SALE (CONT.)

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

MICA AND VACUUM transmitting capacitors. Vacuum relays. Large stock; immediate delivery. Price lists on request. SURCOM ASSOCIATES, 305 Wisconsin Ave., Oceanside, Ca 92054, (714) 722-6162. 3-76-tf

FOR SALE: TR-22 High band color video tape machine, also one CEI-280 plumbicon broadcast camera. Write WXON-TV, P.O. Box 2020, Southfield, Mich. 48075 or call 313-355-2901. 5-76-tf

A FEW COMPETITIVELY PRICED used Revox A77 & A700 decks available. Completely reconditioned by Revox, virtually indistinguishable from new and have the standard Revox 90 day warranty for rebuilt machines. Satisfaction guaranteed. Write requirements to ESSI, Box 854, Hicksville, N.Y. 11802 (516) 921-2620. 5-76-tf

JAMESON COMPAC 16/8 PROCESSOR, MacBeth TD-504 Densitometer, Oscar Fisher 30 gallon Jet Mixer, other equipment. Production Supervisor, WXXI-TV, Box 21, Rochester, NY 14601, 716-325-7500. 2-77-2t

FOR SALE: RCA 5D AM transmitter, reasonable. Call 715-268-7185. 2-77-2t

DISCOUNT BROADCAST AND STUDIO EQUIPMENT. New and Rebuilt. Cart and Reel Recorders, Consoles, Limiters, Monitors, Preamps, Mic's, Speakers, Turntables, racks, furniture, reconditioning services, parts. AUTODYNE: Box 1004, Rockville, Maryland 20850. 2-77-tf

SONY 320F VTR Rack Mount. 4 years old, excellent condition. Bay Hayes, AV Services, Aetna Life & Casualty, 151 Farmington Ave., Hartford, CT. 06156, (203) 273-3951. 2-77-2t

IVC 870C VTR Rack Mount with 3M DOC interface—2 years old, excellent condition, \$5,500. Bay Hayes, AV Services, Aetna Life & Casualty, 151 Farmington Ave., Hartford, CT. 06156. (203) 273-3951. 2-77-2t

TRANSMITTER—presently in use, available March, 1977. GE-TT-32-B, 50 Kw, Filterplexer on Channel 12, notch diplexer, heat exchanger, spare parts, and power tubes. \$25,000. Bill Moore, KBMT-TV 713/833-7512. 2-77-2t

IVC-960CD, 1" Tape Machine totally refurbished. \$15,000. Bill Moore, KBMT-TV, 713/833-7512. 2-77-2t

900 FOOT TELEVISION TOWER—Blaw Knox with 70 lb. wind loading capacity, elevator and guy cables in good condition. Will be dismantled by current owner and ready for transport from Miami, Fla. in June, 1977. Best offer. S. L. Rogers, VP Engineering, WPBT, P.O. Box 610001, Miami, Fla. 33161, 305-949-8321. 3-77-2t

SPARTA/BAUER Model 710 AM transmitter, 10 KW serial 101, high performance modulator—like new, one year use. Frequency 1500 KHZ, new tubes, \$17,000.00. Contact Edward Alatorre, (213) 965-2441 and (714) 996-5685. 3-77-3t

EQUIPMENT FOR RENT

MINICAM FOR RENT—New RCA TK-76 Camera for rent. \$450/day or \$2250/week. Call (415) 777-5777. 3-77-2t

HELP WANTED

PATENTED MATV. \$200.00 day profit possible. Preliminaries \$3.00. Box 809, Boynton Beach, Fla. 33435. 10-76-13t

TELEVISION MAINTENANCE/Supervisors, Electronic/Computer Systems Technicians/T.V. Servicepersons, for Northern New Jersey or New York Area. Send resume to: V.P.C., P.O. Box 268, New Hyde Park, N.Y. 11040. 1-77-tf

HELP WANTED (CONT.)

OPERATING ENGINEER with First Class FCC license to work television control room. Immediate opening, ideal community located in Alaska. Send resume and salary requirements to: George Howard, Chief Engineer, Northern Television, Inc., Box 2200, Anchorage, Alaska 99510. 2-77-2t

MID-WEST VIDEO ENGINEER—Video-RF Maintenance Engineer to maintain CATV origination and headend equipment. Must have background in all areas of video maintenance including video cassette recorders, color cameras, digital video processing equipment and control room equipment helpful. 2 years video experience or electrical engineering degree preferred. Salary based on background and experience. Send resumes to Broadcast Engineering, Dept. 369, P.O. Box 12901, Overland Park, KS 66212. 3-77-1t

CHIEF ENGINEER—WTLV, Jacksonville, Florida, needs top notch Chief Engineer to replace our Nile Hunt who is going to a larger market with our good wishes. Excellent opportunity in Bold New City of the South with enjoyable year around life style. Staff of 22. New RCA transmitter and ENG equipment. Send resume of your experience and full particulars to: Mr. Gert Schmidt, President, WTLV, P.O. Box 1212, Jacksonville, Florida 32201. An Equal Opportunity Employer. 3-77-1t

TELEVISION ENGINEER needed to assume duties of retiring chief engineer. Must know maintenance, administration and FCC rules. If you'd like to live in beautiful northern Arizona, send resume and salary requirements or call Wen Elliott, KOAI-TV, P.O. Box 1843, Flagstaff, Arizona, 86002. Call (602) 774-1818. 3-77-2t

TV MAINTENANCE TECHNICIAN—A major eastern market quality conscious television station is looking for an experienced maintenance technician. Requirements include a minimum of five years working with television equipment. Knowledge of computer technology desirable. A solid engineering educational background is necessary. Top wages for the qualified person. 1st Class FCC license mandatory. An equal opportunity employer. Dept. 370, Broadcast Engineering, Box 12901, Overland Park, Kansas 66212. 3-77-2t

HELP WANTED (CONT.)

SALESMAN WANTED with knowledge of broadcast television equipment, especially color cameras. Position will involve product planning, advertising, and forecasting in addition to sales for North America. Starting and minimum salary \$25K with no upper limit. Excellent benefits. Northeast location. Job demands a well-organized, self-starter who can communicate well both verbally and in writing. Dept. 371, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 3-77-1t

TV TECHS—Techs with strong maintenance background needed for studio and UHF transmitter maintenance. Also need Techs for TV remote operation. All should have digital maintenance experience. Send resume and salary requirements to P.O. Box 77105, Atlanta, Georgia 30357. 3-77-2t

MAINTENANCE ENGINEERS. Excellent opportunity with expanding private video network for 2 qualified engineers. Seeking applicants with 2 years experience in broadcast video production systems, particularly CEI 280 and PC70 cameras. Duties will include production video operation, 2 inch and 3/4 inch VTR's. Formal training in solid state and digital electronics required. Salary \$1000-\$1400 per month. Please submit a resume including salary history to: DATSUN (Nissan Motor Corp.), P.O. Box 191, Gardena, Calif. 90247. An equal opportunity employer, M/F. 3-77-1t

ELECTRONIC TECHNICIAN/TV ENGINEER. A large midwest television distributor requires a person capable of system layouts. Must be experienced and have technical background in Audio, Color Television Systems and Digital Circuitry. Excellent salary and fringe benefit package. Dept. 373, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 3-77-1t

HOLLYWOOD PRODUCTION HOUSE requires video systems technician, experienced in maintenance of VTR (2" Quad & Helical), video camera, and overall video systems. Production experience an asset. Send complete resume to: Dept. 372, Broadcast Engineering, P.O. Box 12901, Overland Park, Kansas 66212. 3-77-2t

HELP WANTED (CONT.)

AUDIO/BROADCAST ENGINEER needed for public FM station with classical music emphasis. Duties include planning, design, installation, maintenance, and renovation of transmission and production technical facilities. FCC first class license, FM broadcast experience, and high interest in audio quality essential. Send resume, including salary requirements, to ENGINEER SEARCH COMMITTEE, WGUC, UNIVERSITY OF CINCINNATI, CINCINNATI, OHIO 45221. An Equal Opportunity Employer. 3-77-1t

STUDIO MAINTENANCE SUPERVISOR—needed at once to maintain studio equipment. PC 70, VR1200, CDL 1260 switcher, etc. Must be experienced. (EOE). For information call collect: Russ Summerville, WNDU-TV, (219) 233-7111. 2-77-4t

MICROWAVE SYSTEMS SUPERVISOR. Specialized common carrier seeks applicants qualified in video microwave systems, for supervisory position in Minneapolis area. Please respond with resume and salary history to R. L. Renaud, Midwestern Relay Company, P.O. Box 68, Rubicon, WI 53078. 3-77-1t

CHIEF TELEVISION ENGINEER

The Office of Biomedical Communication is presently recruiting for a Chief Engineer who shall assume responsibility for all personnel, equipment, and spaces of the CCTV system. Additional responsibilities include the smooth and continuous operation of the CCTV studio and the portable CCTV system, and the maintenance of all records associated with the CCTV network in production, equipment updating, spare parts stock and utilization. Requirements include B.S. degree in electrical engineering with a specialization in electronics, first class F.C.C. Radio-Telephone Operators License, and a minimum of 8 yrs. experience in TV system engineering, system installation, service, repair, maintenance, and operation of CCTV/BW and color systems. Send resume including salary history to: Dr. M. Levine, Director, Office of Biomedical Communication

COLLEGE OF MEDICINE AND DENTISTRY OF NEW JERSEY

N.J. Medical School
100 Bergen Street
Newark, N.J. 07103

An Equal Opportunity/Affirmative Action Employer

TELEVISION ENGINEERING OPPORTUNITIES (coast to coast)

We specialize in the placement of well qualified people in the Television Engineering Industry. Openings at all locations—all levels. Confidential—no cost to applicant. Employer inquiries invited. Contact Alan Kornish.

KEY PERSONNEL, EMP. AGCY.
116 South Main Street, South Main Towers
Wilkes-Barre, Pennsylvania 18701
(717) 822-2196

National Sales & Marketing Manager

Radio broadcast equipment manufacturer has excellent opportunity for aggressive sales & marketing type with some engineering background. All replies kept confidential. Send resume to: **Broadcast Engineering**, Dept. 374, P.O. Box 12901, Overland Park, Ks. 66212.

SITUATION WANTED

WEST COAST CHIEFS—Taking a vacation this summer? EE student seeks summer relief position(s) San Francisco and south. First; 2 yrs. at 50Kw FM; Resume: Dan Benua, Box 527, Brown U., Providence, RI 02912. 3-77-1t

**Have A Banana?
Send It To
Broadcast
Engineering
Today**

Broadcast Products Division

RADIO FIELD SERVICE TRANSMITTER ENGINEERS

International/Domestic Opportunities with Harris

We are a steadily growing division of Harris, a corporation with a remarkably consistent record of expansion in many aspects of communications, and sales now over the half-billion mark. Broadcast Products Division is a world leader in television, radio and long range equipment.

These positions involve both domestic and international travel and offer excellent professional potential, plus exceptional financial opportunities when extended periods abroad are called for.

Requirements include technical strength in AM and FM broadcast, 3-5 years or more of directly related experience, and at least 2 year Associate's degree in Electronics. Ability to work with minimum supervision is essential.

Advantages include salary fully consistent with your qualifications, bonus plus other overseas incentives for international field expense assistance. Please send resume with salary data in confidence to Mr. Lawrence E. Carlstone, Professional Employment Supervisor. Harris Corporation Broadcast Products Division, Quincy, Illinois 62301.



HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

An Equal Opportunity Employer—Male and Female

Ward-Beck portables are going places.

No matter how remote the location, traditional Ward-Beck studio quality is now available from stock in the highly portable M1002 console.

The M1002 earned an enviable reputation as the great performer in the 1976 Summer and Winter Olympics. 55 units were employed by ABC and CBC for network coverage of these historic events.

The versatile M1203 offers increased input and output capability. A combination of comprehensive monitoring facilities with an integral front panel jack field make it ideal for mobile or studio installations where space is at a premium.

Available from stock, the M1002 and M1203 come in a variety of configurations designed to fit even the most modest budget.



Tomorrow's Technology Today.

Ward-Beck Systems Ltd., 841 Progress Avenue, Scarborough,
Ontario M1H 2X4. Telephone (416) 438-6550. Telex 06-23469

Ward-Beck Systems Inc., 290 Larkin Street,
Buffalo, N.Y. 14210



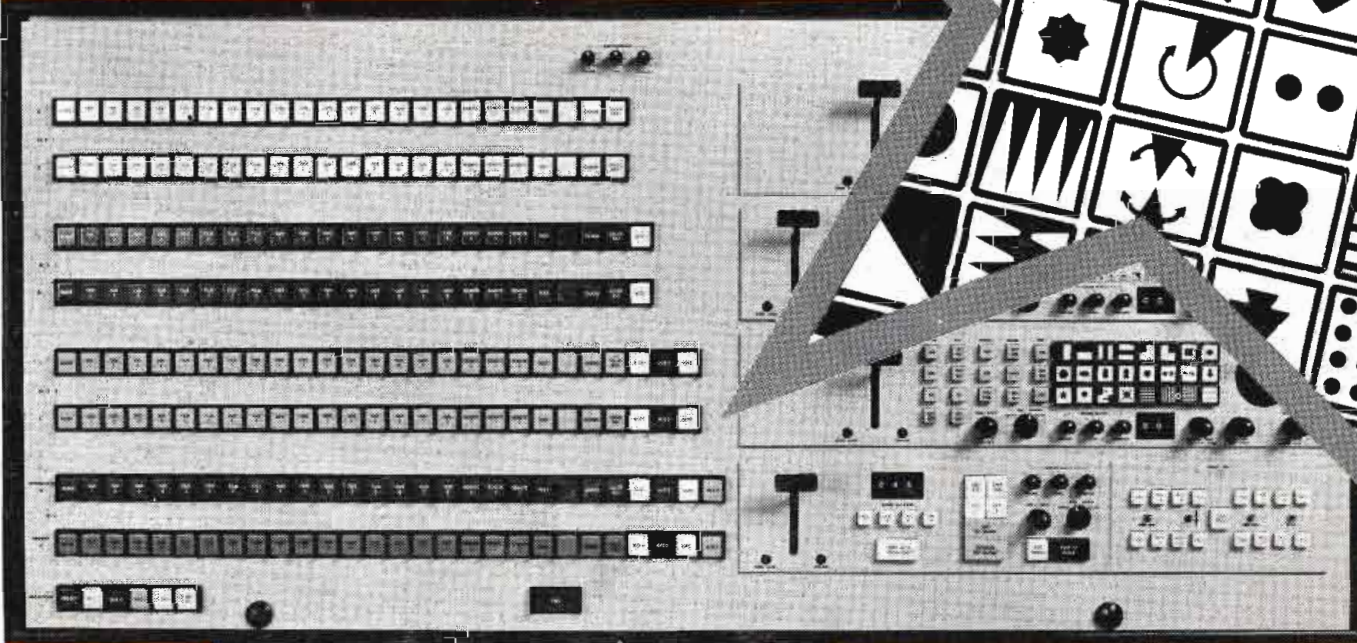
WBS M1002: 10 channel console



WBS M1203: 12 channel console

For More Details Circle (2) on Reply Card

in Switching- the Star is Vital



- 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.
- Automatic transition control on each ME.
- 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. You'll like it.

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

Vital Industries, Inc. is the first manufacturer to introduce extensive use of digital circuitry in switching techniques. In addition to superb electronics, we furnish a control panel that allows easy and frequent use of all features you buy. Example is the separate illuminated pushbutton showing pattern in use on each ME. No secret coding or delegation is used.

Automatic transition on each ME is furnished for professionally smooth transitions of wipes, keys and dissolves.

The VIX-114 is the only switcher in the world that generates the star, heart, binoculars, keyhole and many useful and creative effects.

Delivery now in ninety days.



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

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

For More Details Circle (3) on Reply Card