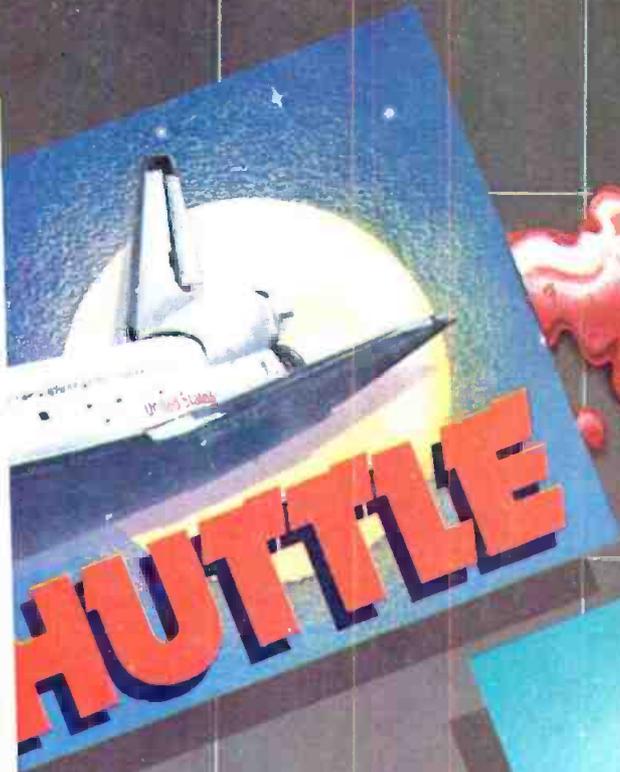


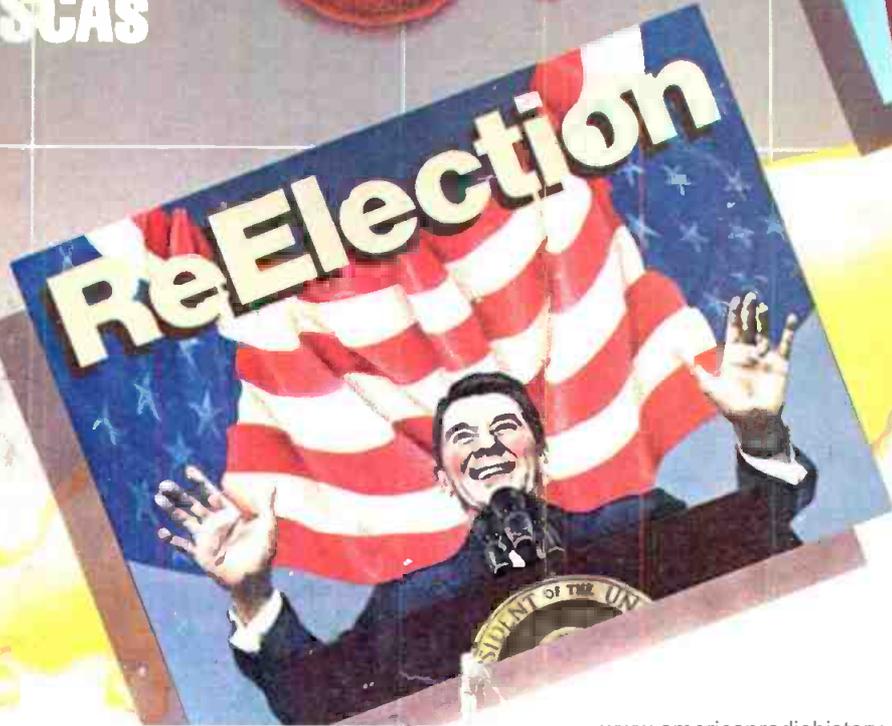
# BROADCAST ENGINEERING

February 1984/\$3

A98400-1-1-1-DNB461050 XXXXX BEG  
F11024830000000 34A 1  
TERRY W DENBROOK G M  
PUGAT SOUND AUDIO  
5105 N 46TH  
TACOMA WA 98407



Videography  
Directional antennas  
SCAs



# CAM

# With ADM, You Get Audio Distribution Your Way.

Transformer...or...Differential



...and One Great Frame Houses Both.



Whichever you prefer — transformer or differential — you get a superb Audio Distribution system with ADM.

Both amplifiers are one-input, six-output cards. Each has an ultra low noise level with distortion less than .1% at +24dBm. Each has 6 individual front panel gain adjustments and 6 individual test points for audio outputs.

Up to six of either amplifier can be interchangeably housed in our CH20C rack frame,

which includes a redundant power supply with automatic changeover.

Both have exceptionally high reliability backed by ADM's five-year unconditional warranty. So take your choice. You get a great system either way.

For more information, contact:  
ADM Technology, Inc., — *The Audio Company*  
— 1626 E. Big Beaver Road, Troy, MI 48084.  
Phone (313) 524-2100. TLX23-1114.

# ADM<sup>®</sup>

*The Audio Company*

WEST CENTRAL SALES  
(817) 467-2990

WEST COAST SALES  
(415) 945-0181

MAIN OFFICE AND  
EAST COAST SALES  
(313) 524-2100

# Midwest can deliver the mobile unit you need... **FAST!**

Whether you're covering on-the-spot news or providing network coverage of a tie-breaking football game, Midwest can put you in the action ... fast! ... with the mobile production unit precisely suited to the job. Midwest's totally integrated mobile production systems give you the quality you need, plus the comfort and convenience that make the tough assignments easier.

One of the largest and most experienced video equipment suppliers in the nation, Midwest offers a complete line of mobile units ... from ENG trucks to 45-foot semi's. And Midwest acts as your single source supplier for all the equipment you could ever need. For full information on how fast Midwest can put you in action with the mobile unit you need, call toll-free today:

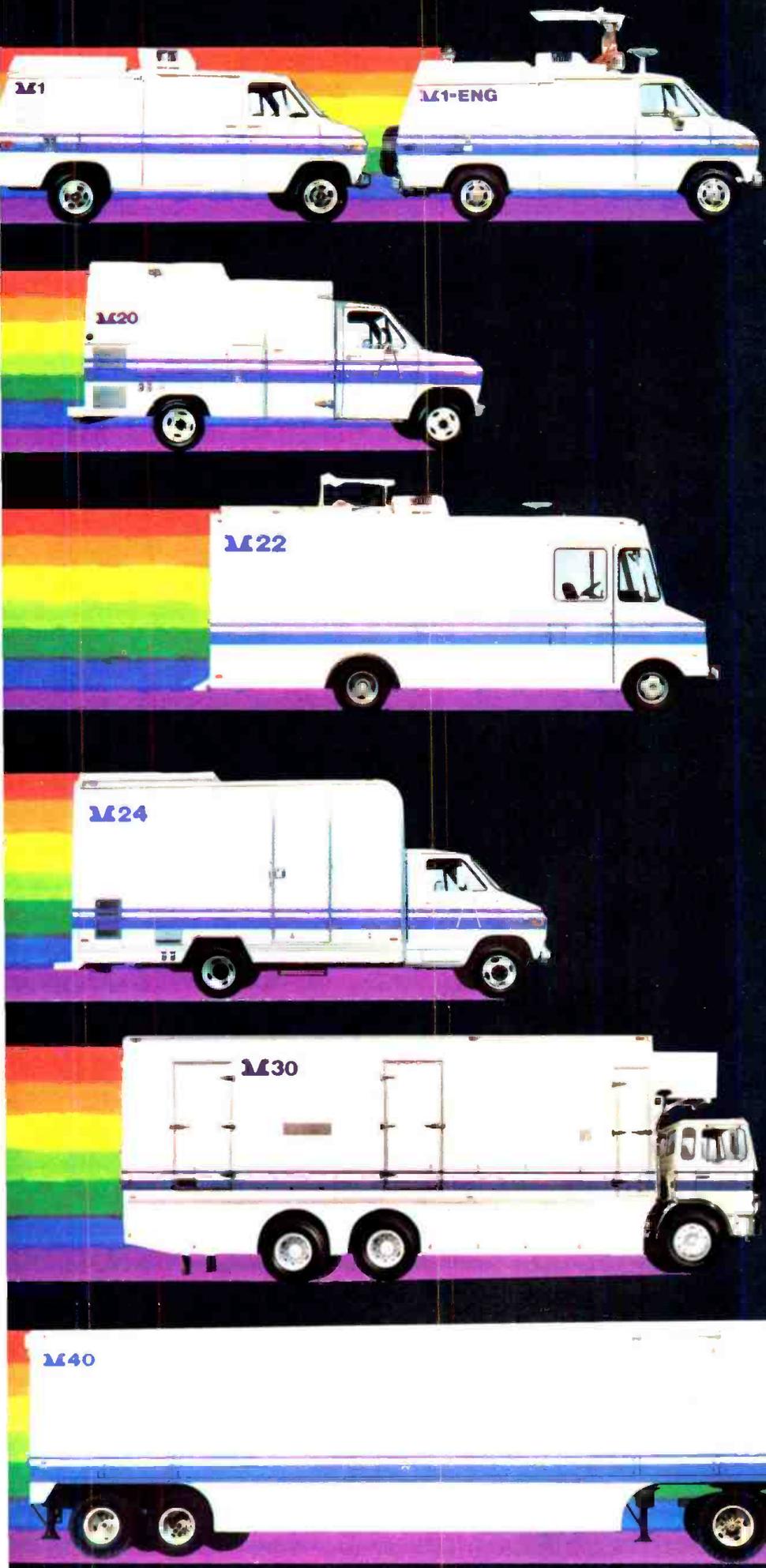
**800-543-1584**  
(In Kentucky 606 331-8990)



Cincinnati, OH	Bristol TN
606-331-8990	615-968-2289
Columbus, OH	Nashville TN
614-476-2800	615-331-5791
Dayton, OH	Charleston WV
513-298-0421	304-722-2921
Cleveland, OH	Virginia Beach, VA
216-447-9745	804-464-6256
Pittsburgh, PA	Washington DC
412-781-7707	301-577-4903
Detroit, MI	Charlotte NC
313-689-9730	704-399-6336
Indianapolis, IN	Atlanta GA
317-251-5750	404-875-3750
Louisville, KY	Miami, FL
502-491-2888	305-592-5355
Lexington, KY	Tampa, FL
606-277-4994	813-885-9308

Mobile Unit Group  
One Sperti Drive  
Edgewood, KY 41017

Circle (2) on Reply Card



# BROADCAST engineering

The journal of broadcast technology

February 1984 • Volume 26 • No. 2

## VIDEOGRAPHICS

- 21 How CNN creates graphics**  
By Bebe F. McClain, president, B.F. McClain Productions, Asheville, NC
- 34 A new, affordable still-store**  
By Chuck Aronson and Ron Long, ADDA Corporation
- 38 Electronic videographics systems: An update**  
By Carl Bentz, television editor
- 48 Digital video processor update**  
By Carl Bentz, television editor

## OTHER FEATURES

- 54 AM DAs: Doing it right**  
By Jeffrey Bixby, A.D. Ring & Associates, Washington, DC
- 66 The status of SCA**  
By Jerry Whitaker, radio editor
- 76 Modulation levels during SCA transmission**  
By John Hidle, P.E., vice president, Engineering, ABC Radio, New York, NY; Harry Priestler, chief engineer, WLS-FM, Chicago, IL; and Alfred Resnick, P.E., chief engineer, WLS-AM, Chicago, IL
- 84 The AM stereo challenge: AM stereo vs. FM stereo**  
By Dave Obergönnner, chief engineer, KSD-AM/KSD-FM, St. Louis, MO
- 88 Field trials: JVC KY-950 ProCam**  
By Carl Bentz, television editor
- 90 AES-'83/New York: A landmark in digital**  
By Bill Rhodes, editorial director
- 106 Corporate profile: TEAC**  
By Carl Bentz, television editor
- 114 Innovations from abroad**  
**Sequential charging: PAG Power's 6000 system**  
By Bebe F. McClain, president, B.F. McClain Productions, Asheville, NC

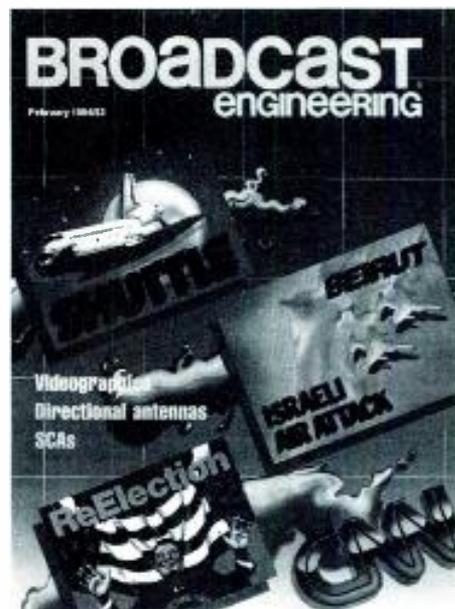
## DEPARTMENTS

- 4 AM stereo update**
- 6 FCC update**
- 10 Editorial**  
AM radio: Where do we go from here?
- 12 Satellite update**
- 14 News**
- 16 Feedback**
- 122 New products**
- 131 People**
- 132 Index of advertisers**
- 134 Classified ads**

©Copyright 1984, by Intertec Publishing Corporation. All rights reserved. Photocopy rights: Permission to photocopy for internal or personal use is granted by Intertec Publishing Corp. for libraries and others registered with Copyright Clearance Center (CCC), provided the base fee of \$2.00 per copy of article is paid directly to CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to Cameron Bishop, publisher.

ISSN 0007-1994. \$2.00 + 0.00.

BROADCAST ENGINEERING (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212-9981. Postmaster, return form 3579 to P.O. Box 12938 at the above address.



**THE COVER** this month is an illustration by Lisa Bell, a graphic designer for Design Services, Turner Broadcasting System, Atlanta. The art depicts the varied and timely news coverage of the Cable News Network (CNN). A description of the approach used for creating graphics at CNN begins on page 21.

## Coming events

- March 27-28**  
LPTV West, Anaheim, CA
- March 27-30**  
Audio Engineering Society (AES), Paris, France
- April 8-12**  
NPR Annual Conference, Arlington, VA
- April 29-May 2**  
NAB 62nd Annual Convention, Las Vegas, NV
- May 3-6**  
ITVA, Las Vegas, NV
- May 12-15**  
Audio Engineering Society (AES), Anaheim, CA
- May 20-23**  
Broadcast Financial Management Association (BFMA) 24th Annual Conference, New York, NY
- May 30-June 2**  
American Women in Radio and Television 33rd Annual Convention, Chicago, IL
- June 3-6**  
National Cable Television Association (NCTA) Annual Convention, Las Vegas, NV

## NEXT MONTH:

- Monitors for radio and television
  - Audio monitor update
  - Video monitor update
- NAB-'84 report
- LPTV industry review

# The maximum for the minimum

In designing the HK-302, Ikegami kept the frills—and the price—to a minimum while maximizing the performance. And that helps keep a moderate equipment budget from interfering with first-quality program origination.

However, staying with the basics doesn't mean sacrificing advanced technology. The HK-302's highly efficient optical system coupled to  $\frac{2}{3}$ " low capacitance diode-gun Plumbicon\* tubes and high transconductance FET pre-amps deliver sharp, low noise pictures (S/N 57 dB) with excellent colorimetry. And the compact camera head includes a full range of operational automatics to ensure consistent signal quality.

Built-in test, maintenance and operational features are integral parts of this camera's "basics" as well. A comprehensive test pulse system lets you adjust the video with the pick-up tubes off or removed.

Complete monitoring circuitry and a broadcast quality sync generator with genlock are also standard features.

To add to the versatility of the HK-302, use the Ikegami automatic highlight compression option. It ensures highly detailed pictures even in high contrast scenes.

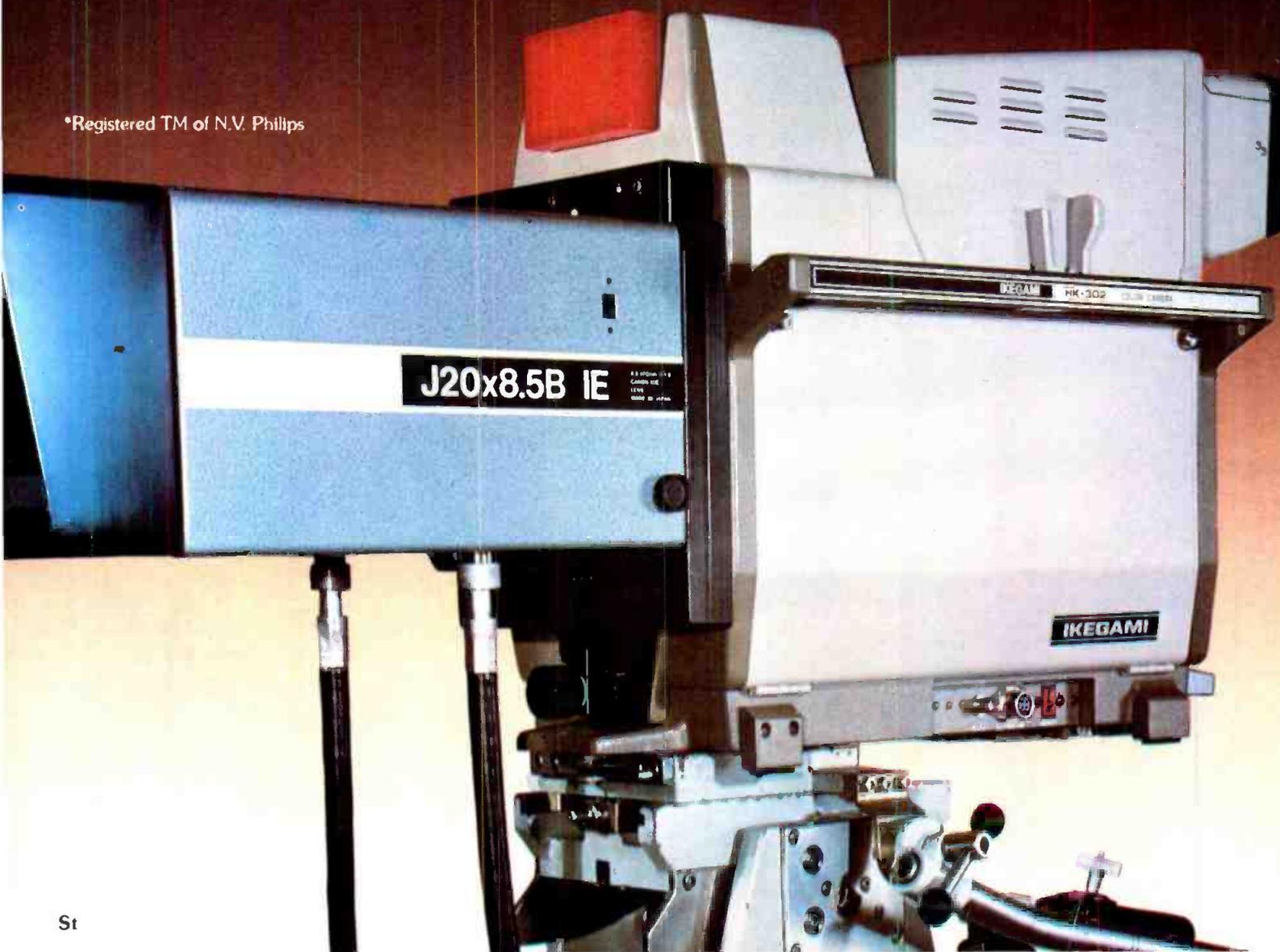
With the HK-302 you don't have to mortgage your station to afford prime time performance. So if you're looking for the maximum in studio production capability with a minimum of cost and maintenance, look over the Ikegami HK-302. For complete information and a demonstration, contact Ikegami.

## Ikegami HK-302

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607; (201) 368-9171  
Northeast: (201) 368-9171  West Coast: (213) 534-0050  Southwest: (713) 445-0100  Southeast: (912) 924-0061  Canada: (201) 368-9179

Circle (3) on Reply Card

\*Registered TM of N.V. Philips





### Harris receives type acceptance

The FCC has granted type acceptance to the Harris STX-1A AM stereo exciter, following extensive testing by the commission in its laboratory. Tests included not only the customary engineering measurements, but also subjective listening evaluations under program conditions. Type acceptance of the STX-1A was called into question last August, when the FCC determined that the original approval given the Harris AM stereo exciter was invalid. The commission said, "The measurement data filed and description of the functioning circuits (included in the original type acceptance process) was not representative of its (the STX-1A's) actual operation during stereophonic broadcasting."

The commission had found excessive monaural receiver distortion when an envelope detector was used for the measurement. Harris suggested a new multitone distortion test (as an alternative to the standard har-

monic distortion measurement technique), which the company said was a better approximation of program audio. The FCC instead decided to waive the distortion measurement requirements for the STX-1A, clearing the way for type acceptance. The commission based its decision on subjective listening tests, which showed the Harris system to be of acceptable quality. The STX-1A met all other standard engineering measurements required for type acceptance by the FCC.

Harris has shipped a large number of back orders, and now is filling new orders for the STX-1A. The company has waived all receiver licensing and royalty fees previously required of receiver manufacturers to help accelerate the production of AM stereo receivers.

### Chrysler goes with Motorola

Chrysler has joined the Buick Division of General Motors in electing to

install single-mode AM stereo receivers keyed to the Motorola AM stereo system.

A Chrysler representative said that the C-QUAM system receivers will be available for portions of the company's 1985 automobile line. The company said it chose the Motorola AM stereo system after extensive internal testing.

The Chrysler announcement followed a decision by Buick to offer Delco radios designed to receive C-QUAM signals as an option in some of its 1984 model vehicles. The Buick decision was based on the much-publicized Delco AM stereo tests, in which three of the competing systems were analyzed on the bench and in the field.

### NAB pushes multimode development

The Executive Committee of the National Association of Broadcasters has urged radio receiver manufacturers to develop multimode units, particularly for automobiles. The resolution said that developing radios capable of receiving all AM stereo transmissions would encourage the introduction of AM stereo technology into the consumer marketplace. [:-(-)]]

## BROADCAST<sup>®</sup> engineering

Editorial and advertising correspondence should be addressed to: P.O. Box 12901, Overland Park, KS 66212-9981 (a suburb of Kansas City, MO); (913) 888-4664. Telex: 42-4156 Intertec OLPK. Circulation correspondence should be sent to the above address, under P.O. Box 12937.

### EDITORIAL

Bill Rhodes, *Editorial Director*  
Carl Bentz, *Television Editor*  
Jerry Whitaker, *Radio Editor*  
Nils Conrad Persson, *Electronics Editor*  
David Hodes, *Video Editor*  
Miguel Chivite, *International Editor*  
Fred Ampel, *Audio Editor*  
Rhonda L. Wickham, *Managing Editor*  
Karen Arnhart Booth, *Associate Editor*  
Jane Cigard, *Editorial Assistant*  
Tom Cook, *Editorial Assistant*  
Barbara Ehli, *Editorial Assistant*  
Pat Blanton, *Directory Editor*

### ART

Kevin Callahan, *Art Director*  
James Sen Clark, *Senior Graphic Designer*

### TECHNICAL CONSULTANTS

John H. Battison, *Antennas/Radiation*  
Blair Benson, *TV Technology*  
Dennis Ciapura, *Technology*  
Dane E. Erickson, *Systems Design*  
Howard T. Head, *FCC Rules*  
Wallace Johnson, *FCC/Bdct. Engineering*  
Donald L. Markley, *Facilities*  
Harry C. Martin, *Legal*  
Robert J. Nissen, *Studio/Communications*  
Hugh R. Paul, *International Engineering*  
Art Schneider, *A.C.E., Post-production*  
Elmer Smalling, III, *Cable Systems*  
Vincent Wasilewski, *Communications Law*

### CORRESPONDING ASSOCIATIONS

American Society of TV Cameramen  
Assn. for Bdct. Engr. Standards  
National Association of Broadcasters  
National Radio Broadcasters Assn.

### CIRCULATION

John C. Arnst, *Director*  
Evelyn Rogers, *Manager*  
Dee Manies, *Reader Correspondent*

### ADMINISTRATION

R. J. Hancock, *President*  
Cameron Bishop, *Publisher*  
Eric Jacobson, *Associate Publisher*

### ADVERTISING

Robyn Kahn, *Marketing Coordinator*  
Dee Unger, *Advertising Supervisor*  
Mary Birnbaum, *Production Manager*

Regional advertising sales offices listed near the Advertisers' Index.

Member,  
American Business Press

Member,  
Business Publications  
Audit of Circulation



**BROADCAST ENGINEERING** (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212-9981. Postmaster, return form 3579 to P.O. Box 12938 at the above address.

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

**SUBSCRIPTIONS: BROADCAST ENGINEERING** is mailed free to qualified persons in occupations described above. Non-qualified persons may subscribe at the following rates: United States, one year, \$25; all other countries, one year, \$30. Back issue rates, \$5, except for the September Buyers' Guide issue, which is \$15. Rates include postage. Adjustments necessitated by subscription termination at single copy rate. Allow 6-8 weeks for new subscriptions or for change of address. Controlled circulation postage paid at Shawnee Mission, KS.



©1984. All rights reserved.  
Intertec Publishing Corp.

### ADVERTISING SALES OFFICES

#### NEW YORK, NEW YORK

Joe Concert,  
Phone: (212) 682-6630  
Stan Kashine  
Phone: (212) 687-4128  
630 Third Ave., Eighth Floor  
New York, NY 10017

#### SANTA MONICA, CALIFORNIA

Herbert A. Schiff,  
Schiff & Associates  
1408 Santa Monica Mall, Suite 200  
Santa Monica, CA 90401  
Phone: (213) 393-9285

#### KANSAS CITY, MISSOURI

Jan Winters,  
P.O. Box 12901, Overland Park, KS 66212  
Phone: (913) 888-4664

#### AMSTERDAM, HOLLAND

John Ashcraft & Co., John J. Lucassen,  
Akerdijk 150A, 1171 PV-Badhoevedorp,  
Holland  
Phone: 0-2968-6226  
Telex: 18406 HARKE NL

#### NORWOOD, AUSTRALIA

Haswell, Williamson, Rouse Pty. Ltd.  
P.O. Box 419  
Norwood 5067, Australia  
Phone: 332-3322  
Telex: AA87113

#### LONDON, ENGLAND

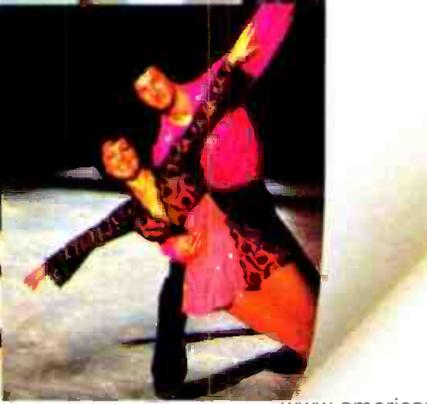
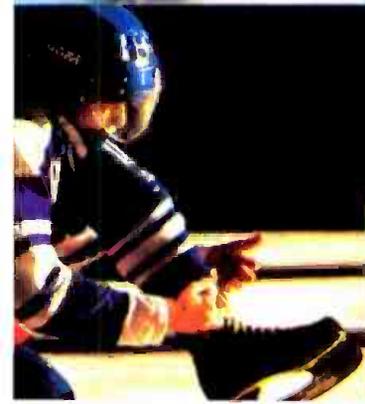
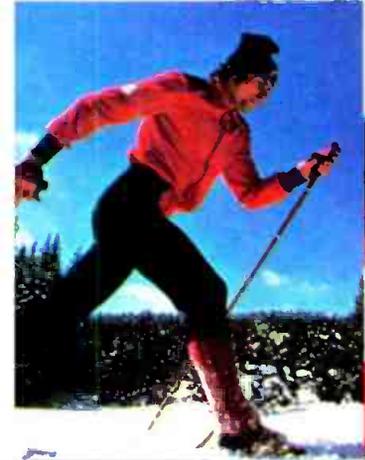
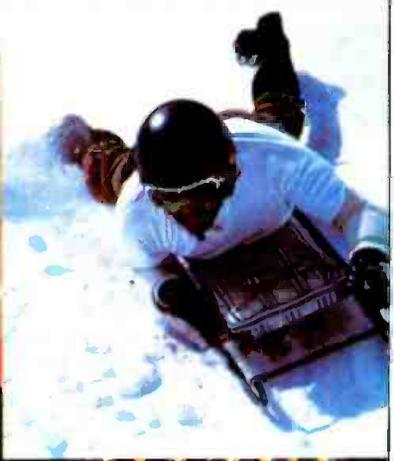
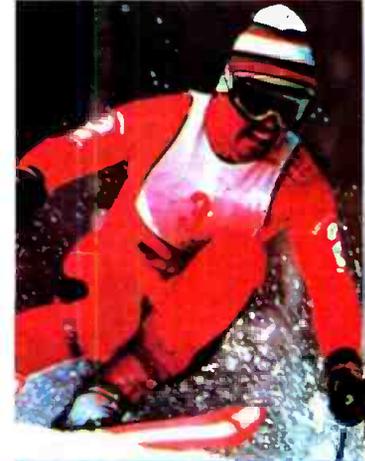
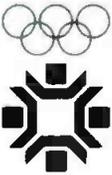
John Ashcraft & Co., John Ashcraft,  
12 Bear Street  
Leicester Square, London WC2H 7AS  
England  
Phone: 930-0525  
Telex: 895-2387

#### TOKYO, JAPAN

Haruki Hirayama  
EMS, Inc.  
Sagami Bldg., 4-2-21, Shinjuku,  
Shinjuku-ku, Tokyo 160, Japan  
(03) 350-5666  
Cable: EMSINCPERIOD  
Telex: 2322520 EMSINCJ



Exclusive Supplier  
of 1" and 3/4"  
video tape to  
the XIVth Winter  
Olympic Games,  
Sarajevo 1984.



# The Tape Behind the Olympics



Ampex video tape  
Winning quality worth broadcasting on 196  
1" video tape and 197 3/4" videocassettes.

## AMPEX

Ampex Corporation • One of The Signal Companies

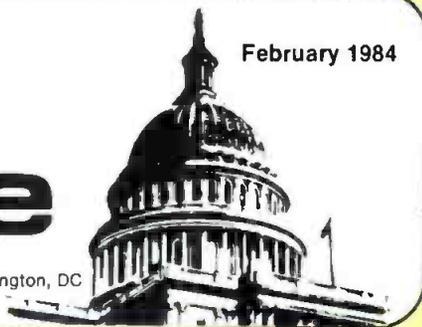
Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, CA 94063, 415-367-3809

Circle (4) on Reply Card

# FCC update

Harry C. Martin, partner, Reddy, Begley & Martin, Washington, DC

February 1984



## Quotas for children's TV voted down

The FCC has decided against adopting mandatory quotas for children's TV programs.

Since 1980, the commission has been considering imposition of rules that would have required TV stations to broadcast specific quantities of programming geared to younger viewers. In a decision issued in December 1983, however, the FCC said such quotas are unnecessary because there has been an overall increase in programming available to children. In this respect, the marketplace has not failed to address the needs of this special group. In addition to traditional broadcast services, the FCC expects that emerging telecommunications services, such as DBS, MDS, SMATV and cable TV networks, will add to current diversity.

In its order, the commission reaffirmed the obligation of all commercial TV stations to serve the special needs of children. Even though specific quantification rules were not adopted, broadcasters still are obligated to be responsive to the needs and interests of all groups in their communities, including children.

Echoing the same theme that has been the basis for other deregulatory actions over the past several years, the agency said there was no value in substituting its judgment for that of licensees in deciding what amounts or types of children's programming was needed, because licensees were in a better position than the government to determine the interests and needs of the children in their audiences. The decision to refrain from establishing quotas also was based in part on free speech concerns.

## Major change to be redefined

The FCC has proposed modifications in its rules under which it classifies certain changes in FM and TV facilities, and ownership in AM, FM or TV applications, as *minor* or *major*.

The proposed reclassifications are important because once an application—or an amendment to a pending application—is classified as *major*, it is subject to a variety of requirements,

including cutoff procedures (which invite petitions to deny and conflicting applications), rules requiring local publication and a 30-day holding period before grant. In the case of mutually exclusive applications, the filing of a major amendment after the cutoff date can result in dismissal of the application.

The proposals affect the following types of applications:

- **those involving changes in service area for FM or television of more than 50%.** Such changes, now considered *major*, would be considered *minor* under the proposed rules. (AM applications never have been classified as *major* or *minor* on the basis of service area changes.)
- **with respect to pending AM, FM or TV applications, a change of 50% or more in ownership.** (This provision would codify existing case law on major ownership changes.)

These rule-change proposals are designed to streamline and speed up the application process. The staff no longer will have to calculate the percentage of change in coverage area shown in applications or amendments, and will have a more definite standard to govern substantial ownership changes.

## Changes in LPTV processing proposed

In a Notice of Proposed Rulemaking adopted in December 1983, the commission has proposed the following changes in its processing procedures for LPTV and TV translator applications: modification of the cutoff rules to provide for a window, or certain date, for filing applications; elimination of the requirement to file financial information or certifications; and designation of TV translators as a separate, higher priority of service than LPTV for processing purposes.

Under the window procedure, applicants would have a limited period after public notice within which to file complete and sufficient applications. Applications would not be placed on an "A" cutoff list, thereby being made subject to competing applications, as

is the current practice. Instead, applicants would have to file during a specified window time period to be considered with any other mutually exclusive application filed during the same window period.

Comments have been invited as to appropriate groupings for a given window period. Groupings by tier, geographic location, market size and channel number have been suggested.

The commission is considering this revision in its processing procedures because of abuses of the present cutoff system. Under current rules, a bona fide applicant may expend substantial time and money to prepare an original application and, after the cutoff date, find that three or four competitors have copied and refiled it in their own names. The commission said that this practice has delayed substantially implementation of the new LPTV service, contrary to the public interest.

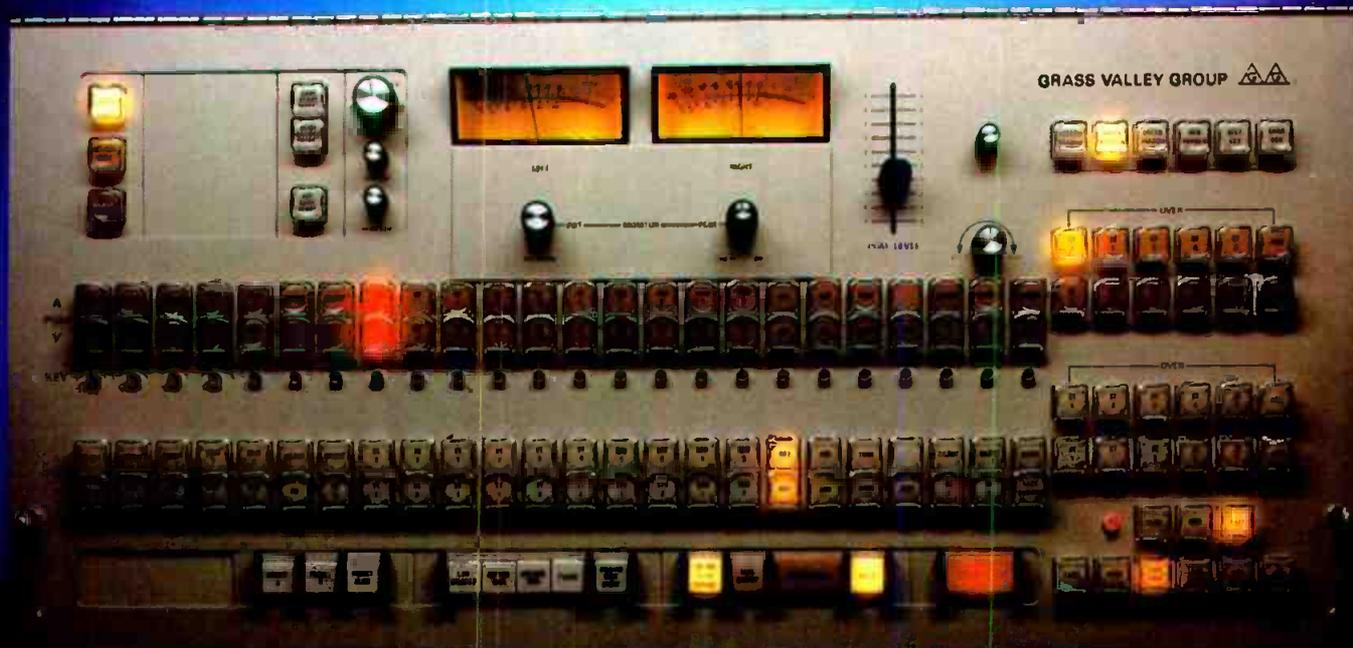
In proposing elimination of the financial showings required for LPTV and TV translator applications, the FCC said that the public interest may be better served by enforcing strict construction deadlines for authorized facilities. This mechanism, which requires completion of construction within one year after grant, already is in place. Further, the commission found that financial commitments may not be available in many instances until after construction permits are granted, because of the newness of the LPTV service. In any event, the FCC said, financing used to construct a facility often differs from that originally proposed, thus making pre-grant showings useless exercises in many cases. The FCC also said that eliminating financial requirements for applications may make it easier for minorities and women to enter the new LPTV service.

Finally, the commission invited comments on the issue of whether TV translator proposals should be given priority over LPTV applications in the processing scheme, and, if so, how such a priority system should be implemented. The commission recognizes that the filing of thousands of LPTV applications over the last several years has delayed processing of TV translator applications and has made it difficult to obtain translator authorizations. Consequently, the advent of LPTV has blocked translator service to shadowed areas and to rural and underserved markets.

To change this situation, the FCC is considering several alternatives. One proposal is to give special priority treatment to translator applications proposing to fill in a full-service facility's city-grade, Grade A or Grade B contours. Another option is to permit

*Continued on page 127*

# JOIN THE GROUP!



More television stations use the 1600-4S  
Master Control Switcher than any other  
brand...worldwide!

- Analog or Digital BORDERLINE
- Expandable M-200 Automation option
- Ease of operation • Reliability • Stereo audio option

And the M-200 Series Automation System provides a better on-air look, the right level of switching automation for your station, *and* room to grow. More than half of the 1600-4S users have added M-200 Automation Systems to their switchers, and the list is growing.

Ask us for users' references. There is a TV station near you using a GRASS VALLEY GROUP Master Control/Automation System.

## THE GRASS VALLEY GROUP, INC.®

P.O. BOX 1114 GRASS VALLEY CALIFORNIA 95945 USA • TEL: (916) 273 8421 TWX: 910 530 8280

A TELEVISION COMPANY

Circle (5) on Reply Card

Offices: **Eastern Regional:** 499 Thornall St, Edison, NJ 08817, (201) 549-9600 • **Southeastern District:** 1644 Tullie Circle N.E., Ste 102, Atlanta, GA 30329 (404) 321-4318 • **Midwestern Regional:** 810 West Bristol St, Elkhart, IN 46514 (219) 264-0931 • **Northwestern District:** 3585 North Lexington Ave, Ste 238, Arden Hills, MN 55112 (612) 483-2594 • **Southwestern District:** 316 Seminary South Office Bldg, Fort Worth, TX 76115 (817) 921-9411 • **Western District:** 1022 Foothill Center St, 214, Red Bluff, GA 31709 (706) 922-1111

www.americanradiohistory.com

TEK 1740 SERIES  
WAVEFORM VECTOR MONITORS

TWO MONITORS IN ONE  
PORTABLE PACKAGE...

THAT'S A NICE SWITCH.



The monitor above is provided with the optional battery pack.

Tektronix introduces a new product to help improve your signal quality. The 1740 series portable waveform vector monitor.

We know that it's crucial to get on remote, space is critical, and the smaller the equipment, the better. So we've combined two way-forms: a 10 vector monitor and a 1000 lines, and integrated them into one compact, anywhere package.

#### HALF THE RACK SPACE.

At 8 1/2 inches wide and 10 inches long, the 1740 series uses only half the normal rack width. That means you gain more usable space and more flexibility than ever.

To change from waveform mode to vectorscope mode and back, just press a button. Control is simpler. There's a brighter CRT display on the 1740 series, for viewing is easy even in high ambient light.

And, because it operates on either AC or DC, the 1740 can be wherever you go.



**TWO-IN-ONE ECONOMY.**

Using one monitor where two were needed before lowers your equipment costs. And, because the 1740 series is completely portable, it makes a sensible purchase for either studio or field use.

And there's more. The 1740 series operates on only 50 watts of power. And that means less heat build-up (which is important in crowded equipment racks).

And in addition, there's a single line display preset for monitoring VHS.

**SEE FOR YOURSELF.**

Now that you've heard about our new two-in-one tool, you should see, one. Call or write us for a demonstration. We have field offices in most cities. Or you can call Toll Free 800-547-1512 (in Oregon 800-452-1877), or contact your authorized Tektronix professional video dealer.

And remember. You can depend on Tektronix for video monitoring equipment that works, and for technical support and service worldwide.

**WORKING HARD FOR YOUR SIGNAL QUALITY.**

**Tektronix, Inc.**  
P.O. Box 1700  
Beaverton, OR 97075

**Tektronix**  
COMMITTED TO EXCELLENCE

Circle (6) on Reply Card



# AM radio: Where do we go from here?

The standard broadcast radio band—the grandfather of the communications industry—is in trouble, and we think the time has come for AM broadcasters to stop complaining about the problem and to start doing something about it.

It is no secret that AM radio has been steadily losing audience shares to the higher quality, and often more aggressive, FM broadcaster. The perception by many in the industry has been that, by and large, technology has deliberately ignored standard broadcasting. Regarding AM transmission systems, this is true to some extent. Regarding receivers, this is true without a doubt.

The AM transmission medium has several built-in problems. First on the list is the fact that the intelligence is transmitted via *amplitude modulation*, which is subject to impulse noise (such as lightning, auto ignition and motors). The second problem is the fact that AM has excellent skywave propagation characteristics at night, allowing good wide area coverage and interesting *distant station* reception reports. But in the world of broadcasting, such benefits mean little when it comes to listeners in the station's primary service area, where advertising sales are made and audience surveys are taken.

Receiver manufacturers have known these problems for decades, and have designed their radios accordingly. The solution to noise and skywave interference from distant adjacent-channel stations was, at one time, to roll off the audio frequency response at approximately 5kHz. This made the receiver simple in design and inexpensive to produce. For a long time, such practices were acceptable, because little programming was available that had high frequency content.

An interesting chain of events then began to unfold. As technology progressed, audio source material became substantially wider in bandwidth and manufacturers of studio and transmitting equipment responded with improvements of their own. AM stations that once rarely transmitted audio frequency components beyond 5kHz suddenly began to see response to 10kHz and higher. This gave excellent reception during daytime periods, but at night the sideband energy from adjacent-channel stations caused severe problems for receivers. The matched system that once had existed, in which AM stations transmitted frequencies up to 5kHz and receivers delivered response up to 5kHz, was disrupted. The sideband energy of 5kHz modulation fits nicely into the standard broadcast 10kHz channel, but spillover results from anything more. Receiver manufacturers addressed this problem by further reducing the audio frequency response capabilities of their radios, down to about 3kHz.

The public became accustomed to low fidelity radio. Listeners did not expect more from AM.

The advent of FM, particularly FM stereo, showed the listening public that something more was available than what they had come to expect. FM was not taken seriously until the mid-1970s when the audience shares and, to a lesser extent, the advertising dollars, began to escape from the AM stations that long had been untouchable. FM, once treated as a stepchild, has grown up and is taking a large part of its parent's share of the pie, as shown in Figure 1 and Figure 2.

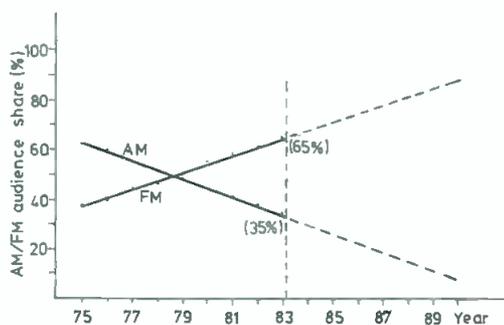
AM radio broadcasters have not rolled over and played dead in the face of this competition. Many innovative programming ideas have kept AM stations on top in numerous markets across the country. The lure of FM for music programming is strong, however, and its momentum is hard to stop. If AM is to be saved from a further exodus of music programming, much more work by broadcasters and receiver manufacturers will be needed than we have seen to date.

Toward this end, the National Association of Broadcasters has formed an AM Improvement subcommittee to look into the problem and to suggest solutions. We applaud this effort. The time has come for someone to say something good about the technical end of AM broadcasting, and provide evidence to back it up.

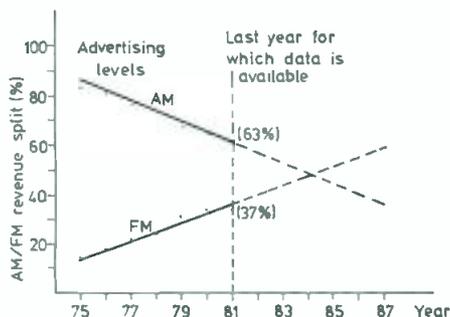
AM broadcasters need a well-planned, concerted effort to improve the technical performance of their transmission systems and, just as important, a coordinated and aggressive move by receiver manufacturers to solve the problems that have plagued AM radio since the beginning. These problems can be solved, in large part, with present technology at a price that the industry, and the public, can afford.

The solution to the AM problem definitely is not another round of loudness wars. New technology has offered the broadcaster more control than ever over the type of signal transmitted, but the new audio processors also have their limits. AM stations cannot expect that placing a new black box ahead of the

Continued on page 128



**Figure 1.** The growth of FM audience vs. AM audience, showing the dramatic shift in listener preference over the last eight years, and projections of what the future may hold.



**Figure 2.** The division of AM vs. FM advertising dollars. If our linear projections are correct, the turning point for the radio industry will come during this year.

# THE TIME CODE LEADERS



# EVERTZ

MICROSYSTEMS

**F**or 1984, the new line of Evertz VITCode and longitudinal time code equipment has moved our technology even further ahead of the competition.

And we continue to offer far and away the best price value and cost-effectiveness.

If you need any kind of Edit Code Generator, Reader, Controller or timing device, ask us for details.

We are the first choice of discriminating broadcasters and production houses around the world.

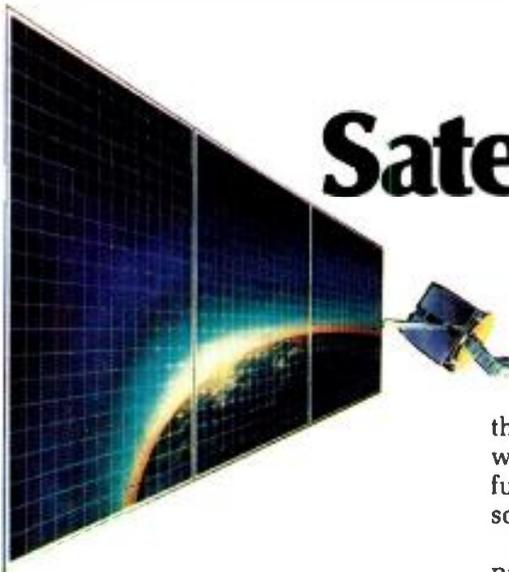
Distributors and Service Worldwide  
 In U.S.A. Contact: AMTEL SYSTEMS INC.  
 400 West Cummings Park  
 Woburn, Ma. 01801 (617) 938-8551

**EVERTZ**  
 MICROSYSTEMS

A Division of Dynaquip Ltd.,  
 3515 Mainway, Burlington,  
 Ontario, Canada L7M 1A9  
 Telex: 061-8784 Tel: (416)335-3700

Circle (7) on Reply Card

February 1984 *Broadcast Engineering* 11



# Satellite update

By John Kinik, satellite correspondent

One year, ago, this column examined satellite broadcasting trends expected for 1983, including the commencement of the first Ku-Band direct-to-home type of service, the continued expansion of conventional C-Band services, the implementation of closer satellite spacing for C-Band satellites and the determination of a plan for direct broadcasting satellite (DBS) services in the Western Hemisphere. It is useful to review the developments of the past year with respect to likely developments during this year.

The DBS services plan was established at the Regional Administrative Radio Conference (RARC) held in Geneva last summer, with channel frequencies and satellite orbital positions assigned. These high power DBS satellites will operate in the 12.2-12.7GHz portion of the Ku-Band and are intended to transmit signals directly to homes, with receiving antenna sizes of 1m diameter or less. Note that this is the only category of satellite broadcasting technology that is designated *officially* as DBS technology. In this column, the term *satellite broadcasting* has been used to describe any broadcasting-type service via satellite. This was done for two reasons: to use the most correctly descriptive terminology, and to underscore the fact that

the existing satellite delivery systems were performing the same function as future DBS satellites would, but with somewhat larger receiving antennas.

Based on the developments of the past year, the most recent C-Band satellites and the new medium power Ku-Band satellites are capable of delivering signals to antennas that are small enough to make the distinction between the future DBS technology and the existing technologies less clear than it has been in the past. By the time the first high power DBS system goes into operation in 1986, the term DBS may be well-established, by virtue of the number of signals available by then on a direct-to-home basis. The first of these services, provided by United Satellite Communications Inc. (USCI), went on the air in December 1983, offering five channels of movies, sports and other programming. The USCI service is being test marketed in Indianapolis and the surrounding region, and will be introduced gradually in other regions of the country during the coming year. Initially, the USCI service will face stiff competition from existing C-Band services, because the advantages of a smaller USCI receiving antenna (4-foot diameter) are offset by the greater number of channels available on C-Band satellites and the fact that the larger (8-foot diameter) antenna required for C-Band reception is not an installation problem in non-urban areas. Also, the higher signal level available from the newest C-Band satellites (37dBW EIRP from Galaxy 1)

is driving the C-Band antenna size down to the 5- to 6-foot diameter range, making the choice even less clear.

To illustrate the basic capabilities of each of the three delivery technologies and to provide a basis for comparison, Table I presents the essential characteristics of C-Band, medium power Ku-Band and future DBS satellite systems.

The downlink signal strength is expressed in terms of effective isotropic radiated power (EIRP) and is determined by a number of factors, including EIRP limits imposed by international telecommunications regulations and the state-of-the-art capabilities in satellite technology (primarily satellite transmitting power amplifiers of the traveling wave tube (TWT) type). For C-Band satellites, the upper limit has been reached partly because of EIRP limits placed on 4GHz signals by the International Telecommunications Union (ITU) to prevent interference into terrestrial microwave systems all over the world that operate in the 4GHz band shared with C-Band satellites.

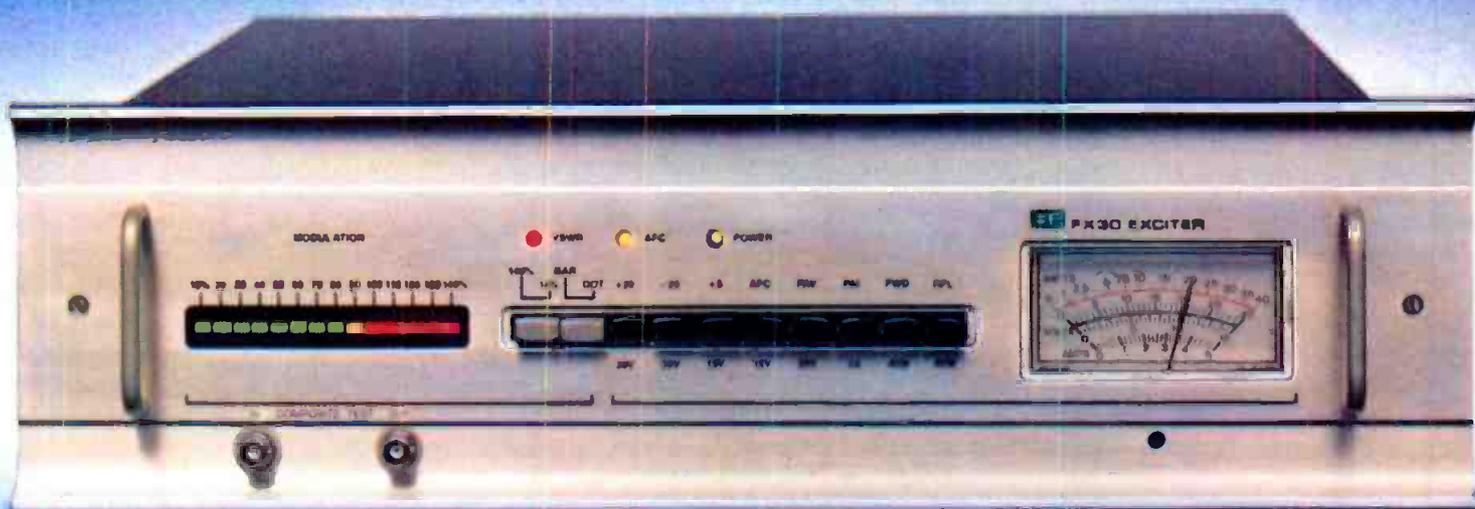
There also are diminishing returns from going much higher in EIRP because of the beamwidth of receiving antennas at C-Band. As shown in Table I, the 1.5m antenna size now possible with the Galaxy satellites is about the lower limit because of the adjacent satellite interference problem at 2° spacing. With 12dB of basic isolation caused by antenna pattern

Continued on page 129

Table I.

	C-Band	Medium power Ku-Band	Future DBS
Frequency range	3.7-4.2GHz	11.7-12.2GHz	12.2-12.7GHz
Typical satellite	Satcom 3R, Galaxy 1	Anik C2, G Star 2	Satellite Television Corporation
Typical EIRP	34-37dBW	47-50dBW	55-60dBW
EIRP coverage	CONUS	East/west beams	4 time zones (4 satellites)
Channels available	More than 30 in 1984	5 (in 1984)	3-4 (in 1986)
Receive antenna size	3m-1.5m	1.5m-1m	0.6m-1m
Adjacent satellite interference isolation	3m-18dB	1.5m-15dB	25dB
Total number of orbit positions	1.5m-12dB (2°)	1m-12dB (1°)	or more (10°)
	35	70	8

# The FM Exciter That Can't Be Copied.



## Broadcast Electronics' FX-30 Exciter.

There are imitations, but if you search the world over, you won't find a better exciter than the FX-30

### Unmatched Performance.

User testimonials confirm that the FX-30 means outstanding on the air sound, that it offers lowest distortion (THD and IMD typically 0.02%) and that it delivers typical signal to noise of 80dB or better.

### Unmatched Acceptance.

Over 500 satisfied users know how the FX-30 has consistently provided the kind of results that top broadcasters demand.

### Unmatched Reliability.

Field proven dependability, rugged construction and precision workmanship from the high quality front panel to the shock mounted encapsulated modulated oscillator.

### Unmatched Conservative Design.

Quality engineered with thorough attention to detail assures you that every component in the FX-30 is operated conservatively.

Why Settle For a Copy  
When You Can Own The Original!

**BE** BROADCAST  
ELECTRONICS INC.

4100 N. 24th ST., P.O. BOX 3606, QUINCY, IL 62305-3606, (217)224-9600, TELEX: 25-0142

Circle (8) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)

## McMartin plans FM/SCA network

McMartin Industries, Omaha, NE, has announced plans to develop a nationwide FM/SCA communications network to be called Comuni-Quik.

The network will use the new Super S transmission system that McMartin recently invented and that now is operational. The Super S system permits five separate and distinct full-range voice or data services to be transmitted simultaneously over the subchannel spectrum of any FM broadcast station.

Of the five channels available on the network, the company plans to set aside at least three of the channels for subsequent lease to well-established national companies specializing in electronic publishing and education, news services, data transmission, computer downloading and software conversions, paging, electronic mail or background music.

The remaining two subchannels probably will be saved for locally originated services. Examples would be foreground or stereo music, ethnic music, utility load management, electronic sign displays and radio reading services for specialized audiences.

A special feature of the network will be monitoring facilities at the McMartin plant in Omaha. The network is expected to be operational nationally during this year. A second phase of the development calls for the company to expand the Comuni-Quik network internationally to countries in which McMartin FM transmitters and FM/SCA equipment now are in use or are being planned.

## Development can double satellite channel capacity

The number of channels on a communications satellite could be doubled using a new amplifying system developed by Dr. Henry G. Kosmahl, an electron physicist at NASA Lewis Research Center, Cleveland, OH. The new system—termed a dynamic velocity taper (DVT)—actually is a relatively minor technical modification of an existing space amplifier.

Kosmahl explained what happens technically when the dynamic velocity taper is used:

"A stream of electrons is directed from an amplifier. Over a certain length they interact with a radio wave. In the process, a part of the energy of the electron is transferred to the wave. The wave carries the signal or communication—voice or whatever. Since the electrons become slower as they proceed, we put a weak wave and

strong electron beam at the beginning. We end up with a strong wave and a weak electron beam."

Kosmahl said that the dynamic transfer of power from the electrons to the radio wave in synchronization is the key feature of the development. A major side benefit is that additional power results from the constant resynchronization.

Hughes Aircraft's Electron Dynamics Division already is using data furnished by Lewis to test the new device and is reporting early success, including obtaining 30% more power just by rearranging the "hard limiter" characteristics.

Kosmahl has applied for a patent on the DVT. It will be owned by NASA, but will be available to industry.

## ABC forms committee for Summer Olympics

A World Broadcasters RF Committee for the 1984 Los Angeles Summer Olympic Games has been established by ABC-TV, the host broadcaster. The committee will coordinate all radio frequency activity for US radio and TV stations planning news coverage of the games and the many world broadcasters planning radio and TV broadcasts of the events.

ABC-TV, under a special waiver and temporary authorization from the FCC, has been assigned the UHF TV spectrum from 482-488MHz to handle the many requests for operational communications channels. World and US broadcasters requiring communications channels will be assigned dedicated frequencies in this spectrum for their use during the games. Microwave requests will be considered on a case-by-case basis so that existing Los Angeles area ICR and STL links and related Olympic microwave operations are ensured protection.

Any organization planning activity in the Los Angeles area for the games that require the use of RF equipment must coordinate their requirements through the committee. Information should be sent in writing no later than March 1 to Michael LoCollo, chairman, World Broadcasters RF Committee, ABC-TV, 1313 N. Vine St., Hollywood, CA 90028.

## Tektronix opens service center in China

Tektronix, Beaverton, OR, has established a product service facility in Beijing, China. The Tektronix China Service Center will be operated cooperatively with the Chinese Academy of Sciences, the official sponsor and operations management

for the venture. The service center will be located at the Institute of Computing Technology in Beijing. Tektronix's immediate goal is to provide high quality product service.

## TTS to build and operate shortwave broadcast station

Telecommunications Transmission Systems (TTS) of Salt Lake City has announced that it will build and operate a shortwave broadcast station. The station, which will be located in the western United States, will be a commercial venture funded by TTS and other partners.

According to TTS president Raymond C. Rask, the goal is to have the station on the air by some time in 1985.

## Students invent compact, inexpensive satellite dish

Remote areas of the country now may have access to good TV reception, thanks to three Syracuse University (Syracuse, NY) engineering students who have designed an inexpensive ground station satellite dish.

Joseph Blade, Jared Goodfriend and Peter Lord designed a satellite ground antenna called STGA I, which won third place in a national student design competition sponsored by the General Electric Company's Plastic Operations and Plastic Design Forum magazine.

Made of GE's industrial plastics, the satellite measures two feet in diameter and easily can be mounted on a roof. The students, all seniors in the L.C. Smith College of Engineering, shared a cash award of \$3000.

## UPI inaugurates own satellite uplink

United Press International has announced the transfer of its satellite uplink from Glenwood, NJ, to its communications center in Dallas, making it the first major US wire service to have ownership and full control of its own uplink services.

National and international news now feeds into the UPI Dallas Technical Center and is beamed directly up to the Westar 3 satellite for distribution to UPI subscribers. Formerly, the news feed traveled from Dallas to the New Jersey uplink by land lines and microwave, which UPI identified as a costly and unreliable link between breaking news and subscribers. In addition to adding reliability, UPI expects the new uplink to increase the volume of data that can be moved through the system. [:-?>)]]]

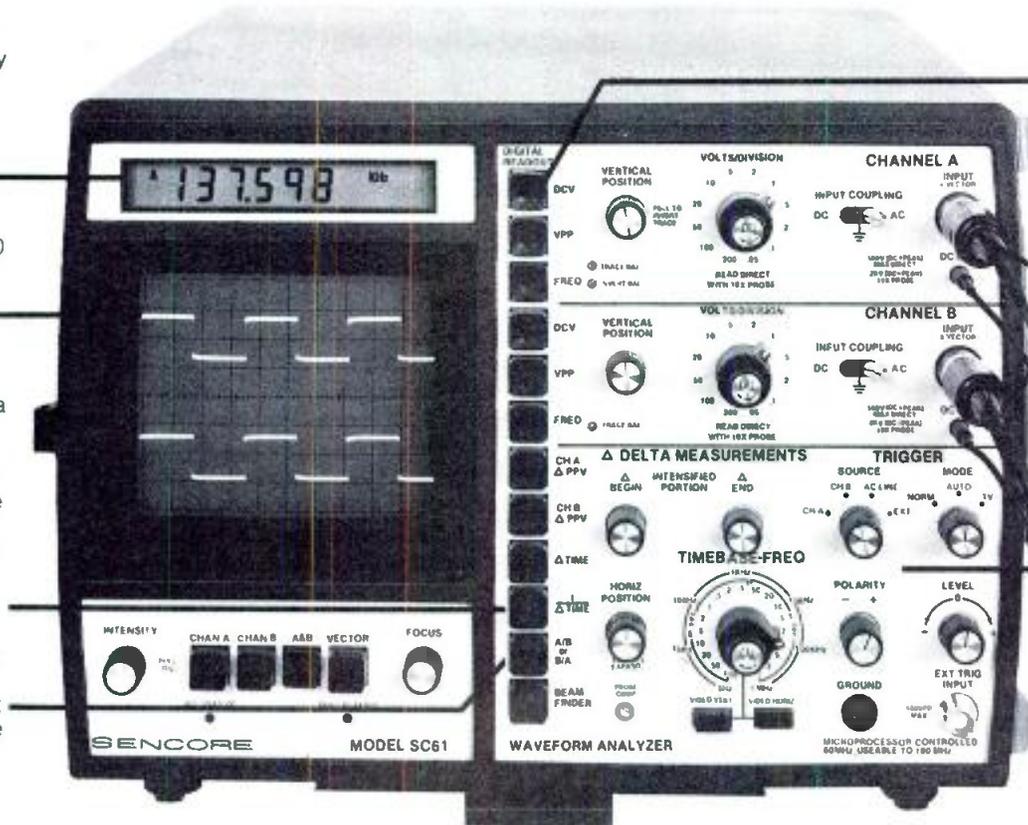
# Double Your Troubleshooting and Testing Productivity . . . Or Your Money Back!

**Six-digit readout:** Automatically tracks every CRT test. We call it digital autotracking. It's patent pending.

**Bright dual-trace CRT:** 60 MHz (-3 dB); 100 MHz (-12 dB)

**Delta PPV, Time, Freq:** Measure any part of a waveform for PPV, time or frequency using Delta measurements. Just dial in the waveform section you want to measure and push.

**Simplify Freq ratio tests:** Automatically compare input/output ratio of multiply/divide stages from 1:1 to 1:999,999 with the push of a button.



**Autotracking DCV, PPV, Freq:** Measure DCV to 5%; PPV to 2%; freq. to .001%. Just push a button for either Channel A or B.

**One probe input:** One probe input per channel for all measurements - digital and scope - with 5 mV to 2000 V measuring range. (2 lo-cap probes provided.)

**Super sync:** ECL provides rock-solid sync trigger circuits with only 4 controls; includes TV sync separators for video work.

U.S. Patent Pending  
Financing Available

**The first scope with push button digital readout.** If you use general purpose oscilloscopes for troubleshooting or testing, we can double your present productivity with the SC61 Waveform Analyzer, the first instrument to turn every conventional scope measurement into an automatic digital readout.

**No more graticule counting.** Connect only one probe to view any waveform to 100 MHz. Then, just push a button to read DCV, PPV, frequency and time — automatically!

There are no graticules to count or calculations to make, which speeds every measurement.

The digital readout is from 10 to 10,000 times more accurate as well.

Plus you have everything you want to know about a test point, at the push of a button, which speeds troubleshooting tremendously.

A special Delta function even lets you intensify parts of a waveform and digitally measure the PPV, time or frequency for just that waveform section.

And it's neat. No more tangled leads, piles of probes or dangling cords. The SC61 is an entire test station in one unit.

**The one and only.** There are other scopes with digital readout, but none of them completely automate every conventional scope measurement so you can automatically analyze any waveform without counting one single graticule. Totally automatic waveform analyzing at the push of a button. It will make all the difference in your productivity.

**Double your productivity.** When we say the SC61 will double your productivity, we're being conservative. We've seen cases of

three, four, even ten time increases in productivity with this first-of-its-kind, automated oscilloscope. Every situation is different, however, so try the SC61 and judge for yourself. Here's our offer.

**Money back guarantee.** If the SC61 does not at least double your productivity during the first thirty days, you may return it for a full refund, including freight both ways.

**Call today.** Get the entire SC61 Waveform Analyzer story. Call toll-free today, and ask for our eight page color brochure. It could be the most productive call you make this year!

**Phone Toll-Free  
1-800-843-3338**

Alaska, Hawaii, Canada and  
South Dakota call collect  
(605) 339-0100

**SENCORE**  
3200 Sencore Drive, Sioux Falls, SD 57107

Circle (9) for information  
Circle (10) for demonstration

# feedback

## Photo credit

Credit for the photo on page 58, October 1983 (in the article, "Ku-Band Milestone Reached"), should have been given to Microdyne Corporation, manufacturers of the earth station system provided by VideoStar Connections.

BE staff

## Correction

Readers of the December 1983 BE article, "Time Base Correction: An Equipment Survey" (page 112), may have discovered some missing information. Unfortunately, there are no built-in diagnostics in publishing as are found in some TBC and frame synchronizer equipment. Reader Service Numbers did not appear in the article. Table I includes those numbers for readers wanting more information on products in the article. Also, several manufacturers were not included in the original article. Those companies and their products are included here.

**FOR-A Corporation.** For capstan-servoed or non-servoed VTRs, digital encoding of analog signal components in the FA-410 TBC increase the S/N ratio of luminance and chrominance

with improved signal stability. A 16H correction window, blackburst outputs, preset proc-amp functions and dropout compensation are standard. Models are available for NTSC and PAL. In the PAL version, the FA-430, digital TBC functions are enhanced with image processing capabilities, including noise reduction, detail enhancement, color correction and gamma correction.

Circle (375) on Reply Card

**Hotronic.** Feedback of 3.58MHz is available from the AD51 TBC and frame synchronizer to allow correction of direct or heterodyne VTRs. Synchronization of outside video sources to station sync also is possible. A 1-bit/board design is provided, and all memory boards are interchangeable. More than one frame of memory is included in the 4x<sub>sc</sub>, 8-bit system, which is completely remote-controllable and offers adjustable vertical blanking.

Circle (376) on Reply Card

**Nova Systems.** The Nova 500 corrects all 3/4-inch and 1/2-inch non-segmented VTRs that accept sync and derived subcarrier inputs. Digital processing reinserts sync and burst in accord-

ance with RS-170A, even if reference sync-subcarrier phasing is not correct. With 32 lines of storage, the system is an 8-bit, 4x<sub>sc</sub> design.

Circle (377) on Reply Card

Table I.

ADDA .....	(378)
Ampex .....	(379)
Apert-Herzog .....	(380)
Digital Video Systems .....	(381)
FOR-A Corporation .....	(382)
Fortel .....	(383)
Gunnerfield Ltd. ....	(384)
Harris .....	(385)
Hotronic .....	(386)
MCI/Quantel .....	(387)
Merlin Engineering .....	(388)
Microtime .....	(389)
NEC .....	(390)
Nova Systems .....	(391)
QuesTech Ltd. ....	(392)
RCA Broadcast .....	(393)
REGIS/BLT .....	(394)
Sony Broadcast .....	(395)
Thomson-CSF Broadcast ...	(396)

BE staff

## Correction

In reference to TASCAM on page 34 of the 1983 Spec Book and page 96 of the November 1983 BE, the spec listing

## The New Garner 1400



The high-energy tape eraser that outperforms every other eraser on the market.

The revolutionary coil design of the Garner 1400 makes it the superior high-energy 1-inch tape eraser on the market. Independent tests prove it:

### Depth of Erasure:

No eraser can match the Garner 1400's minus 90 db. erasure of a heavily saturated 14-inch reel of 1-inch high coercivity tape.

### Speed:

It is no contest. The 1400 erases high-energy tapes completely in less than 16 seconds. Other erasers take four times as long.

### Ease of Operation:

No one beats Garner 1400's ease of operation. Just touch the "on" switch and place the tape on the conveyor. There are no drawers, no spindles, and no height adjustments.

### Dependability, Guaranteed

For over 12 years, Garner has set the standard for tape erasers. Just one look at the rugged construction of the Garner 1400 shows you why. Garner is so confident of the 1400's quality that it's backed with a 2-year warranty.

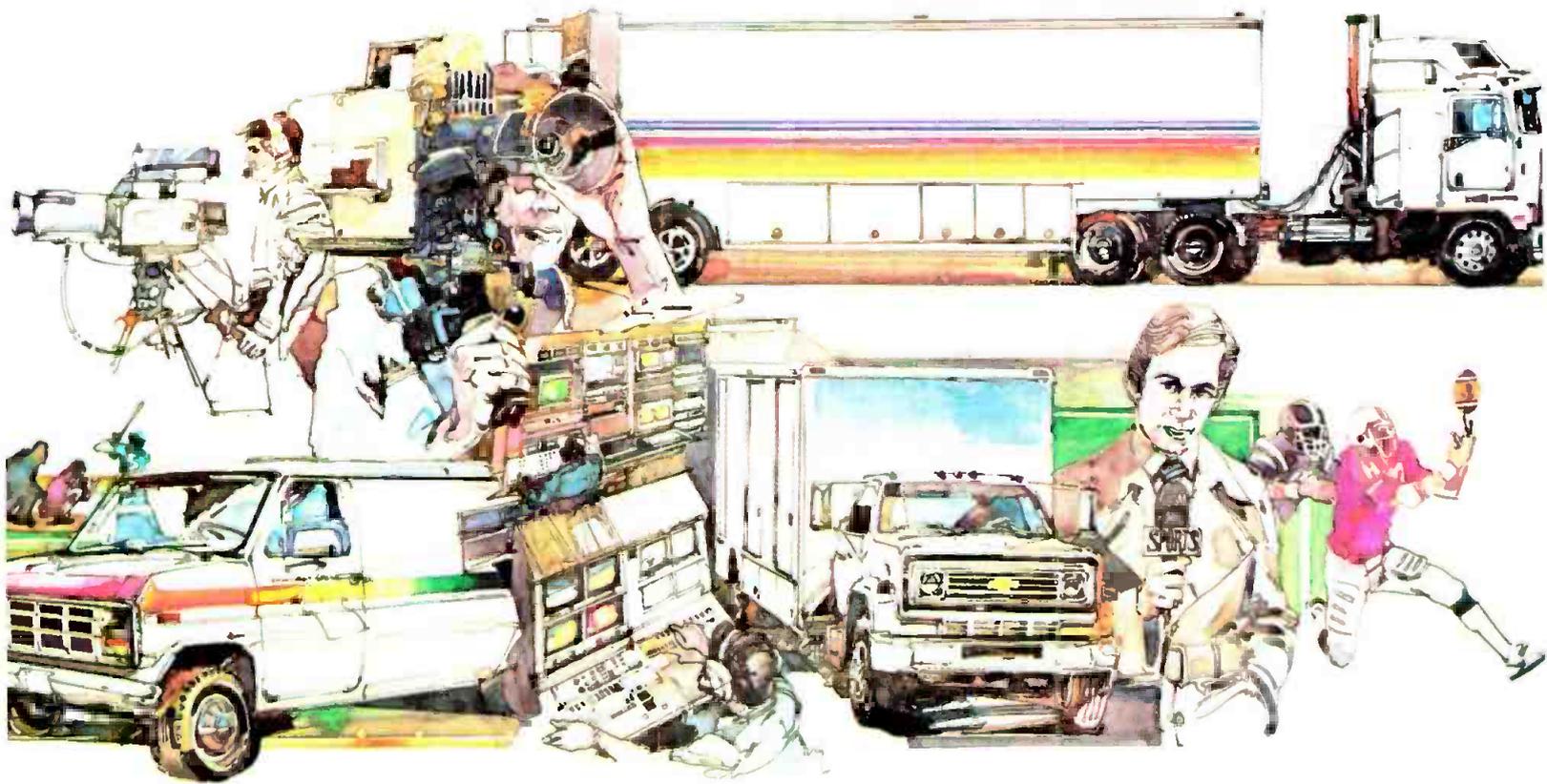
The Garner 1400...designed to meet the highest standards of the industry...yours.

**garner industries**

4200 North 48th Street, Lincoln, NE 68504  
(402) 464-5911/TELEX 438068

Circle (11) on Reply Card

# MOBILE TELEVISION UNITS

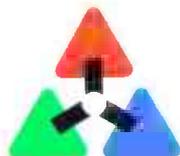


If your future plans include a mini-van, a full scale production truck, or something in between, we can develop your ideas into a complete television vehicle.

Our experienced staff will design and engineer into your vehicle the needs of your organization.

As authorized representatives for leading manufacturers, Lerro provides turnkey installations of state of the art technology anywhere in the continental United States.

To find out more about Lerro and how they can provide your mobile unit, contact Bob McTamney at (215) 223-8200.



## LERRO

ELECTRICAL CORPORATION  
3125 N. Broad Street, Philadelphia, Pa 19132

**FULL LINE OF ALL HITACHI BROADCAST EQUIPMENT**

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

headed by model 32 should read: series 30, with 2-, 4- and 8-track models. The column headed by 58 should read: series 40, with 2-, 4- and 8-track models. The column headed by 52 should read: series 50, with 2- and 8-track models available.

BE staff

### Correction

Because of computer coding and printout, some errors appeared in the September 1983 **Buyers' Guide**. The following is the correct data:

• **Headphones with announcer's microphone.** The list for Swintek should appear in red ink and should

reference the company's ad on page 112.

• **Microphones, wireless.** Swintek should have been listed in red ink, with a reference to its ad on page 112.

• The following listings for Audio + Design Recording should have appeared in red ink, with a reference to the company's ad on page 165:

Amplifiers, AF and AGC  
Amplifiers, AF Compressing  
Amplifiers, AF General Purpose  
Amplifiers, AF Peak Limiting,  
AM & FM  
Amplifiers, De-esser  
Amplifiers, Distribution Audio  
Equalizers, Audio Emphasis

Filters, Audio  
Filters, Variable and Fixed Tuned  
Preamplifiers, Audio  
Preamplifiers, Limiter-Compressor  
Preamplifiers, Microphone  
Sound Systems, Automatic Level  
Control

Time Code Readers

• Tektronix should have been listed in black ink in the following product areas:

Amplifiers, Operational  
Amplifiers, Processing Video  
Analyzers, RF Network  
Analyzers, Sideband  
Analyzers, Video  
Attenuators, Fixed  
Attenuators, Impedance Matching  
Attenuators, Microwave  
Attenuators, RF  
Automation, Video Testing  
Calibration Services, Instrument  
Color Correction Equipment  
Computer Software  
Delay Measuring Sets, Envelope  
Demodulators, Video  
Detectors, RF  
Differential Phase/Gain  
Measuring Sets  
Display Units, Digital  
Dividers, Power  
Filters, Noise  
Frame Synchronizer  
Generators, Burst  
Generators, Cross-pulse  
Generators, FM/SCA  
Generators, Signal Marker  
Generators, Signal Pulse  
Generators, Signal RF  
Generators, Staircase  
Generators, Subcarrier  
Generators, Sync Pulse  
Generators, Video Carrier  
Generators, Video Signal Test  
Pattern  
Generators, Video Sweep  
Generators, VITS Inserter  
Modulators  
Monitors, RF Level  
Monitors, Video Color  
Monitors, VTR and TBC  
Oscilloscope Cameras  
Probes, Oscilloscope  
Synchronizers, Digital Video Frame  
Test Equipment, Monitor & Meter,  
Audio  
Test Equipment, Monitor & Meter,  
Video  
Test Equipment, RF  
Voltmeters, ac  
Voltmeters, dc  
Waveform/Vector Monitors

BE staff

### Guidelines for proper documentation

An editorial, "It's Greek to Me" (BE May 1983), prompted a response from Dr. Hans Springer, Schule fuer Rundfunktechnik, Nuernberg, West Germany. Agreeing with the editorial, Springer said that many problems of instruction manuals for broadcast

Continued on page 130

## Quick. How many defects can you spot in this videotape?



No one can SEE defects by just looking at a videocassette.

Defects show up when the tape is played. And then it's too late.

So RTI has come up with something to help you. It's our new Professional Videotape Evaluator/Cleaner.

It spots defects BEFORE it's too late.

Now you can record on tape that you KNOW FOR SURE is not defective. As newspeople say, "the building only burns once."

It also helps frequently used tapes look good time after time. This makes YOU look good time after time.

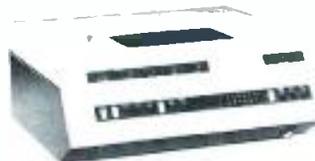
Our machine also cleans and burnishes your tapes. So you can extend their life. And it helps keep your recorder heads clean by reducing tape-borne dirt.

It's fast and easy to operate. Just insert your cassette, press the button and the tape whirrs through at 25 times normal speed.

LED readouts display defect counts such as wrinkles, oxide voids and edge damage. At the same time, your tapes are gently cleaned.

The machine is about the size of a desktop copier. It comes in U-Matic, VHS and Beta models.

When you see how it helps you spot defects—you'll be glad you spotted this ad.



For more information about the new Professional Videotape Evaluator/Cleaner, please write or phone us free at 800/323-7520\*



4700 Chase, Lincolnwood, Illinois 60646

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

Circle (12) on Reply Card

# Above all...

Howe Audio  
consoles . . .

## Simply Reliable

Over 70% of Howe Audio customers are repeat customers. They know we provide them with reliable, quality products. Here are just four of the stations that have purchased more than one Howe Audio console:

**KIMN/KYGO,**

Denver, Colorado  
Chuck Wallman, C. E.  
(303) 234-9500

**WNUS,**

Belpre, Ohio  
John Patten, G. M.  
(614) 423-8213

**WNNC,**

Newton, N. Carolina  
Dave Lingatell, C. E.  
(704) 464-4041

**KQEU**

Olympia, Washington  
Dale Zabriskie, C. E.  
(206) 491-9200

Howe Audio has been making quality audio consoles for the past 6 years, supplying broadcasters world-wide with quality products at affordable prices. Quality in the form of VCA Control, unparalleled specs, 22 stereo inputs, 2 stereo outputs, one mono output, a spare parts kit, and many other features on each Howe Audio console.

Call the users listed, or call Howe Audio for the name of a user near you. You'll discover even more reasons why your station should be equipped with the best console on the market.

**HOWE AUDIO . . . ABOVE ALL  
. . . QUALITY!!**

# the Sound Solution



**howe audio productions, inc.**

3085 A Bluff Street  
Boulder, Colorado 80301

303/444-4693

For more information: 800/525-7520

Circle (13) on Reply Card

www.americanradiohistory.com

The JBL logo is displayed in white, bold, sans-serif capital letters on a 3D rectangular block. The block is colored with a gradient from purple on the left to orange on the right. A bright starburst light effect is positioned at the top right corner of the block. The background of the entire advertisement is a dark blue field with glowing, concentric circular patterns that resemble sound waves or a laser hologram.

UREI  
ELECTRONIC  
PRODUCTS

## SOUND. SCIENCE. SYNERGY.

When you see "JBL" on a speaker, sound system or our newly acquired partner UREI Electronic Products, you're looking at a great deal more than a company logo. You're looking at the synergy of science and sound. At the marriage of advanced scientific research and innovative application.

The science of sound and JBL have always been synonymous. Tools from laser holography to the computer to robotics are helping JBL bring new clarity, richness and authority to sound.

JBL research has produced the first perfected use of pure titanium in the audio industry, giving new ruggedness, dependability, and sound integrity to the compression driver diaphragm. Our patented "diamond surround" diaphragm has dramatically extended high frequency response.

We've harnessed computer science to make major advances in the design of JBL transducers and UREI audio electronics. And microprocessor-directed mechanical arms are flat-winding voice coils for even greater material density and efficiency.

Our quality control network remains the most comprehensive, most demanding in the industry. Every single part, component, and system is put through a rigorous, uncompromising battery of tests and inspections. At the end of each production

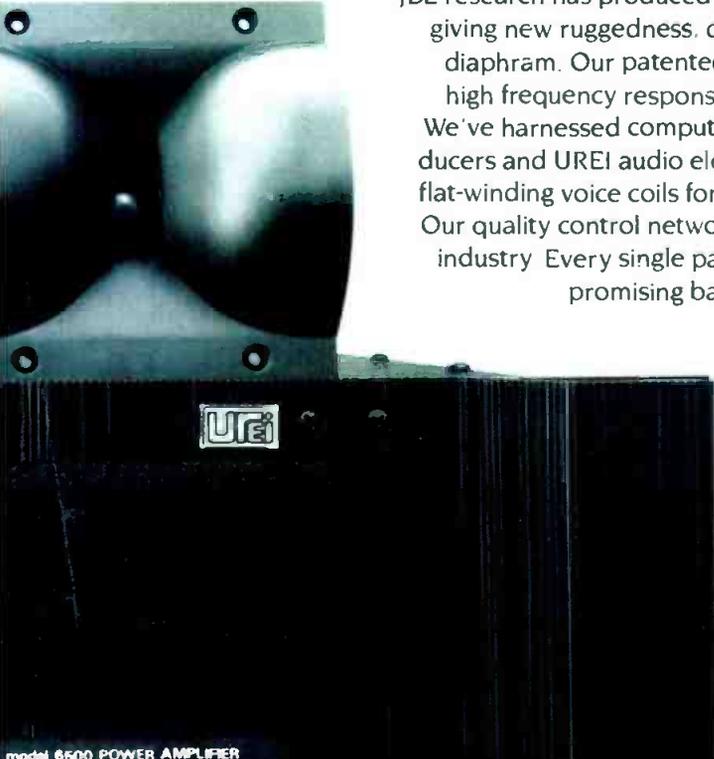
phase, every product is graphed and compared against its exacting design goals. Finally, products move to Quality Assurance where they are life-cycle tested to insure pro-rugged dependability.

At JBL, we are committed to sound and the sciences that bring it to life. Because we know the caliber of our performance plays an integral part in yours.

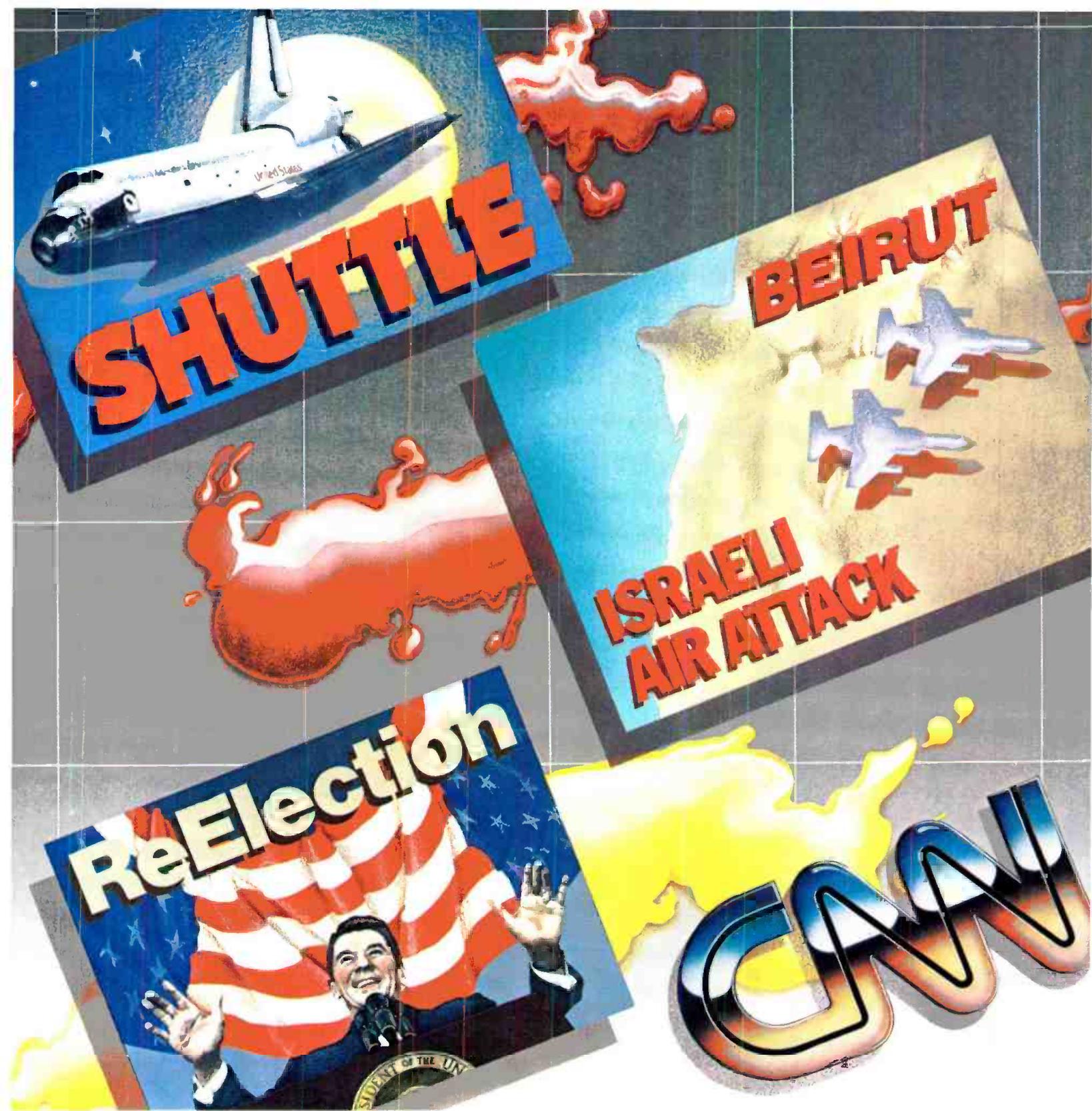
JBL Incorporated, 8500 Balboa  
Boulevard, P.O. Box 2200, Northridge,  
California 91329 U.S.A.

The JBL logo is shown in white, bold, sans-serif capital letters on a solid orange square background.

JBL Harman International  
©JBL Inc. 1983

A close-up photograph of a black, rectangular power amplifier. The top section features two large, circular drivers with a metallic finish. Below them, a smaller driver is visible. The UREI logo is printed on the front panel. The text "model 6500 POWER AMPLIFIER" is printed in the bottom left corner of the image.

model 6500 POWER AMPLIFIER



By Bebe F. McClain, president, B.F. McClain Productions, Asheville, NC

# How CNN creates graphics

This report, which resulted from a tour of the CNN operation, examines how the ADDA electronic still-store, the ESP-750, has been adapted to satisfy high volume graphics requirements.



Seven steps were required from the first map of Europe to the completed graphic (shown).

Graphic artists at Cable News Network (CNN) have discovered how flexible the ADDA ESP-750 still-store can be. In the past, the ESP-750 had been considered an optical slide chain replacement. Now artists at other TV stations also are learning how to "cut and paste" graphics electronically, with higher productivity and greater variation.

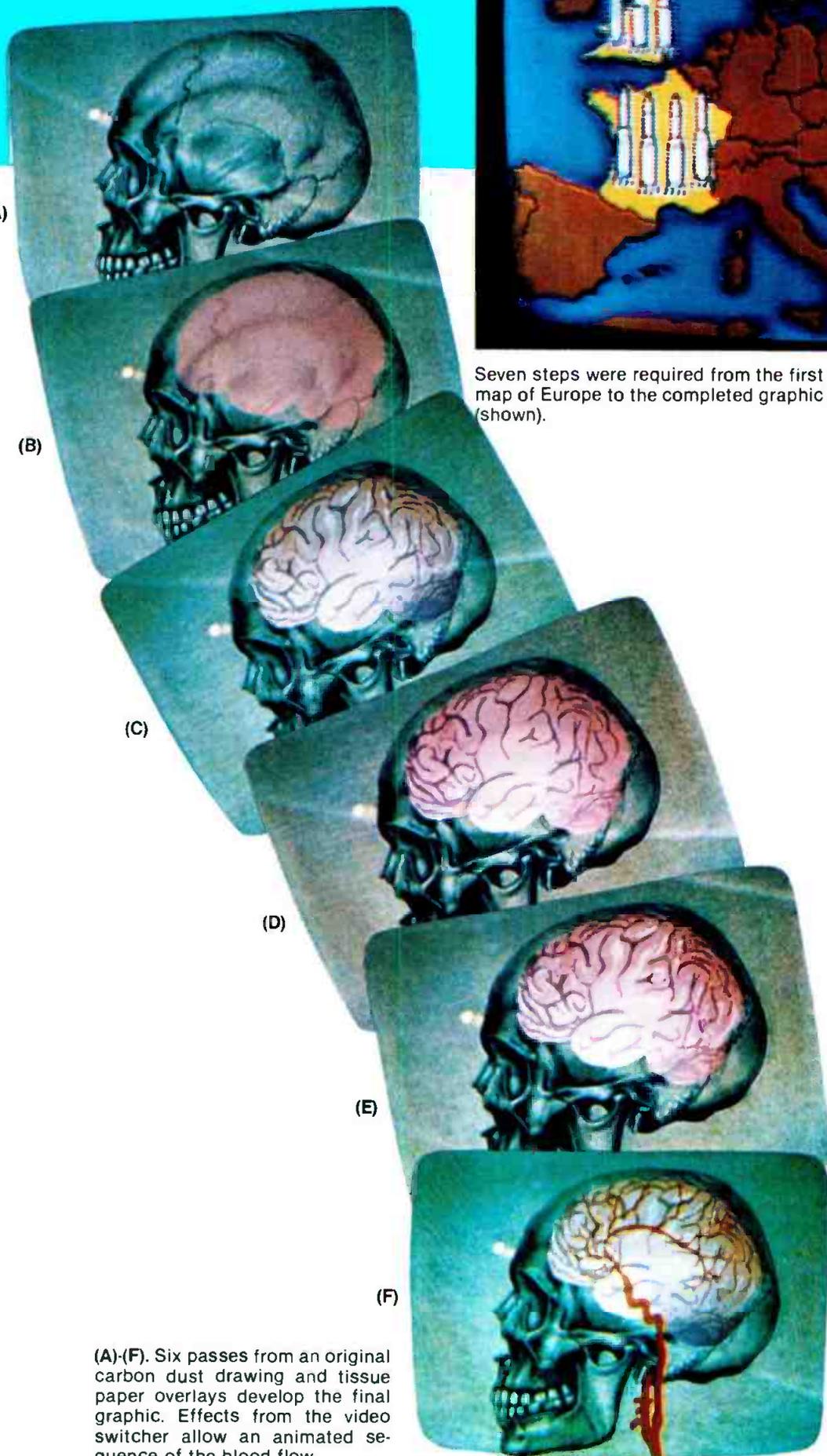
#### CNN's setup

Turner Broadcasting, located at WTBS in Atlanta, includes the CNN cable news service and the Headline Service. Of the two, the larger operation is the news service, with 20 graphic artists working in shifts to produce support graphics for 22 hours of news programming daily, which comprises approximately 20 new graphics per hour or 440 complete graphic items per day.

The CNN newsroom is open. As cameras face the news talent, they also see many CNN production staff members in a large open space behind the anchor desks. One-third of this area belongs to graphic arts. (See Figure 1.)

Equipment in the graphics department includes two copy stands with JVC KY-2700 cameras and a production console. Color and monochrome monitors, test equipment, two GVG 1600 switchers, a Thomson-CSF character generator and two operations panels for the still-store systems fill the equipment racks. These two control panels in the master control area and three additional panels elsewhere in the building access five main-frame computers. Each computer may select any of six disk drives, each having a capacity of 750 full frames of video. This comprises the four ADDA systems. A fifth still-store

*Continued on page 26*



(A)-(F). Six passes from an original carbon dust drawing and tissue paper overlays develop the final graphic. Effects from the video switcher allow an animated sequence of the blood flow.



At TASCAM, we know how exasperating the hi-fi deck can be in any professional environment. The audio quality doesn't approach that of the machines with which it attempts to interface. The biggest hassle is balancing the entire juggling act with transformers and cables that allow the deck to be imposed into the system in the first place.

Well, the fighting's finally over. Whether your needs are for broadcast, recording studio, or multi-image applications, production, on-air, or sound reinforcement systems, TASCAM's professional 122-B and 133-B Cassette Recorder/Reproducers have got your balancing act wired. Out of the box, ready to go, no modifications. With the flick of a switch, each machine offers full compatibility with both high level +4 dBm, XLR balanced and line level unbalanced systems.

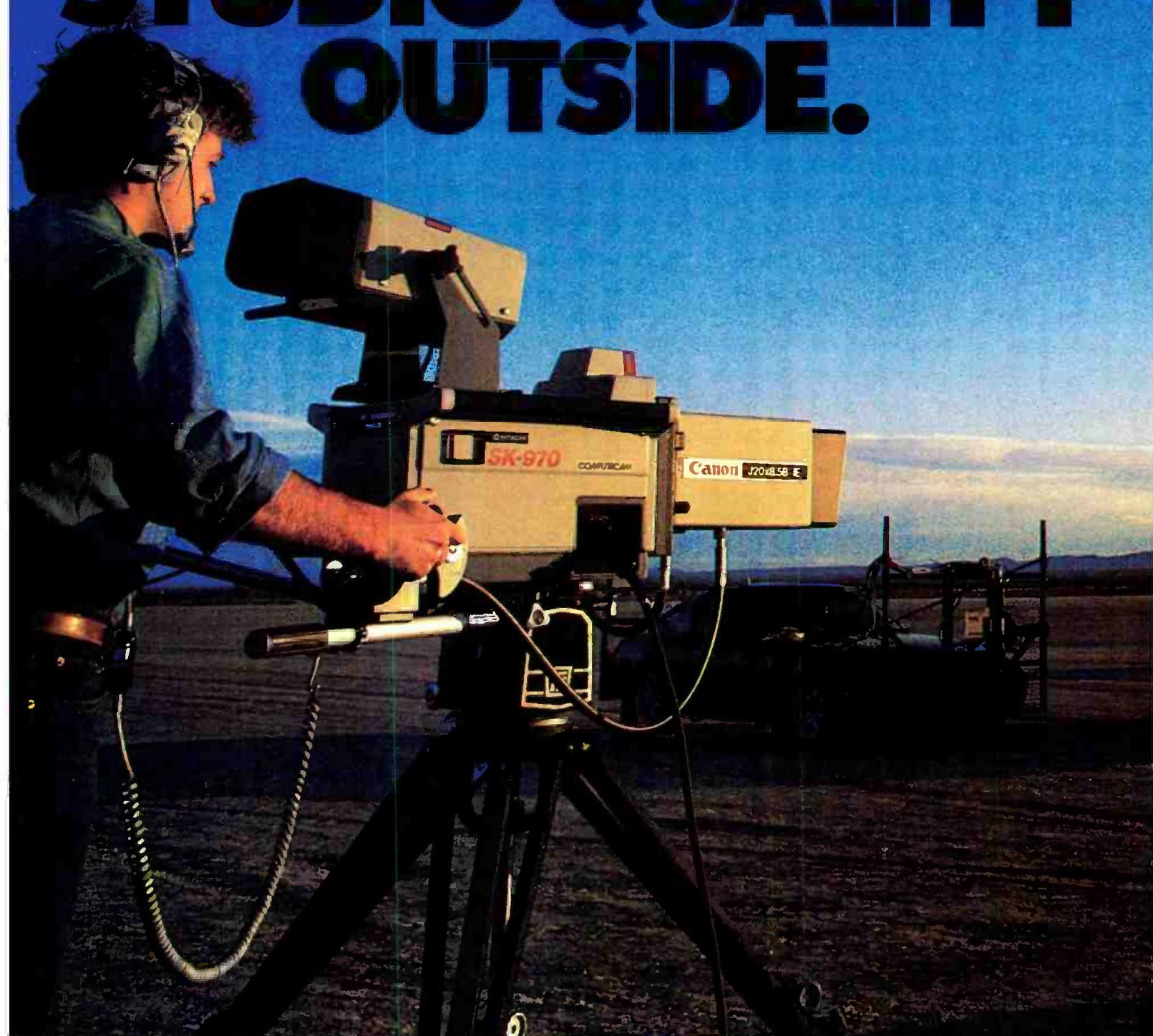
Both machines are built to take the most punishing production/dubbing demands. Each delivers professional audio quality far superior to either hi-fi or cart decks. And each offers the features you expect, helping to improve both the precision and ease of your work.

Why fight the system, when there's a truly professional answer to your stereo or stereo-plus-cue cassette machine needs. TASCAM's 122-B or 133-B. See your TASCAM dealer or write TASCAM Production Products, 7733 Montebello, CA 90640, (213) 726-0303.

# FINALLY, CASSETTE MACHINES FOR PROFESSIONALS WHO'D RATHER SWITCH THAN FIGHT.

**TASCAM**  
TEAC Production Products

**HITACHI PUT  
THE COMPUTER  
INSIDE  
SO YOU CAN TAKE  
STUDIO QUALITY  
OUTSIDE.**



You're shooting the big one. A national political convention. The World Series. Or the most ambitious car commercial ever taped on location.

Until now, either you run the risk of ruining your best studio cameras in the field. Or go with your best field cameras and risk falling short of the quality you're looking for.

Well, agonize no longer. Hitachi's new Computacam™ is here. The first video camera with an on-board computer that sets up automatically in just 2 minutes—including the green channel. And that delivers big camera studio performance at virtually any location. Because the computer in Computacam gives you total control.

### **POWERHOUSE COMPUTER IN A 55-POUND PACKAGE.**

With the Hitachi Computacam SK-970, you don't set up cameras one by one using an external computer—which can waste all kinds of expensive time on a multi-camera shoot. And which means you can lose automatic set up on *all* your

cameras if the external computer should ever go down.

Your least experienced cameraman can balance all your Computacam cameras perfectly with the push of a button. Each camera has a built-in diascope. And each computer has data files that correct for everything from light to lenses. These files even "remember" conditions if you should ever have to reshoot. Yet all these electronics come in one small, incredibly rugged package.

Most important, the computer in Computacam is the *only* one that can store data to correct for registration errors caused by lens zooming and focusing. And it's the *only* computer that dynamically compensates for temperature so you'll know your picture's centered in either a blazing desert or a blinding snowstorm.

### **PLUMBICONS AND OTHER PLUMS FOR PERFECTIONISTS.**

For all its finesse in the field, don't forget you're also getting a *great* studio camera in Computacam SK-970. That comes with either a Plumbicon or a Saticon®

high-performance pickup tube that provides up to 700 lines of horizontal resolution. This means picture quality that can open up whole new markets for you.

Computacam is the beginning of a whole new family of cameras. We already have an EFP shoulder-mount version—the SK-97—that also has an on-board computer and the same technical features you get in the SK-970.

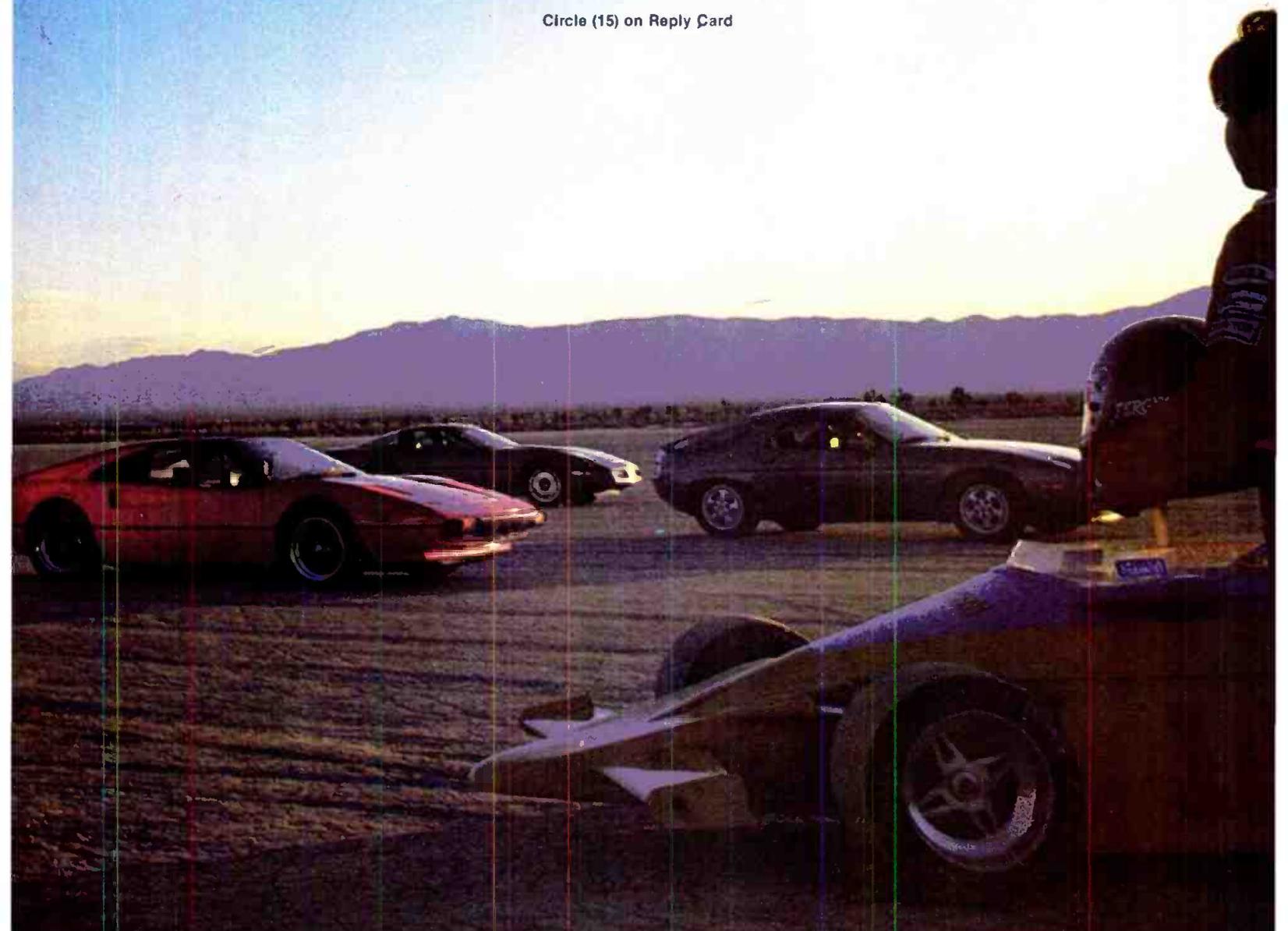
What will it cost you to have the camera for all places and all seasons? Put it this way. Even with a 7-inch viewfinder and a wide array of lenses, it's a whole lot cheaper than the finest motor car. And you'll be getting the same order of performance.

Only Hitachi has Computacam. And it's not excessive to say it's the next generation of video cameras.

For more information, contact Hitachi Denshi America, Ltd., Broadcast and Professional Division, 175 Crossways Park West, Woodbury, NY 11797. (516) 921-7200. Offices also in Chicago, Cincinnati, Dallas, Denver, Seattle, Los Angeles and Washington, D.C.



Circle (15) on Reply Card



is planned to handle the storage load. (See Figure 2.)

The multiple-disk system provides storage for 4200 graphics on a "permanent" basis, while 300 additional frames are changed daily. Three times daily, stills are deleted to accommodate newly created ones, according to news production requirements.

A computer terminal, located in the graphic arts area, accesses a BASYS

News Fury computer used by CNN copywriters. An artist, building graphics to complement a story, can read the story copy on the terminal screen. Print-outs, kept beside the terminal, give the planned story run-down for each hour. A run-down sheet lists the story, indicates audio source and states what graphics are needed. A top-story list shows the 14 major stories and all graphics made

that day. Each story uses at least three graphics, and these are changed hourly. The artist can punch up a system ID number to view previously used graphics before creating new ones.

#### A need for graphics

When CNN's 24-hour news service was in the planning stage, graphics were expected to play a key role. Without them, producers faced the

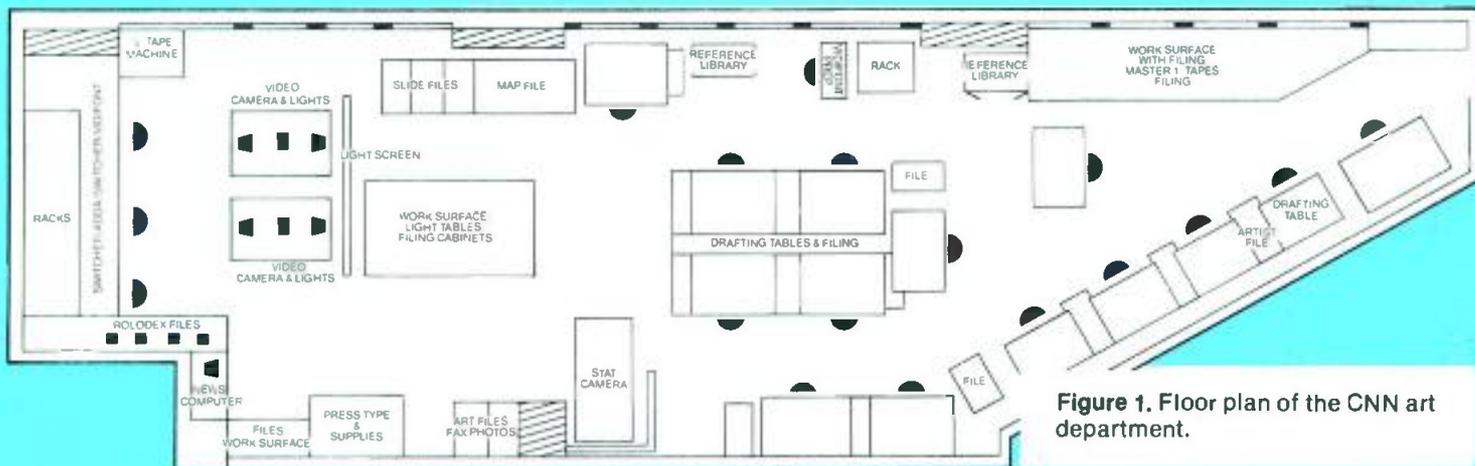


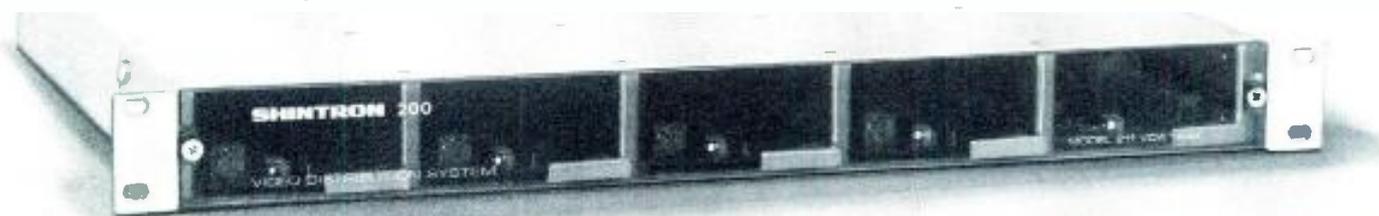
Figure 1. Floor plan of the CNN art department.

# Shintron makes the DA you need to buy only once

You want two things from an audio or video distribution amplifier. You want the best performance obtainable from current technology. And you want long, trouble-free service life.

Shintron's 200 Series gives you both, with performance that exceeds most CE's expectations and operating life that delights the maintenance crew as well as the controller.

Other niceties include direct plug-in compatibility that lets you upgrade Grass Valley racks with Shintron 200 Series modules. When you're ready for the DA you buy only once, specify the Shintron 200 Series. For complete information, circle reader service number or contact:



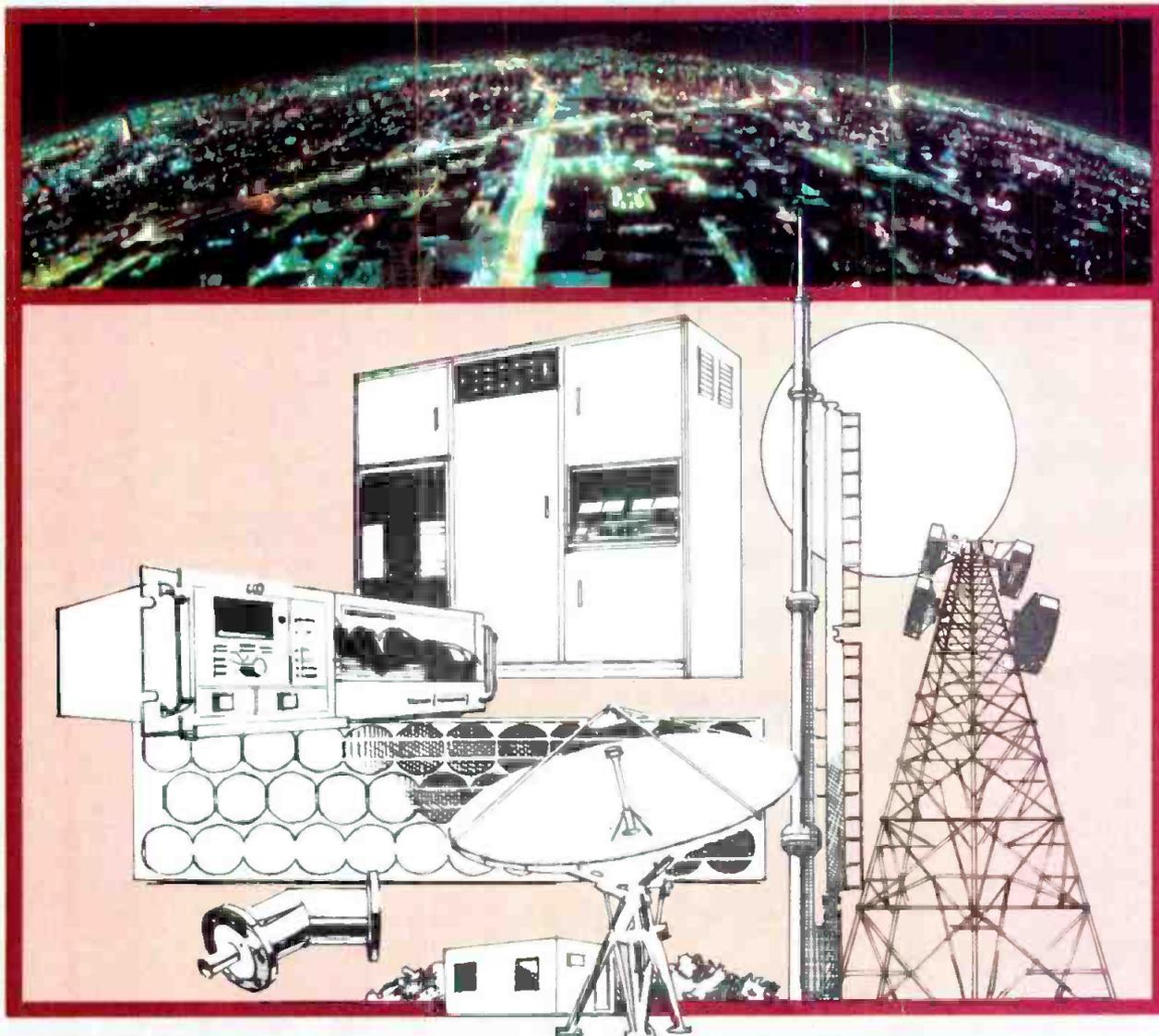
**SHINTRON**

SHINTRON Company, Inc., 144 Rogers Street, Cambridge, MA 02142/(617) 491-8700/Telex: 921497

Shintron Europe, 198 Avenue Brugmann, 1180 Brussels Belgium/ Tel: 02-347-2629/Telex: 61202

Circle (16) on Reply Card

# The Signal of Reliability



**Acrodyne** provides The Signal of Reliability to meet the changing demands of television broadcasters worldwide.

Acrodyne can supply all your transmitting equipment requirements, with translators and transmitters from 1 Watt to 20 kW visual power output, transmission lines, antennas, earth stations and test equipment. Our complete line of UHF and VHF products is designed for CCIR Domestic and International standards, and offer compatibility with stereo and multi-channel sound systems and encoding systems (STV).

Our modular product designs permit maximum flexibility in configurations including main/alternate main, standby service and final amplifier bypass. More than 1,600 Acrodyne television broadcast systems are in use worldwide, including solar and/or wind-powered versions.

Service is another part of our dedication to you, the customer. Our engineering staff and applications personnel are always ready to provide on-site support for existing Acrodyne products, and to review your future requirements.

We began serving the broadcast industry by developing broadband solid state amplifier designs and have expanded our product line by utilizing high technology VHF and UHF tetrodes. Through the continued application of new technologies and our reputation for reliability, Acrodyne can meet all of your needs today...and tomorrow.

## **ACRODYNE**

Acrodyne Industries  
—Marketing Department  
A Unit of Whittaker Corporation  
516 Township Line Road  
Blue Bell, PA 19422  
(215) 542-7000 (800) 523-2596  
Telex: 846358

**The Signal  
of Reliability**

Circle (17) on Reply Card

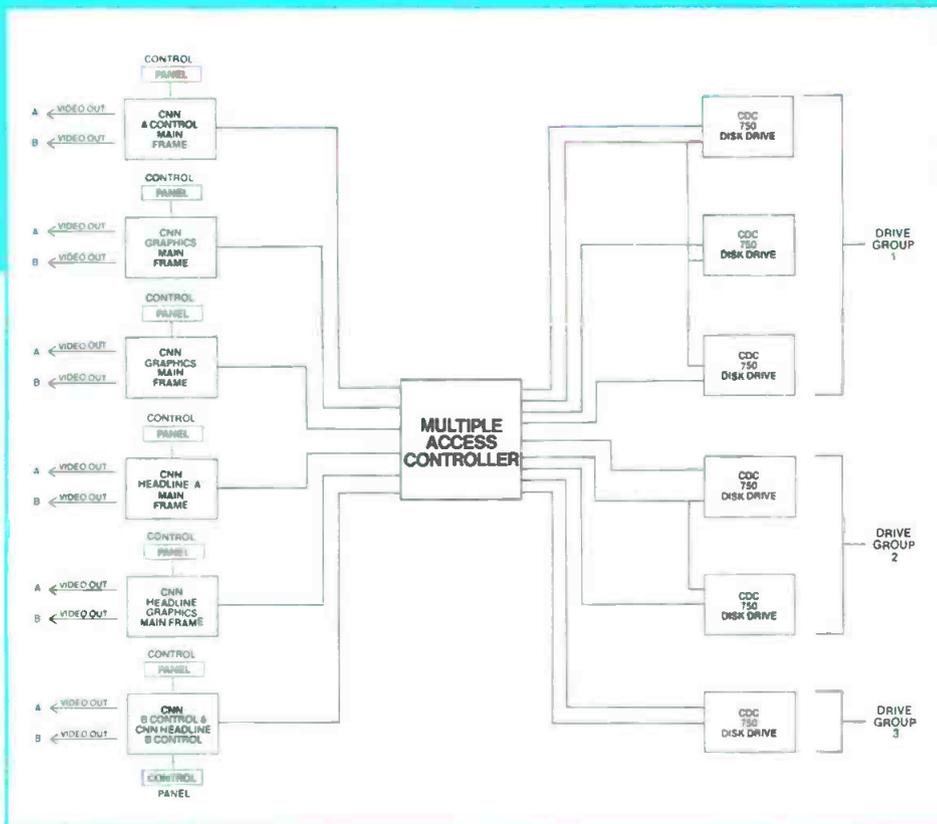


Figure 2. Block diagram of the ADDA equipment and controlling computers.

ducers specify where graphics are desired, especially for feature stories and special packages. For fast-breaking stories, the producer or director may call directly to the graphics control area via intercom to request additional items for the news program.

#### Method of production

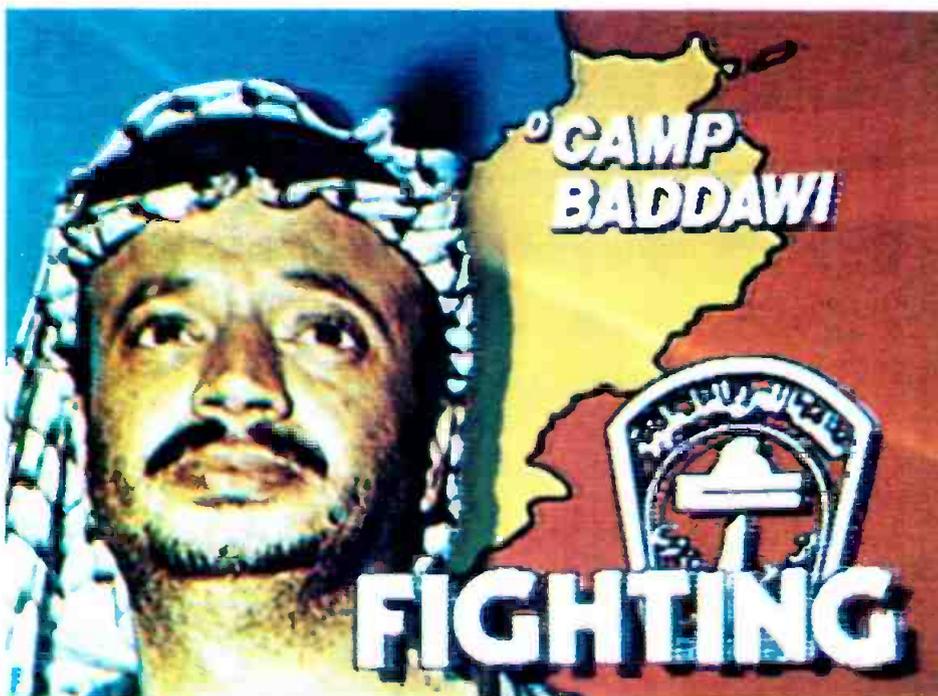
The CNN artists—all trained graphic designers, illustrators or fine arts graduates—work to combine press type, drawings, maps, photos, magazine cutouts and slides into videographics. Their main resources include:

- a *swipe file* of wire photos, magazine articles and other flat artwork, arranged alphabetically by subject and name;
- a *slide file* containing photos of people, corporate or government agency logos and team logos for sports; and
- a *map file* containing hundreds of maps, each on individual art boards.

Enlargement, reduction or reversal of visuals are made on a photostat camera in the center of the graphics area. Materials for a graphic are taken to a video copy stand, where its camera ties into the still-store system. When background artwork is positioned under the video camera, and after adjustments are completed, one full frame of video is placed in the ESP-750 frame buffer memory in analog form.

A second piece of art or type then is placed under the camera. With the ADDA system feeding the stored video into a video switcher in Key or Wipe mode, the artist sees the second image superimposed over the first, allowing visual adjustments. When the image is correct, the Freeze button places the new composite in memory.

Additional elements can be placed under the camera one at a time. Camera zoom position and height above the artwork is variable to change element size before layering.



This complete graphic showing Yasser Arafat took seven passes.

prospect of relying primarily on *talking heads* for segments with no outside footage.

Ann Williams, CNN art director, estimated that, without the still-store production tool, she would need a staff of 50 and about three hours lead

time for each story. With the still-store, her 20-person staff provides all the graphics needed 22 hours a day, often with only a few moments notice.

Each hour of the news service is considered a new show, with a new producer and a new story run-down. Top news items carry over hour to hour, but are rewritten, and new graphics are incorporated. The pro-

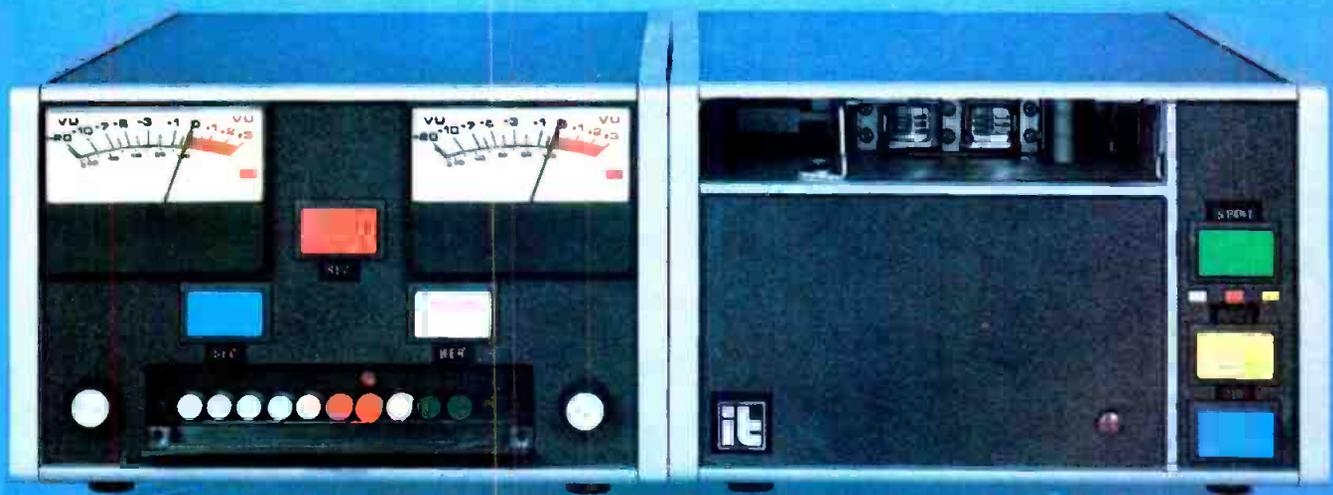
# PURE SOUND!

It's your goal. It's the quality that'll make your radio station special. It'll reduce the "distance" between you and your listeners. It's simple. . . the better your sound, the better your business.

ITC's in the sound business, too. It's our business to make you sound better. That's why we're so proud of the Series 99B cartridge machine. It's as close to pure sound as you can get. It's not for everybody. It's for the best.

Pure and simple.

## ITC Series 99B



### INTERNATIONAL TAPETRONICS CORPORATION

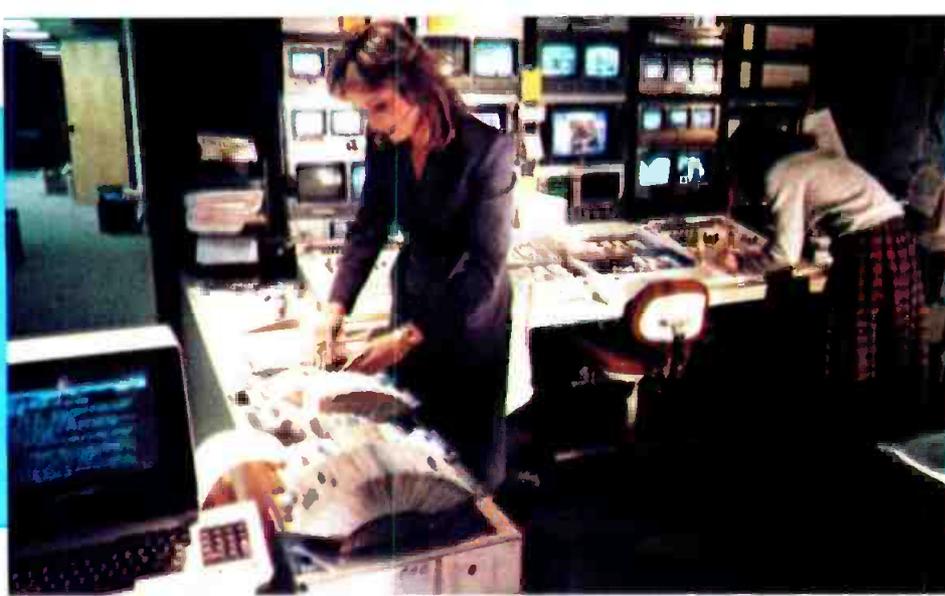
2425 South Main Street / P.O. Box 241 / Bloomington, Illinois 61701

**Call Toll-Free: 800-447-0414**

From Alaska-Hawaii and Illinois Call Collect 309/828-1381

3M hears you...

Circle (18) on Reply Card



Ann Williams, CNN art director, uses the Rolodex file to locate graphics ID numbers stored in the ADDA system. The terminal, at lower left, ties to the BASYS News Fury automated news system, allowing the art department to check each news story for appropriate illustrations.

## There are many ways to split a mic, but only one way is best

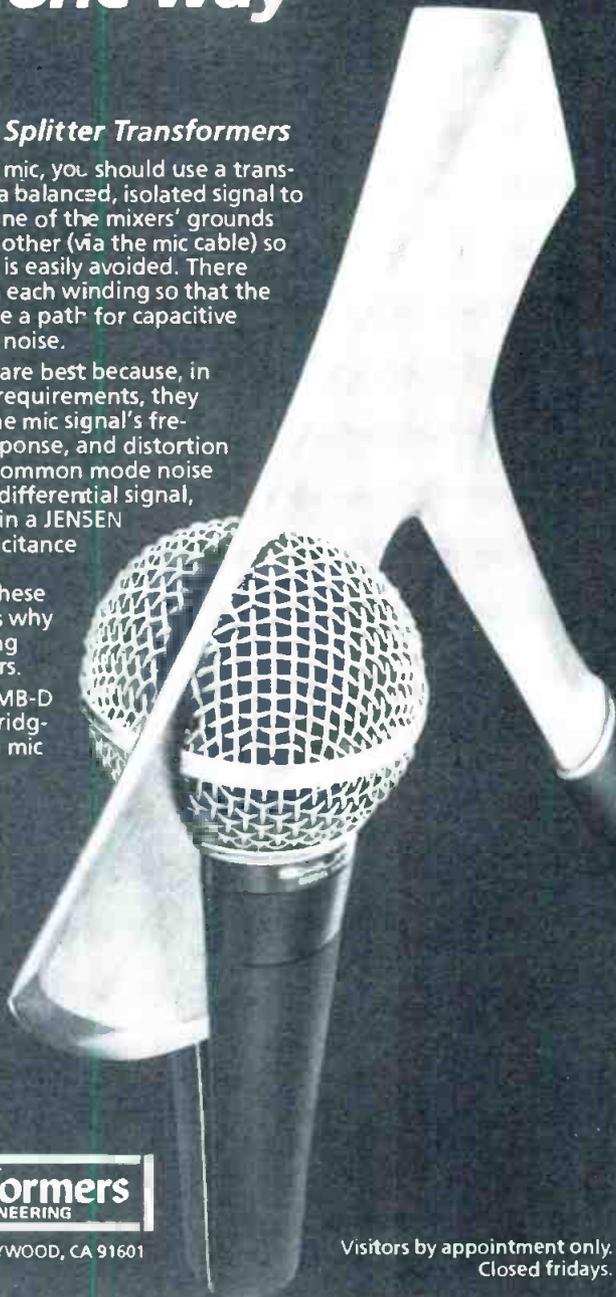
### Jensen MB-series Mic Splitter Transformers

When you need to split a mic, you should use a transformer because it provides a balanced, isolated signal to the input of each mixer; none of the mixers' grounds need be connected to each other (via the mic cable) so ground-loop induced noise is easily avoided. There must be a Faraday shield on each winding so that the transformer will not provide a path for capacitive coupling of common mode noise.

JENSEN TRANSFORMERS are best because, in addition to meeting these requirements, they minimize degradation of the mic signal's frequency response, phase response, and distortion characteristics. To prevent common mode noise from being converted to a differential signal, each end of every winding in a JENSEN TRANSFORMER has its capacitance precision-matched to that winding's Faraday shield. These are just a few of the reasons why most engineers end up using JENSEN splitter transformers.

The JENSEN JE-MB-C, JE-MB-D and JE-MB-E microphone bridging transformers will split a mic signal to 2, 3 or 4 mixers.

*Insist on the best...  
insist on a JENSEN.*



**jensen transformers**  
By REICHENBACH ENGINEERING

10735 BURBANK BLVD. / N. HOLLYWOOD, CA 91601  
(213) 876-0059

Visitors by appointment only.  
Closed Fridays.

Circle (19) on Reply Card

Vidifont titles may be put into the system during any pass with another element, thereby incorporating two elements in one pass.

When all elements are frozen in analog form, the artist presses the Store and enter control. At that time, the information is converted from analog to digital form and recorded on the hard disk memory. In ADDA's system, composite, rather than component, signals are used to reduce encoding and decoding that tends to degrade signals after needed multiple generations.

A typical news graphic done by CNN, a photo of Yasser Arafat, although made in a few minutes, took seven passes. The recording sequence of passes included the following:

- a map;
- a shadow of Arafat;
- Arafat's photograph;
- a shadow of the PLO logo;
- the PLO logo;
- a shadow of "FIGHTING" (press type); and
- "FIGHTING" and the words "Camp Baddami" (Vidifont).

Shadow effects are used to give CNN graphics a 3-D look. Williams has found that using electronics gives the depth of dimension she desires in a fraction of the time of mechanical methods. Overlapping artwork, creating shadows and showing a third edge are methods CNN artists use frequently for a stand-up look.

### Production

The first step in all graphics production is to capture the background. Then, to create a shadow, a piece of artwork is laid under the camera. With the switcher set for a reverse key, the artwork becomes a *black box*. To make the box transparent, the artist fades up the background on a second bus, positioning the fader bar between the two switcher buses. The effect, a transparent drop shadow, is frozen in the buffer storage. Then the artwork that causes the shadow is positioned, slightly offset from the shadow, and is recorded into the composite.

# THE VERSATILE VTR. FOR BEAUTIFUL PERFORMANCES. DAY IN AND DAY OUT.



## THE DEPENDABLE VPR-80.

Our fashionable VPR-80 one-inch Type C VTR offers you seven stylish choices—including a slim-and-trim standalone and three sophisticated studio console models.

The VPR-80 has Automatic Scan Tracking (AST™) as a standard feature. When paired with its companion TBC-80 digital time base corrector, the VPR-80 delivers smooth slow-motion playback from stop to 1.5X play speed. Other highly attractive performance features include: a built-in frame-accurate editor providing keypad entry and trim of edit points, precise tape handling from spots through two-hour



reels, and comprehensive diagnostic systems down to the component level.

VPR-80. It's the multi-faceted beauty that fits in fashionably anywhere. From the people who started it all. For more details, contact your local AmpeX AVSD sales office.

### AMPEX

AmpeX Corporation • One of The Signal Companies

Allanta 404/451-7112 • Chicago 312/593-6000  
Dallas 214/960-1162 • Los Angeles  
213/240-5000 • New York/New Jersey  
201/825-9600 • San Francisco 408/255-4800  
Washington, D.C. 301/530-8800

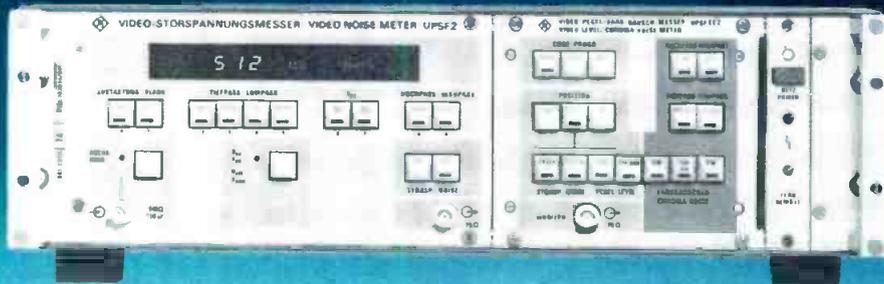
Circle (20) on Reply Card



Williams and Jon Teschner, ADDA representative, check over a graphic stored in the library.

# THE ONLY FULL CAPABILITY VIDEO NOISE METER

Model UPSF2



- **DUAL-STANDARD:**  $\mu P$  automatically determines standard (525/625 lines), identifies it on the display, and performs the appropriate measurement.
- **Measurement Domain:** Full-field, any individually selected line, any individual "spot" ( $4 \mu s \times 10$  lines)
- **IEEE-488 (GPIB) Bus Compatible**
- **Video Level Measurement:** Luminance-bar amplitude, or individual test-points selectable in steps of  $1 \mu s$  (range:  $-500$  to  $+1500$  mV)
- **Noise Measurement:** Luminance (peak or rms) or Chrominance (AM or  $\phi M$ ). Range: 0-80 dB, referenced to 714 mV (525 lines), 700 mV (625 lines), or actual luminance-bar amplitude.

Send for our new catalog



## ROHDE & SCHWARZ

13 Nevada Drive, Lake Success, N.Y. 11042 • (516) 488-7300 • Telex 96-0072

Fat, exaggerated shadows may be hand-drawn and placed beneath artwork. The result is a dimensional look, as though turned up to expose a third side.

Most color, not already part of the artwork, is added electronically. To add color, black-and-white art is placed under the camera and the switcher is set for a box wipe containing the area to be colored. The color is keyed in and frozen. Additional areas can be boxed in and colored in turn.

Airbrushing, an effect of one color fading into another, adds color and depth to type. Starting at the bottom, part of the title is boxed in and colored, using a soft edge effect. The box is moved so that a new edge overlaps the first, and another color is applied to that portion of the title, also with a soft edge. Usually, three colors are used.

When the identity of a piece of art must be camouflaged, posterization effects may be used. Posterizing, or digitizing, on the still-store is accomplished by removing a board from the system. Additional distortion is possible by colorizing the electronic image.

For almost every hourly CNN segment, basic maps are stored and used repeatedly by electronically highlighting portions. Once an area is highlighted, additional layers of elements are added. Outlining is done last.

Single frames from videotape also can be incorporated into the graphics. A U-matic VTR is installed beside the ADDA production console for that purpose. The artist can grab one frame from a tape to use as the base, or as a layer, in a composite graphic.

Highly detailed artwork often is used at CNN for health-related stories. Margaret Barnwell, formerly a medical illustrator, creates carbon dust illustrations of body organs and full-color cell animation drawings on acetate. With an accurate drawing as a base, Barnwell can modify or highlight areas with additional detail on layers of tissue paper. Networks of veins on individual tissues are added to the base drawing on sequential

Circle (21) on Reply Card

# We Owe it to You— The Lenco Challenge



PMM-931

Since you have shown confidence in Lenco for the past TEN YEARS, we feel that we "owe it to you" to supply the best performing monochrome monitor that the industry can provide.

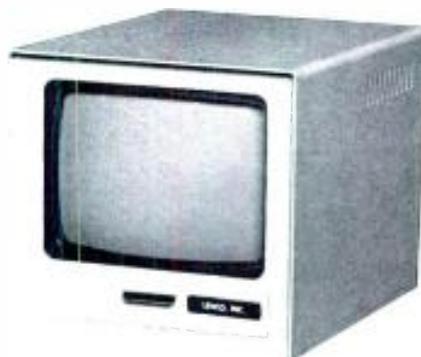
We have achieved your monitor performance expectations by offering you individual modules for ease of replacement and system update.

Top that off with 900 lines of resolution, an outstandingly bright picture, fast thirty day delivery, and a two year warranty. That's our commitment to you.

We owe it to you to make the best. It's a challenge we accept. Now will YOU accept the challenge to compare?



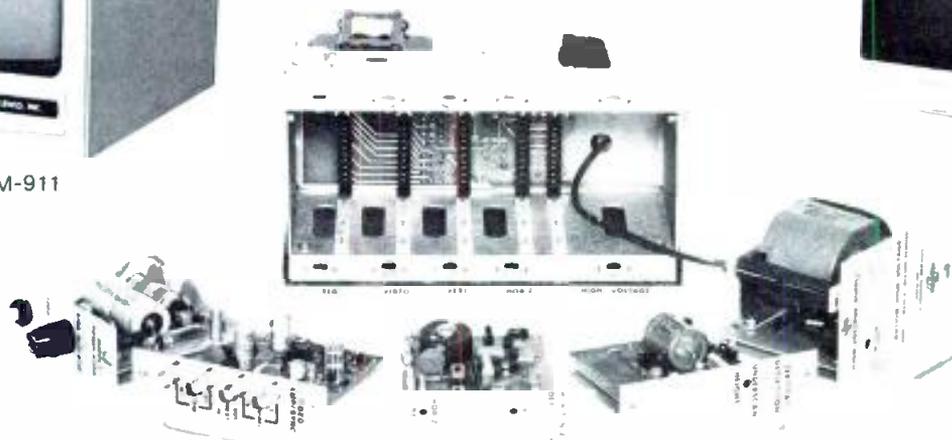
PMM-922



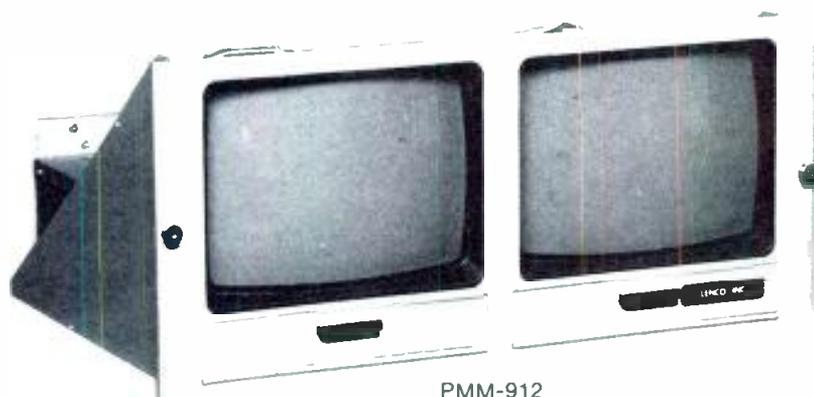
PMM-911



PMM-942



Modules



PMM-912



**LENCO, INC., ELECTRONICS DIVISION**

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

Circle (22) on Reply Card



Margaret Barnwell, former medical illustrator, prepares artwork for a special story on the brain.

## A new, affordable still-store

By Chuck Aronson and Ron Long, ADDA Corporation

Eight years ago, early video still-storage devices were regarded primarily as engineering tools to replace slide chains. Electronic stills could be as immediate as the news stories they illustrated without the continued cost and handling problems associated with slides. Besides cutting costs, saving time and reducing labor, there were other benefits. For example, a TV news director would not need to worry about important slides appearing during the newscast with thumbprints, upside-down, backward, dusty or crooked. Sequences of stills could be edited easily, and the digital technology image quality was identical at each viewing.

Two frame buffers allowed either a dual-channel mode, in which the two outputs operated independently, or a preview/on-air mode, in which a still could be previewed before being passed to the *on-air* output through an internal 2x1 digital vertical interval switcher. All this led to the acceptance of the still-store as a cost-effective and easy-to-use product, but the system basically was still that of a slide chain.

With the introduction of ADDA's ESP-C series in 1981, the still-store found a new role as a graphics production tool, complementing its role as a storage device. With an integral video synchronizer, the two frame buffer outputs can be mixed (in an external switcher) with new images from a copy stand camera and stored again. Transparency of electronics allows as many as 20 successive mix/overlay operations to be performed in creating images with depth and perspective. The accompanying article about graphics at CNN explains how this is done.

Until now, high purchase prices have kept still-store use primarily in the domain of the networks and larger TV stations, even though recent developments in Winchester disk drive technology have resulted in lower cost for storage media. However, ADDA Corporation has introduced the ESP II low cost/compact still-store with digital switching effects, for those with smaller budgets. With new technology and advanced packaging techniques, the cost has been reduced by more than 35%, resulting in a 1-drive system with a capacity of 400 stills at less than \$34,000.

The new system has two video channels and digital switching effects with one or two disk drives of various types and capacities, fitting rack space that has been reduced by 30%. While retaining multigeneration transparency, ease of operation and graphics capability, digital switching effects have been included.

Picture quality, of utmost importance to the broadcaster, is based on the same 8-bit, 4x<sub>sc</sub> sampling scheme as in the ESP-C series. The disk drive data format, compatible with the ESP-C series, allows disk packs to be passed between either type of system or directly shared in a dual-port drive configuration with two systems accessing a common disk drive. Owners of ESP-C systems can add auxiliary ESP II units with complete interchangeability of their data base of stills.

The ESP II mainframe enclosure, requiring 7 inches of rack space, contains three plug-in board assemblies. Two assemblies are freeze-frame synchronizers, while the third contains gen-lock, disk drive control, system control and digital switch-

ing effects circuitry. The system can function as two independent freeze-frame synchronizers with a third separate output for the digital switching effects.

The digital switching effects allow a variety of transitions from one still to the next. In addition to vertical interval (*cut*) switching, transitions such as horizontal, vertical or corner wipes; fade or dissolve; and push on, push off or pull off effects may be selected with transition times of 16, 24, 32 and 48 frames. Push and pull functions, which move the stills horizontally on and off the screen, are not found on production switchers. Modifier controls—reverse and midstop—allow transitions in the reverse direction or temporarily halted in the middle.

Sequences of stills are created such that the on-air operator need only press the "next" button for the next still to be switched on-air from preview and the subsequent still to be called to preview. The switching effects may be programmed into the sequence list. Independent synchronizer channels allow effects between two stills, two live pictures or one of each.

Proc-amp controls for the two video channels and system timing adjustments are found on the engineering remote control panel. This unit, only 1¼ inches high, is powered from the mainframe.

Operational control and switching effects are accomplished from a production remote control panel. The production remote, requiring only 3½ inches of rack space, uses dedicated push-buttons for all key system commands. Moreover, the new production remote control is compatible with existing ESP-C systems.

# The more you see, the more we hear



## Look who's talking about Dubner now.

While we claim no responsibility for the famous line, "Build a better mousetrap and they'll beat a path to your door," we'd like to think it might have been said about the Dubner CBG-2 video graphics/animation system. In any case, we thought you might like to hear what your colleagues are saying about us:

**"The CBG-2 is undeniably the most novel and flexible state-of-the-art real-time animation graphics device currently available."**

— Mark Bernardo, Chief Graphics Design Engineer, Olympics  
ABC Television

**"We needed a machine that would allow us to compete effectively in an already competitive market. The CBG-2 gave us the capability to create weather maps and news graphics quickly, it could be operated by department personnel, and it was the best buy on the market."**

— Bob Plummer, Director of Engineering, Fisher Broadcasting  
KOMO (Radio & Television, Seattle)

**"It's a digital computer and animation tool that allows artists to create quality animations independently. The CBG-2 is relatively inexpensive, it works fast and enhances the creative process with real-time imagery."**

— Elaine Schwartz, Computer Animator  
Atlantic Image (New York animation house)

**"The CBG-2 is much faster and less expensive than standard film animation. The real-time animation, clean key capability, expandability and great software support make it one of the best computers around."**

— Corinne Sousoulas, Art Director  
Motion Picture Laboratories (Memphis post production house)

**"The CBG-2 is a valuable tool due to its ability to create effective graphics quickly. It offers three dimensional animation, graphic enhancement, and character generation all in one unit. And these features are difficult to find in any one machine."**

— Victoria Henigman, Electronic Graphic Designer  
WPBT-TV (Miami PBS Affiliate)

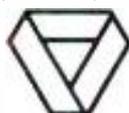
**"The Dubner was purchased for its advanced animation capabilities, its ability to be upgraded via software, and its cost effectiveness. We love it!"**

— Dan Sokol, Vice President, Engineering  
Video Post & Transfer (Dallas post production house)

With all the nice things being said about Dubner, all we can say is thank you. We plan to keep up the good work. You'll keep seeing it and we'll keep hearing about it.

**For a free demonstration of the Dubner CBG-2, call (201) 592-6500, or write.**

DUBNER



Dubner Computer Systems, Inc. 158 Linwood Plaza Fort Lee, New Jersey 07024

Circle (23) on Reply Card





Ann Walker, CNN assistant art director, composes a title on the Thomson-CSF Vidifont keyboard.



Teschner checks one of the six disk drives used to store CNN graphics.

video passes. With the switcher, she can electronically wipe red color up the drawing, making it appear as though blood is flowing.

**System education**

Williams said that an artist requires about a month to become fully trained to produce graphics with the ESP-750 systems at CNN. Through ADDA's

training program, supervised by Jon Teschner, formerly a member of the CNN art group, that amount of time can be reduced considerably. Teschner travels for ADDA Corporation, conducting training sessions for system users.

One CNN artist adapted easily to the electronic method of producing graphics. Having been exposed to computer technology, she was not intimidated by electronic systems.

Another, however, had to overcome a basic fear of electronic equipment before mastering the system. She had to learn that the control panels and systems would not blow up if the wrong button was pushed. Both now believe they use their skills as designers far more than just their drawing skills. There is more time for creativity, because the time-consuming aspects of drawing, coloring, cutting and pasting have been reduced, if not removed.

Generally, the learning process is a step-by-step procedure, starting with a proficient use of the copy stand video camera. Then the artist learns the control panel of the ESP-750. Finally, the artist masters video switcher effects. Beyond the hardware, the learning experience never stops. The artists at CNN continue to share new ideas, discoveries and techniques with one another.

**Artist as technician**

With no union at CNN, the artists actually operate the video equipment. They also may act as camera operators, technical directors and still-store operators. Editors often call from an edit suite to have an artist feed graphics directly to the suite. The artists also switch graphics as they go on the air.

**The age of disposable art**

At the end of my visit, I sat at the ADDA operator control station with the lead artist and went through the Pack review mode. The artist viewed hundreds of graphics as they appeared for a second each on the screen. Dozens were earmarked for deletion, an operation that occurs three times daily.

One artist said that the system challenges her imagination to produce the volume of graphics required. With the ADDA ESP-750, the drudgery and much of the stress usually associated with such a production load is eliminated. In Williams' opinion, "The switcher is the scissors and the still-store is the glue that holds the layers together," for an approach that keeps the news visually exciting at CNN.

| :? :->))))

# Now there's even more to look into



TM19-9RH



TM20-9RH

## Ikegami's new Broadcast Color Monitors

Ikegami has just made it impossible for any quality-minded high resolution color monitor user not to consider looking into an Ikegami monitor.

They call it the 9-Series, two new monitors (13V and 19V) with standard features that include a High Resolution Shadow Mask CRT with a Self-Converging In-Line Gun; American Standard Matched Phosphors; a Comb Filter to preserve luminance resolution; pulse cross and R-Y/B-Y outputs. We think you'll call it just what you've been looking for.

Along with its streamlined design and easily serviced modules, Ikegami's new monitors follow in a tradition of excellence. Each offers high stability, exceptional performance and proven reliability. Together with Ikegami's Delta-Gun Series, the 9-Series provides yet another reason to look into the monitors that more and more video users are spending their time looking into.

Isn't it time you looked into Ikegami monitors?

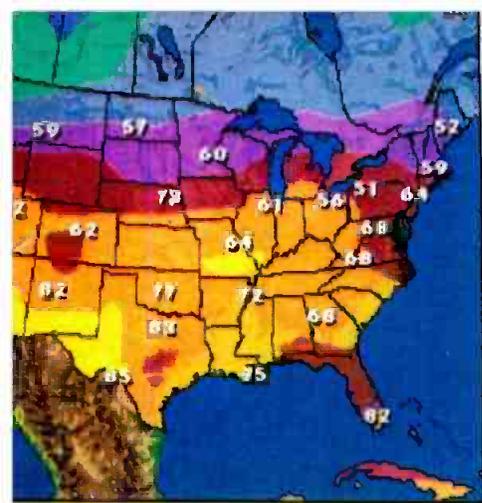
# Ikegami

9-Series monitors

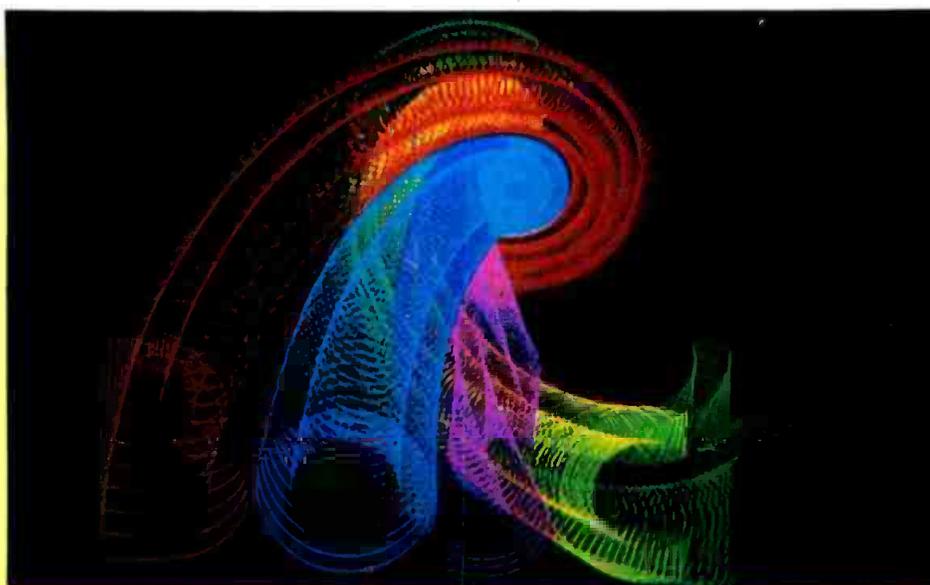
*Ikegami is the supplier of Color Monitors to ABC for its coverage of the 1984 Winter and Summer Games.*

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607; (201) 368-9171 • Northeast: (201) 368-9171  
West Coast: (213) 534-0050 • Southwest: (713) 445-0100 • Southeast: (813) 884-2046 • Canada: (201) 368-9179

Circle (24) on Reply Card



Aurora Systems AU/100



Bosch-Fernseh FGS-4000

# Electronic videographics systems:

## An update



Photo: Jerry Blank

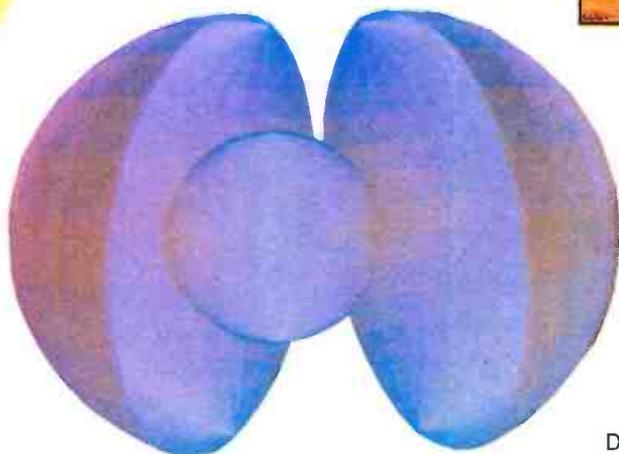
Digital Graphics Leonardo (CAT-1600)

By Carl Bentz, television editor



Computer Graphics Images

Photo: Keith Thomson



Dubner Computer CBG-2

Television is a visual medium. Keeping it visual requires a good deal of time for a news staff and art department. An ENG/EFP operation or a satellite-relayed news service may add valuable segments of recorded visual material, but sometimes just the right graphic must be created. Electronic videographics equipment, as a tool for the art department, helps get required visuals.

A TV station's plans for using visual material must include techniques for generating those materials. In the case of CNN (see "How CNN Creates Graphics" on page 21), the large volume of material dealing with international topics has led to an electronic still-store version of cut-and-paste artwork that works well. Other facilities, however, prefer the results of the artist at the board, with brush in hand. For such applications, electronic graphics generator systems provide flexible means of creating the right "slide" to chroma-key into the news show, a catchy visual for the station

*Continued on page 42*



# THE CHOICE FOR '84

	Number of Channels	Number of Inputs	Electronic Switching and Attenuation	Distortion (THD)	Signal/Noise Ratio	LIST PRICE
<b>RADIO SYSTEMS</b> ESA-10	10	30	YES	.03	-80	\$8,950
Auditronics 212	10	20	YES	.1	-78	\$12,389
Pacific Recorders BMX-10	10	20	NO	.025	-75	\$13,250

Specifications per manufacturers' brochures.  
Consoles priced comparably equipped.

## COMPARE VALUE.

For thousands of dollars less than its closest competitor, the ESA-10 from Radio Systems delivers superb sound and complete operator control of every audio function. In 1984, high performance in a broadcast console is finally available at the right price.

## COMPARE PERFORMANCE.

Electronic Step Attenuation is the name for flawless audio control.

Inputs are switched by CMOS circuitry and attenuated by digitally encoded commands as they enter the console. Then the signal is routed directly to output stages. This shortened path results in super-low distortion, ultra-low noise and excellent RFI immunity.

## COMPARE FEATURES.

Standard features include: 30 inputs/dual output/remote control/clock and timer/test oscillator/set up meter/mono-mixdown/three stereo meters. No other console is so fully equipped. Call Toll Free 800-523-2133. In PA (215) 356-4700.



# RADIO SYSTEMS

P.O. BOX 356 • EDGEMONT, PENNSYLVANIA 19028

www.americanradiohistory.com

# ONLY SCOTCH 480 CAN STAND



Every opinion expressed in an editing session adds up to more starting, stopping and rewinding of the tape. And that can lead to reduced picture quality, unless you've got new

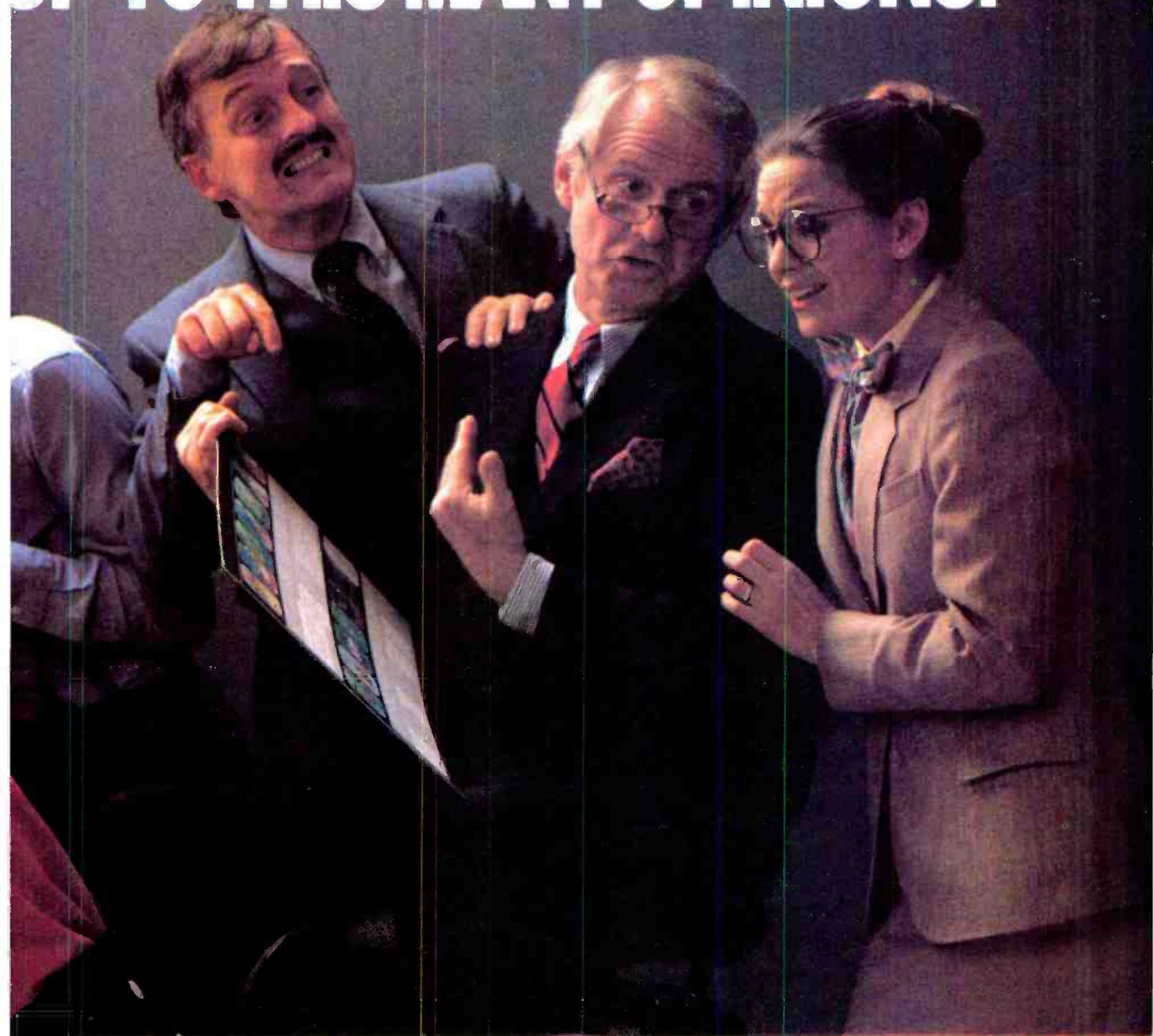
Scotch™ 480 one-inch video tape working for you.

An advanced magnetic dispersion, consisting of a totally new oxide, binder and lubrication system on Scotch 480

video tape keeps your productions looking good through the toughest editing sessions. In fact, 3M lab tests have shown 480 video tape capable of delivering over *1,000 edits from the*

"Scotch" is a trademark of 3M ©3M, 1983

# UP TO THIS MANY OPINIONS.

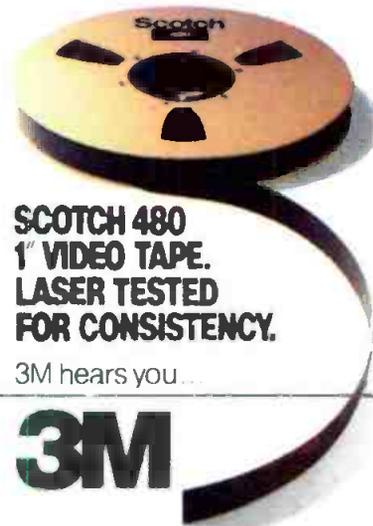


same preroll point, with no significant reduction in playback picture quality.

If your video requirements call for a tape with that kind of durability and image quality, call 1-800-328-1684

(1-800-792-1072 in Minnesota) for more information about Scotch 480. Your productions will look better and so will you.

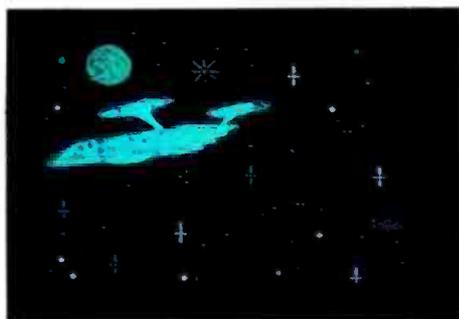
Magnetic Audio/Video Products Division/3M.



**SCOTCH 480  
1" VIDEO TAPE.  
LASER TESTED  
FOR CONSISTENCY.**

3M hears you...

**3M**



MPB Vista



McInnis-Skinner NEWSKAN

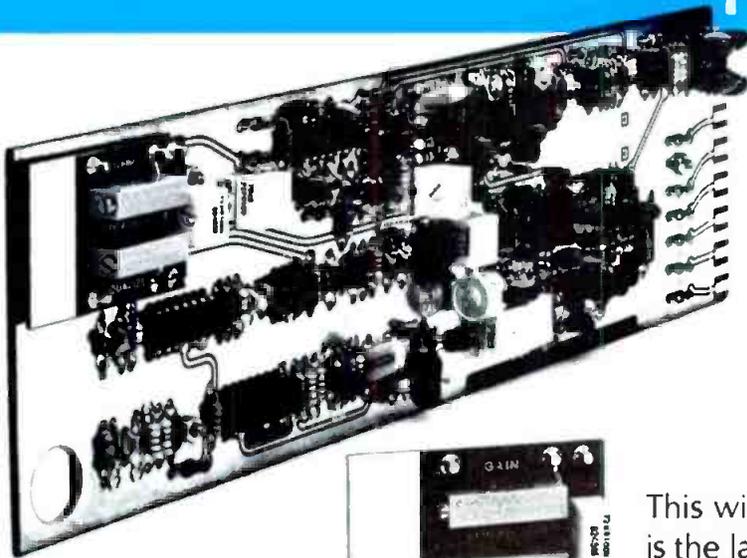


Medigraphics Patran-H

**Table I.**  
**Guidelines to electronic videographics**

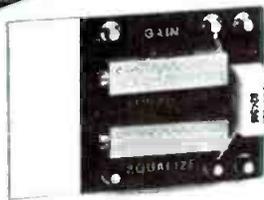
<b>Features</b>	<b>Questions</b>
Ease of use	Is the system user-friendly? Can it be operated efficiently by non-technical people?
Menu control	How are the menus arranged? Do they guide the operator? Is the menu displayed on a separate monitor, in color, with all information easily located? Is the menu combined with the picture being generated?
Available colors	How many colors can be used at a time? How many colors and tints are available to use?
Color adjustment	Can colors be mixed? Is the artist limited to a fixed color selection?
Brush shapes	How many different brush shapes are available? Can a special shape be created, if required?
Air brush	Is the air brush technique available for those fine and subtle gradations and shadings?
Image modification	Can the image be altered, edited or modified, allowing a stock image to fit a special purpose?
Edging effects	Are shadows and various edging effects inserted manually? Can edging effects be generated for 3-D illusion automatically?
Image quality	How crisp is the generated visual? Is the focus as sharp as the CRT display will allow? Does the system exceed the typical NTSC TV system?
Anti-aliasing	How good is the resolution? Are algorithms included to smooth out lines and to avoid apparent motion in the picture caused by NTSC characteristics?
Picture expansion	During the generation process, can the picture be expanded to make fine details easier to create?
Display planes	Is the system a multiplane system, allowing a foreground and a background to be handled separately?
Animation capabilities	Can the system be used for real time animation, with dissolves between planes? Is motion within a plane possible? Can cell animation be done?
Video input	Can a camera or other video input be used for image generation? Does the camera digitizing input allow color? Is it limited to black-and-white? Does the system allow a graphics tablet?
Available fonts	How is titling added to the image? Are fonts or typefaces limited? Can fonts be created?
Weathergraphics	Does the system tie directly to a weather service for automatic displays of maps, clouds and numerical data? Is the system essentially limited to weather use? If the station also uses a newsroom computer, are tie-ins between the two possible?
Storage systems	In what format are images stored? Are discs floppy or rigid? What storage capacity of complete images is possible? Are multiple-disc memories allowable as a library function? Can more than one system be tied together?
Operator access stations	Are all operations done through one control panel? Can multiple-control and recall-only display terminals be interfaced?
Geometrics	Can the operator access geometric shapes from the menu to aid in image generation?
Cut-and-paste	Does the system software allow the cut-and-paste technique? Can sections of the image be moved intact?
Basic system	Is the basic system a graphics generator or a character generator with graphics options?

# HIGH PERFORMANCE



## Video Equalizing Amplifier VEA-662

**\$265.00**



This wideband, six-output amplifier is the latest addition to our comprehensive line of distribution equipment. It features differential input,

soft backporch clamping and easily set, continuously variable equalization from zero up to 300 meters (1000 feet) of Belden 8281 or equivalent coaxial cable. Delay trim and common mode hum null controls are also provided. A unique feature of this ultrastable, low power amplifier is a removable sub-module which contains the operational controls for gain and equalization. This allows instant, adjustment-free amplifier substitution.

## Here are some prominent SPECIFICATIONS

### Input

Return loss ..... > 54 dB to 5 MHz  
 > 46 dB to 10 MHz  
 Common mode rejection . > 60 dB to 1 kHz

### Outputs

Return loss ..... > 40 dB to 5 MHz  
 > 36 dB to 10 MHz  
 Output isolation  
 Signal (3.58 MHz) ..... > 48 dB  
 Load ..... < 0.05 dB/load at 10 MHz  
 < 0.15°/load at 3.58 MHz  
 Output DC ..... < ±25 mV at back porch

### Timing

Delay ..... 25.4 ns (32.7° at 3.58 MHz)  
 Adjustment range ..... typically 6° at 3.58 MHz

### Power Requirements

Total power  
 dissipation ..... < 2 W

### Performance

Frequency response ..... < ±0.02 dB to 5 MHz  
 < ±0.1 dB to 10 MHz  
 +0 -0.2 dB at 15 MHz  
 typically -0.6 dB at 20 MHz  
 Differential phase ..... < 0.1° 10% to 90% APL  
 Differential gain ..... < 0.2% 10% to 90% APL  
 H tilt ..... < 0.25%  
 V tilt ..... < 0.25%  
 S/N ratio ..... > 70 dB to 20 MHz  
 (rms noise/0.714 V)  
 unweighted

### Equalization

Range ..... 0 - 300 m (0 - 1000 ft)  
 Belden 8281, Northern  
 Electric 728, or equivalent  
 Response ..... < ±0.05 dB to 5 MHz  
 < ±0.15 dB to 10 MHz  
 typically -0.2 dB at 15 MHz  
 typically -1.0 dB at 20 MHz

**Compare price and performance . . .  
 then give us a call.**

Leitch Video of America, Inc.  
 825k Greenbrier Circle  
 Chesapeake, VA 23320  
 Tel.: (804) 424-7920  
 Telex II: 710 882 4342

**LEITCH**

Circle (26) on Reply Card

Leitch Video Limited  
 10 Dyas Road  
 Don Mills, Ontario M3B 1V5  
 Tel.: (416) 445-9640  
 Telex: 06 986 241

# Videographics manufacturers

Use this listing, with Reader Service Numbers, to obtain additional product information.

- P. Albrecht Elektronik .....(301)  
TX83 videotex system
- Alden Electronics .....(302)  
Weathergraphics
- Aston Electronic Designs Ltd.(303)  
Font compose unit for Aston  
character generators
- Aurora Systems .....(304)  
AU/100 graphics  
New weather software
- Beston Electronics .....(305)  
Font compose option for  
Marquee character generators
- Bosch-Fernseh .....(306)  
FGS-1000 graphics  
FGS-4000 graphics
- British Videotex & Teletext ..(307)  
Teletext graphics
- Chyron Corporation .....(308)  
RGU camera/font composer  
VP-2 generator, Digifex option
- ColorGraphics Systems .....(309)  
NewStar and Liveline newsroom  
systems, with graphics and  
weather
- Computer Graphics Lab.....(310)  
Images graphics  
Tween, Tweep, Scan, BigPaint  
and Record software for im-



Thomson-CSF Vidifont V

- proved graphics and animation
- Digital Graphics Systems ... (311)  
CAT-1600 series fine arts  
graphics  
Election reporting software

- Dubner Computer Systems ..(312)  
CBG-2 graphics  
ESD weather interface  
Election, sports formats  
The Fantastic Animation  
Machine .....(313)  
Graphics system
- Florida Computer Graphics ..(314)  
Graphics system
- FOR-A Corporation .....(315)  
FVW-300 generator with light  
pen to draw on screen
- GEC-McMichael Ltd. ....(316)  
Clock/logo generator
- Gresham Lion Ltd. ....(317)  
Supervisor 214 graphics
- Harris .....(318)  
VG Electronics TTS4 teletext  
graphics
- Interand .....(319)  
Telestrator 440 graphics  
Weather software
- Kavouras .....(320)  
TADAC C-Band and S-Band  
radar displays  
GOES weather display  
capability
- Logica Ltd.....(321)  
ICON graphics

*Continued*

## THE DATUM COMMITMENT: Time Generation, Reading, Recording, and Display for Video Applications



### SMPTE TIME CODE EQUIPMENT

- Longitudinal and Vertical Interval Time Code generation and reading including user bits
- Jam sync, dubbing and external control capabilities
- NTSC/EIA RS170A and PAL/EBU 3079-E color video signal compatible
- Internal character generation of decoded or generated frame number and time-of-day or user bits



### NETWORK SOURCE IDENTIFICATION CODE ENCODERS AND READERS

- Encodes input SMPTE Serial Time Code and 8 bit source number into the 48 bit SID code
- Reader automatically scans the vertical blanking interval and displays and outputs the decoded source number and time



### DIGITAL TIME DISPLAYS

- Up to nine decimal digits on 7-segment LED display
- Up to 2 inch high LED display configurations
- Parallel BCD input at TTL compatible levels
- Can be shelf, rack cabinet, wall or ceiling mounted

**datum inc** TIMING DIVISION  
1363 State College Blvd., Anaheim, CA 92806  
(714) 533-6333

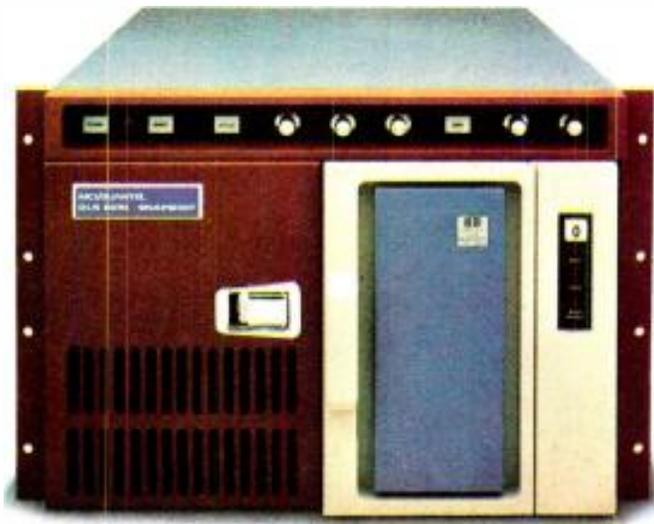


### AUTOMATIC VIDEO MAGNETIC TAPE SEARCH SYSTEMS

- Remotely controls operation of attached video magnetic tape recorder/reproducer
- Automatic searching for selected start and stop times by reading and comparing time code recorded on video magnetic tape
- Industry standard computer compatible interfaces available for programmable control of tape search operations

T0109

Circle (27) on Reply Card



# One of the world's smallest digital still stores is also one of the largest.

Introducing "Snapshot" from MCI/Quantel. Only 12¼ inches high by 19 inches—including removable cartridge Winchester disk drive!

Snapshot is not only the smallest of MCI/Quantel's DLS 6000 series units—it's one of the smallest digital still stores in the world.

Snapshot lets you capture pictures from live asynchronous feeds, store up to 400 of them with titles, and replay them on demand. You can prepare and edit sequences or stacks of sequences. And you can search by title.

Need more? You can increase Snapshot's storage to 1,600 pictures. Or you can upgrade it to

a DLS 6020 with on-air cuts and dissolves. Or upgrade it further to a DLS 6030, the most powerful still store available with production effects that bring an exciting look to your skills.

If that's not enough, you can integrate up to seven Snapshots—or other DLS 6000 series units—as workstations into our Central Lending Library (CLL). Now you can store over 10,000 stills at each

workstation and have simultaneous access to 100,000 more from the CLL. Plus unlimited off-line storage on disc cartridges or videotape.

You can even include MCI/Quantel's Paint Box as one of the workstations. So you can create the finest electronic graphics ever seen in television and have them instantly available for on-air use as well as library storage.

So whether you want a small system or a big system, Snapshot is the place to start.

Call your local MCI/Quantel office for more details. Or get in touch with us directly at 415/856-6226. Micro Consultants, Inc., P.O. Box 50810, Palo Alto, California 94303.



## MCI/QUANTEL

The digital video people.

MCI/Quantel and "Snapshot" are trademarks of Micro Consultants, Inc.

Circle (28) on Reply Card

MCI/Quantel .....(322)  
 Paintbox graphics  
 MPB Technologies .....(323)  
 Vista graphics systems  
 McInnis-Skinner &  
 Associates .....(324)  
 NEWSKAN newsroom system  
 Zephyr weathergraphics  
 Election, sports software  
 Medigraphics .....(325)  
 Pantran-H graphics  
 Satellite Broadcast Network .(326)  
 GOES weathergraphics  
 Swanlind Ltd. ....(327)  
 TM108 character generator  
 Graphics package  
 Symtec .....(328)  
 PGS III graphics with  
 Apple hardware  
 Synsat Communications ....(329)  
 Stormscan weathergraphics  
 Weatherpix, weatherwire,  
 radiowire



Via Video System One

3M .....(333)  
 Camera compose option to  
 D-8800 character generator  
 Technology Service .....(330)  
 Series 2000 weather radar  
 displays  
 Texscan/MSI .....(331)  
 Zgrass graphics  
 Thomson-CSF Broadcast ... (332)  
 Graphics V Vidifont graphics  
 WSI weather interface  
 Vidicast, VidISports software  
 Unitel .....(334)  
 Teletext graphics  
 Scriptel P, Graphitel graphics  
 Vectrix .....(335)  
 VBX-TV graphics  
 Via Video .....(336)  
 System One graphics  
 World System Teletext .....(337)  
 VG Electronics TTS4 teletext  
 graphics

ID, animated sequences for most requirements and even a projected backdrop for a special production. Weather reporting adds another dimension to graphic needs, using radar imaging, photographs from satellites and a host of other meteorological data for the complete picture, often with multiple map presentations and numerical data overlaid.

If you need generated graphics with

flexible capabilities, fast access to stored images, editing/retouching of visuals and animated sequences, an electronic videographics system also may be for you. But what should you look for in such a system, before you invest in a major purchase? System cost and image quality are important, but so are a number of other features. A list of some of these features is found in Table I. While looking for a

graphics system, check these features and questions to help select the system that best suits your needs.

There are other aspects of various systems that you will want to investigate as well. To get more information, use the manufacturer listing with Reader Service Numbers. The notes with each company indicate the model number and capability of the company's product. [:-:~))]]

# This Modulation & Power Controller will keep your AM Transmitter right on the money. 24 hours a day, seven days a week.

## We guarantee it.

With the MPC-11 controlling your transmitter you can be sure your station is operating at optimum levels without exceeding FCC license limits. Your station "sound" will always be just right regardless of program format or level of audio processing. We can guarantee this because our MPC-11 lets you select all of the parameters. From threshold levels to adjustment increments to time intervals. For power, positive and negative modulation peaks, and "do nothing" low level modulation limits. For primary and alternate transmitters with up to three different antenna patterns.

Once the parameters are set the MPC-11 will take over. It will continuously monitor the rf signal and auto-

matically provide raise/lower power commands. It will provide precise digital gain control over two separate audio feeds to the modulator. The MPC-11 is compatible with AM stereo applications and existing remote control systems. It also provides a continuous indication of the exact amount of correction supplied. Both through the front panel meters and through auto-logging outputs.

You may truly "set and forget" the MPC-11. It will provide alert alarms before compensation limits are reached. Plus LED status and alarm outputs for all parameters. It even contains self diagnostic circuits to provide fail safe operation in the event of a malfunction. The operational status of all alarm, indicator, and diagnostic circuits may be verified with a front panel switch.

Price: \$2,750.00 (rf sample is required).



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

Circle (29) on Reply Card



## A NEW DIMENSION IN MASTER CONTROL SWITCHING

*Utah Scientific, the industry's number 1 supplier of routing switchers, has now applied its talents to an allied area—Master Control Switching. Designed for immediate conversion to stereo and / or station automation, Utah Scientific Master Control Switchers are designed to deliver superior performance today while accommodating your future needs as well.*

- Two models: two bus and three bus
- The industry's best performance specs
- Full preset capability with "goof-proof" single-button execution
- Integral edge, shadow, outline and color matte
- 28 direct inputs plus two assignable from panel
- Alphanumeric readouts on assignable inputs
- All-digital interconnect via RS-422 lines
- Top quality switches
- Stereo-ready—just add the matrix and one card
- All panel functions software controlled
- Machine control for two telecines and ten VTR's included
- Available with or without station automation system
- Preroll times individually assignable and user alterable
- Full audio over / under capability
- Separate 8 x 3 audio only matrix included
- Four large LED VU meters

**US** UTAH SCIENTIFIC  
a DYNATECH COMPANY

1685 West 2200 South  
Salt Lake City, Utah 84119

Telephone: (801) 973-6840  
Toll Free: (800) 453-8782  
TWX: 910.925.4037

Circle (30) on Reply Card

# Digital video processor update

By Carl Bentz, television editor

Digital-based video equipment is rapidly replacing traditional analog instruments. This short overview of TBC, still-store, effects and graphics systems provides a guide for locating information on these complex, yet versatile, devices.

Digital concepts in video processing have resulted in many tools for video production. Time base correction and frame synchronization equipment, among the first products to use digital techniques on a large scale, now appear as integral parts of other processing systems. TBCs are essential if VTR, VCR and videodisc playback capabilities are planned in video productions. ENG microwave feeds and satellite-relayed programming require frame synchronizers for live segments used with effects in local news or other shows.

Still-store systems, based on floppy and rigid (Winchester) disk memories, also have evolved from relatively simple production tools to sophisticated devices. What once was a means of holding a still frame of video, a slowly stepping sequence of stills or a slow-motion segment now presents a means of holding hundreds of thousands of individual images. Individual stills or a sequence of animated video may be called from the systems. But although still-store systems are important in themselves, they have become merely an integral part of even more esoteric effects and digital arts systems. Some of these electronic slide projectors or slide libraries include production effects to further enhance their value in production and on-air use.

One area that consistently draws interest at equipment exhibitions is digital video special effects. Methods of dealing with effects and video manipulations seem to rely heavily on high volume solid-state memories and LSI circuitry. These systems, however, also are combined with multiple microprocessors to control frame buffer memories and frame synchronization for their operation. Added to the innovation in processing circuitry is a new technology: the magnetic bubble memory. Although considered too slow for processing activities, bubbles in rugged cassette-type packages form convenient non-volatile storage systems for effects sequence programming of some systems.

Videographic art systems do not yet equal the subtlety of an artist's brush or the detail of pen and ink. But, electronic videographic systems make quick work of logo generation, image retouching, animation, original art and production backgrounds for television and theater. Most systems offer

# WHAT STANDS SEVEN INCHES HIGH, CONSUMES ONLY A PINCH OF POWER, COSTS LESS THAN \$30,000 AND IS THE PICTURE OF QUALITY?



## Why, the revolutionary A42 video slide projector, of course.

A digital slide store doesn't have to be a bulky system loaded down with unnecessary features to justify a hefty price tag. We proved that to you at NAB '83 with our latest generation digital video slide storage system — the A42. This rack-mountable little beauty stands only 7 inches high! It combines the very latest in Winchester disk and digital video processing technology to deliver the highest quality images. And the price is right at \$29,900. We've got features galore,

including: on-line storage of 100 frames/200 fields (expandable to 300 frames/600 fields), automatic intermixing of field and frames, and an optional high-speed digital streaming tape drive for backup and off-line storage.

**The A42.** It's your opportunity to get full broadcast quality in the world's smallest slide store system. For details, call (415) 571-1711, or write to Abekas Video Systems, Inc., 319 Lincoln Centre Drive, Foster City, California 94404.

# Abekas

Video Systems, Inc. 319 Lincoln Centre Drive, Foster City, California 94404

# DIGITAL VIDEO EFFECTS SYSTEMS

Equipment for visual image manipulation, aspect alteration, and/or dimensional distortions. Digital techniques are used in the operation. Simpler key, border, wipe, etc., effects may be within the repertoire, but are not listed here.

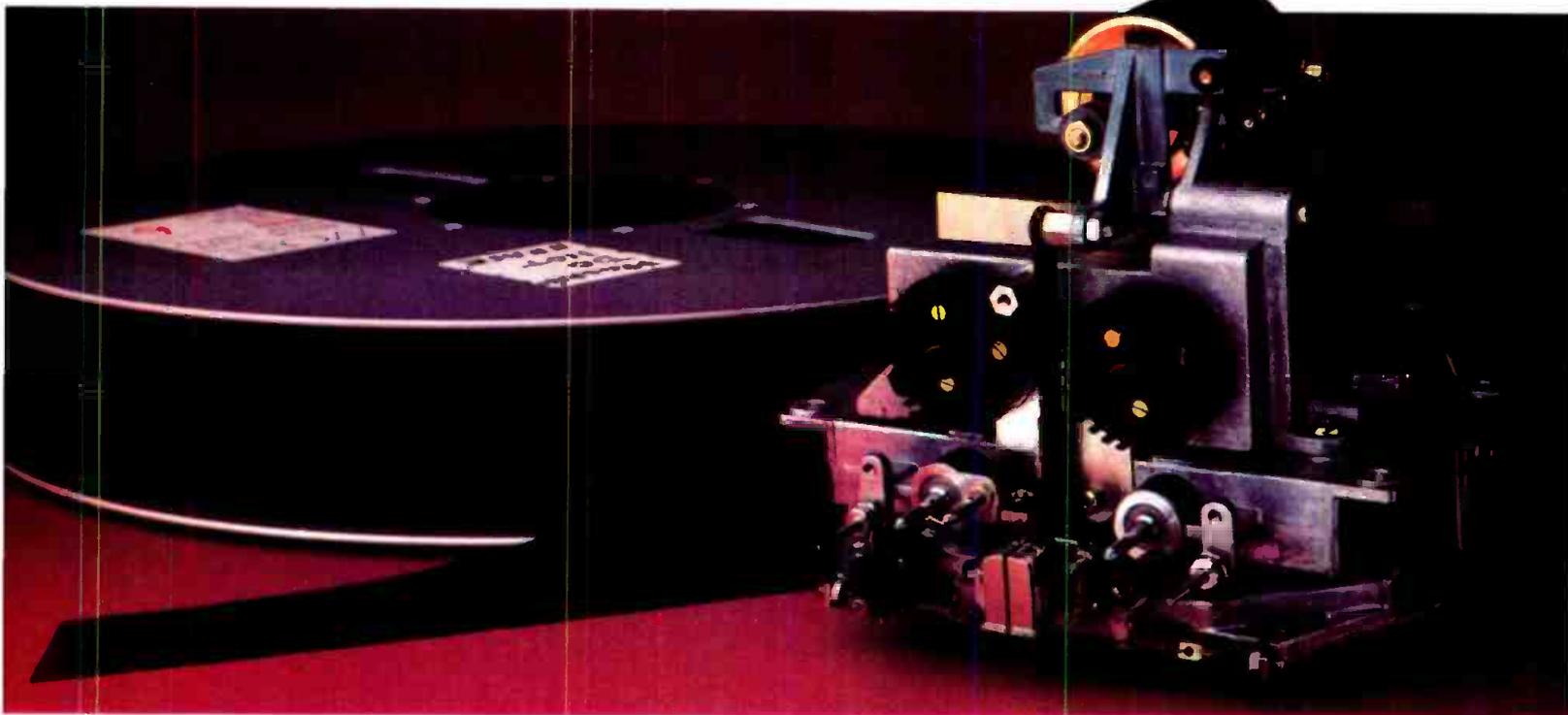
Manufacturer	ADDA Corporation	Ampex Corporation	Digital Services Corporation	Grass Valley Group	MCI/Quantel
Model Number	VIP(1)	ADO	Digifex(2)	DVE-2	DPE 5000/Plus
Video Output Channels	1	4	1	1	5
Image Size Changes:					
Compression (H and V)	Yes	Yes, 100%	Infinite	Infinite	Infinite
Expansion (H and V)		> 100%	Yes	Infinite	x4
Rotation Around Axes	X, Y	X, Y, Z	X, Y, Z	X, Y	X, Y, Z
Perspective Changes:					
Along Horizontal	No	True perspective	No	No	Yes
Along Vertical	No	True perspective	No	No	Yes
"Elastic Sheet"	No	No	No	No	Yes
Page Turn	No	Linear plane only	Yes	No	No
Multi-image Freeze	Yes	No	No	Yes	Yes
Image Trail Freeze		No	Yes	Yes	Yes
Image Positioning	Yes	Yes	Yes	Yes	Yes
Picture Splits	Yes	Multichannel	Yes	Yes	Yes
Key Tracking		No	No	Yes	Yes
Mirror Imaging (H and V)		Yes	Yes	Yes	Yes
Push-Pull Wipes	Yes	Multichannel	Yes	Yes	Yes
Posterization		No	Yes	Yes	No
Programmed Sequences	Yes	Yes	Yes	Yes	Yes
Mass Memory Type		Disc	Disc	Disc	Disc
Auto/Manual Transitions	Manual	Either	Either	Either	Either
Reader Service Number	344	345	346	347	348

(1) Also available from ADDA is the AC20A, providing positional/wipe effects.

(2) A recent introduction by DSC is the FlexiKey effects generator for use with any video switcher. A variety of pre-programmed image manipulations may be used manually or automatically.

Manufacturer	MCI/Quantel	Microtime	NEC America	Precision Echo	QuesTech Ltd.
Model Number	Mirage(3)	T'E-120	E-Flex	Squeezer	6101P
Video Output Channels	Multiple	1	1 or 2	1	1
Image Size Changes:					
Compression (H and V)	Yes	No	Yes	1/4, 1/9, 1/16, 1/25	Yes
Expansion (H and V)	Yes	No	Yes	Variable crop only	x2
Rotation Around Axes	X, Y, Z	None	OptiFlex option	None	Through sequence
Perspective Changes:					
Along Horizontal	Yes	No	OptiFlex option	No	.....
Along Vertical	Yes	No	OptiFlex option	No	.....
"Elastic Sheet"	And geometrics	No	Optional	No	No
Page Turn	Yes	No	Optional	No	No
Multi-image Freeze	Yes	No	Yes	No	No
Image Trail Freeze	Yes	No	Yes	No	No
Image Positioning	Yes	No	Yes	Yes	Yes
Picture Splits	Yes	No	Yes	No	.....
Key Tracking	Yes	No	Yes	No	.....
Mirror Imaging (H and V)	Yes	No	No	Yes	Yes
Push-Pull Wipes	Yes	Yes	Yes	No	Possible
Posterization	Yes	No	Yes	No	Yes
Programmed Sequences	Yes	Yes	Yes	No	Yes
Mass Memory Type	Disc	None	Bubble	None	.....
Auto/Manual Transitions	Either	Either	Either	Manual	Yes
Reader Service Number	349	350	351	352	353

(3) For details on the MCI/Quantel Cypher, contact the manufacturer.



## On designing a cassette transport to meet 2" mastering standards.

As an audio professional, you probably work with several tape formats. But your demands for reliability and performance are always the same.

In designing a transport for the Studer A710 and the Revox B710 MKII cassette decks, our engineers worked with the same principles established for our professional open reel decks. No cost-cutting compromises were permitted. For example, the Studer Revox cassette transport is built on a die-cast aluminum alloy chassis, not on stamped metal. This is the only way to assure precision machining and long term stability.

Four direct drive motors handle your cassettes smoothly and gently. Two quartz-locked, Hall effect capstan motors keep wow-and-flutter down to a conservatively rated 0.05% (DIN weighted). Two additional DC reel motors, both servo regulated and microprocessor controlled, provide constant speed fast winding, automatic start-of-oxide cueing, and motion sensing for positive tape protection.

No sleds allowed. Most other cassette decks use a sled mechanism to insert the heads into the cassette shell. The free play inherent in this design often contributes to azimuth misalignment.

In the Studer Revox design, a die-cast headblock pivots upward on two precision (0.001 mm tolerance) conical bearings and

locks into a solid 3-point mount. Because the headblock always locks into exactly the same position, absolute azimuth stability is assured.

One transport, two decks. This remarkable transport can be found in only two tape decks, the Revox B710 MKII and the Studer A710. Features shared by both units include 3 head design, internal 24 hour clock for programmable operation, tape type sensor, Dolby™ B and C noise reduction, plug-in modular PC boards, optional remote control, and adjustable headphone output with ample amplification.

A710: The Studer Version. This deck offers professional line level inputs and outputs, with output levels adjustable from -3 to +14 dBu. It also has calibrated input and output levels, XLR connectors, and a rack mount flange standard.

B710 MKII: The Revox Version. The lower priced B710 MKII has front panel mike inputs, mike/line mixing, and an optional infrared remote control.

For the long run. The Studer A710 and Revox B710 MKII are built for consistent, dependable performance. Hour after hour. Year after year. The kind of performance you expect from the world's most respected name in audio recording.

For more information on Studer Revox cassette decks, contact: Studer Revox America, 1425 Elm Hill Pike, Nashville, TN 37210, (615) 254-5651.

**STUDER REVOX**



Revox B710 MKII

Studer A710

Circle (32) on Reply Card

# DIGITAL VIDEO EFFECTS SYSTEMS

Manufacturer	Regis-BLT	Toshiba Corporation	Vital Industries
Model Number	AVP 900	DPE-III	SqueeZoom
Video Output Channels	2	4	4
Image Size Changes:			
Compression (H and V)	1/4 through 1/64	0 to 100%	Infinite
Expansion (H and V)	x4, x16	0 to 100%	Infinite
Rotation Around Axes	None	X, Y	X, Y, Z
Perspective Changes:			
Along Horizontal	Yes	No	No
Along Vertical	Yes	No	No
"Elastic Sheet"	No	No	No
Page Turn	No	No	Yes
Multi-image Freeze	Yes	Yes	Yes
Image Trail Freeze	Yes	Yes with decay	Yes
Image Positioning	Yes	Yes	Yes
Picture Splits	Yes	Yes	Yes
Key Tracking	Yes	Yes	Yes
Mirror Imaging (H and V)	Yes	Yes	Yes
Push-Pull Wipes	Yes	Yes	Yes
Posterization	Yes	Yes	Yes
Programmed Sequences	Yes	Yes	Yes
Mass Memory Type	Disc	Bubble	None
Auto/Manual Transitions	Manual	Either	Either
Reader Service Number	354	355	356

higher resolution in detail and color than US NTSC TV is capable of showing on the home receiver. The art systems approach CAD-CAM computers in their capability for generating 3-D objects and manipulating them to allow viewing from various angles and directions. Economics, however, has kept most broadcast facilities from purchasing the more industrial-type models.

In every case, equipment transparency has been the designers' aim, with the input signal altered only toward the desired effect or correction. The digital signal format, based on binary-coded information, reduces concerns of noise and non-linearity in analog circuitry. Missing bits in a binary word are sensed and corrected by various means to cover what might appear as holes in an image. And, best of all, an international agreement has been reached on the digital video sampling frequency, bringing the future reality of an all-digital TV studio closer into focus.

### Information sources

Today, however, we still must work with separate systems that meet our needs. If your station needs to upgrade time base correction equipment, refer to our December 1983 issue, "Time Base Correction: An Equipment Survey" (page 112) and to

the *Feedback* column in this issue for equipment information. Also, refer to our September 1983 *Buyers' Guide* for information on TBC and frame synchronizer systems.

Regarding still-stores, several new systems have appeared since our August 1983 "Still-store Update" (page 61). They include the following:

- ADDA's ESP II digital video processor, a low cost, multichannel unit with production effects, compatibility with ESP C systems, in a portable format. For information, circle (340).
- Chroma Digital Systems' Digifex 766 frame-store and synchronizer, which includes full proc-amp functions. Production effects included are compression, mosaic tiling, posterization and position control. For information, circle (341).
- Harris Video Systems' IRIS II enhancements—including the ICS composition station and production effects—and the new model 650 4-frame synchronizer, for up to six users simultaneously, with each user terminal including titling capability. For information, circle (342).
- Picture Element Ltd.'s (PEL) Video Sequence Processor (VSP) with record, process and playback of sequences; 2-frame frame-

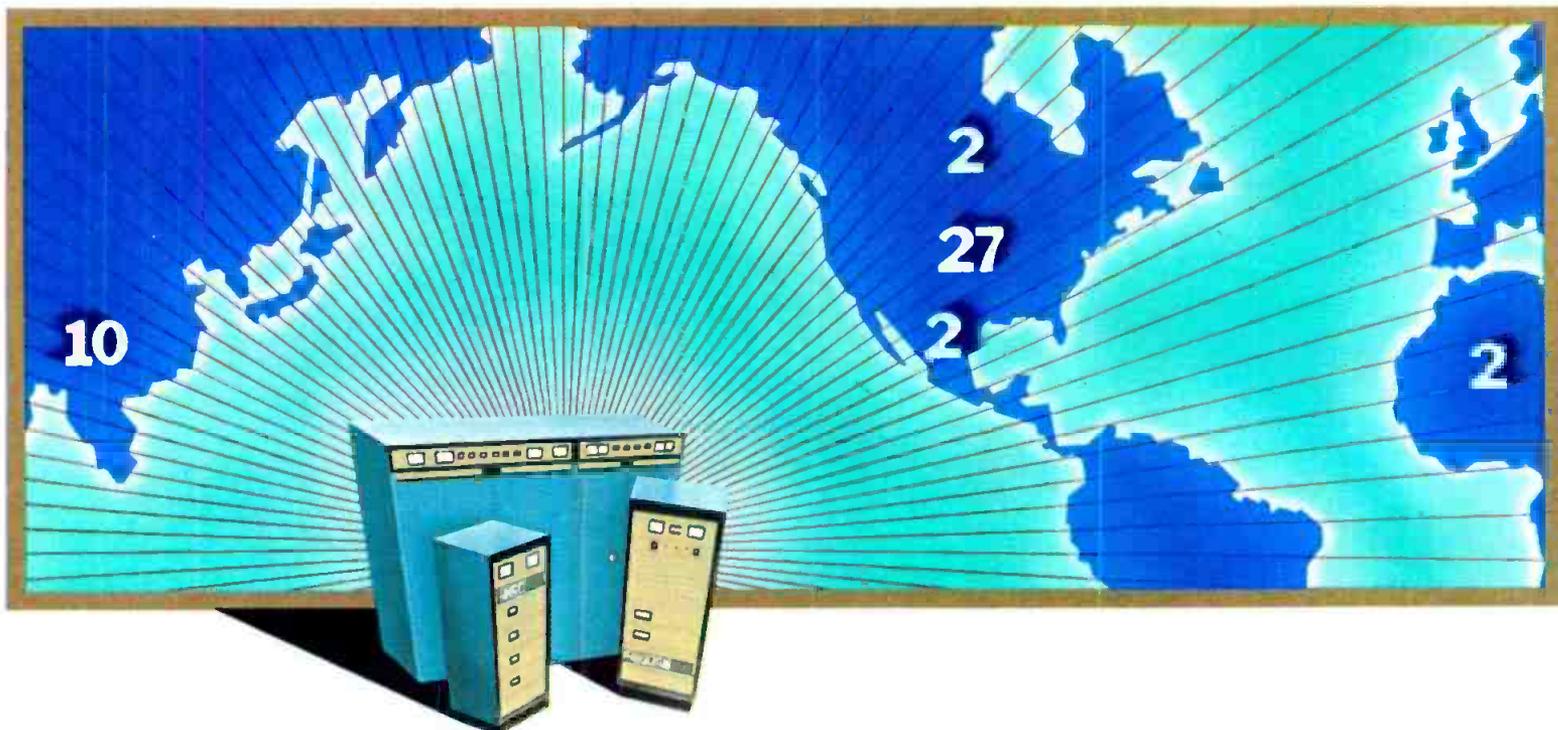
store memory; hardware capable of 64-bit operation; and formats for NTSC, PAL, YIQ, YUV, RGB and HDTV Y/R - Y/B - Y 1125-line systems. For information, circle (343).

Clarifying a note in the August 1983 update ("Still-store Update," page 61) on Abekas Video Systems' A42 still-store, the 7-inch-high portable or rack-mountable package allows creation, editing and replay of up to three 100-image sequences. For information, circle (357).

For information about graphics generators, refer to "Electronic Videographics Systems: An Update" on page 38 of this issue, and to the *Buyers' Guide*.

Unlike other products in this update, the Digivision DRGB-343 digital video converter provides 1024-pixel resolution output in both horizontal and vertical detail. Inputs from NTSC cameras, capstan-servoed VTRs, off-air broadcasts or video laser disc units, as well as RGB video, are converted to the high definition format with color, real time motion compensation. For information circle (358).

Concerning special effects using digital technology, the accompanying tables from the BE 1983 *Spec Book* give a perspective of available equipment by showing selected specifications for various systems. [ :?(-)]]]



# Forty-three station installations in the last 24 months!

**Not bad for a company you may hardly know.**

**B**ut more and more broadcasters are getting to know us every day! There's good reason why we've grown so fast. We call it "station orientation" . . . the basic philosophy of George Townsend, whose background is station engineering. Now it's practiced by all our design engineers, most of whom have had hands-on broadcasting experience.

## We know staying on the air is everything.

We've been there when things go to black. We know the pressure to correct the problem fast. Who needs ulcers! You don't. We don't. So we design maximum redundancy into all our equipment.

But when servicing becomes necessary, we've made it so you can get to the trouble fast — and have room to work. It would be so easy to make smaller cabinets for our equipment. But we haven't forgotten that normal size hands do the service work.

## Maybe you too should get to know us.

As so many broadcasters have lately, perhaps you should get to know us, too. Write for a catalog. But if you're in a hurry or have a technical question, call one of our executive group. At Townsend, you won't have trouble getting through to the top.

Circle (33) on Reply Card

**MAIN OFFICE AND MANUFACTURING:** 79 Mainline Drive, Westfield, MA 01085, Tel. 413-568-9581 TWX# 710-356-1521 **OFFICES:** California; 1080 Los Molinos Way, Sacramento, CA 95825, Tel. 916-972-9969 • Indiana; 7725 "C" South River Rd., Indianapolis, IN 46240, Tel. 317-255-7049 • Far East (Bangkok): Box 11-1240, Nana, Thailand 10112, Tel. 2-251-8834

### TOWNSEND T.V. TRANSMITTERS

Our record of station installations in just the last 2 years:

Modesto, CA	Tampa, FL	Topeka, KS
Los Angeles, CA	Lima, OH	Denver, CO
2 transmitters	Albany, NY	Yorkton, CAN
Milwaukee, WI	Gainesville, FL	Portland, OR
Clarksburg, WV	Eugene, OR	Sacramento, CA
Marion, IL	Ibadan, Nigeria	Alabama
Waterbury, CT	Oyo, Nigeria	Palm Springs, CA
Augusta, SC	Tallahassee, FL	Ensenada, Baja, CA/Mexico
Salinas, CA	St. Cloud, MN	Tijuana, Baja, CA/Mexico
St. Louis, MO	Chicago, IL	Canada — 2 transmitters
Derry, NH	2 transmitters	India — 10 transmitters



Howard G. McClure  
Vice President/  
General Manager



Robert J. Anderman  
Director of  
Sales and Marketing



Andrew V. Juettner  
Director of  
Engineering



George R. Townsend  
President

# TOWNSEND

ASSOCIATES, INC.

*The Television  
Transmission  
Specialists*

# AM DAS: Doing it right

By Jeffrey Bixby, A.D. Ring & Associates, Washington, DC

The pattern of any AM directional antenna system (*array*) is determined by a number of factors, including the electrical parameters (phase relationship and ratio of current in each tower), the height of each tower and the location of each tower with respect to the other towers (particularly to the reference tower). Electrical parameters are, to a greater or lesser degree, adjustable, and tower height is not always open to question. This discussion focuses on the importance of correctly locating the towers of a directional system during construction and ways to ensure that they are placed correctly.

An array consists of two or more towers arranged in a specific manner on property. Figure 1 shows a typical sketch of a tower layout for a 3-tower array, and the pattern such an array would produce. This is an in-line array, meaning that all the elements (towers) are in line with one another. Notice that the major lobe is centered on the same line as the line of towers, and that the pattern nulls (minima) are positioned symmetrically about the line of towers, protecting co-channel stations A and B at true bearings of 315° and 45°, respectively.

Figure 2 shows the same array, except that it has been rotated by 10°. Notice that the pattern shape is not changed, but the position of the major lobe and the nulls follow the line of towers. Also notice that the nulls no longer are pointed at the stations to be protected. Figure 3 and Figure 4 show that the position of the nulls can be changed by varying the electrical parameters so that one or the other can be pointed in the required direction, but not both. Also, when this is attempted, the size and shape of the small "back" lobe is changed, as is the shape of the major lobe, especially the radiation on the line of towers.

If we imagine a directional antenna system constructed on a gigantic lazy Susan or turntable, we can rotate the pattern without affecting its shape. But, to accomplish the required protections and to have the major lobe(s) oriented in the right direction, there is

only one correct position. In most cases, the position of the towers will be specified with respect to a single reference tower. The location of the other towers will be given in the form of a distance and bearing from that reference. Occasionally, a reference point, usually the center of the array, will be used. In any case, it is critical that each tower be in the correct place.

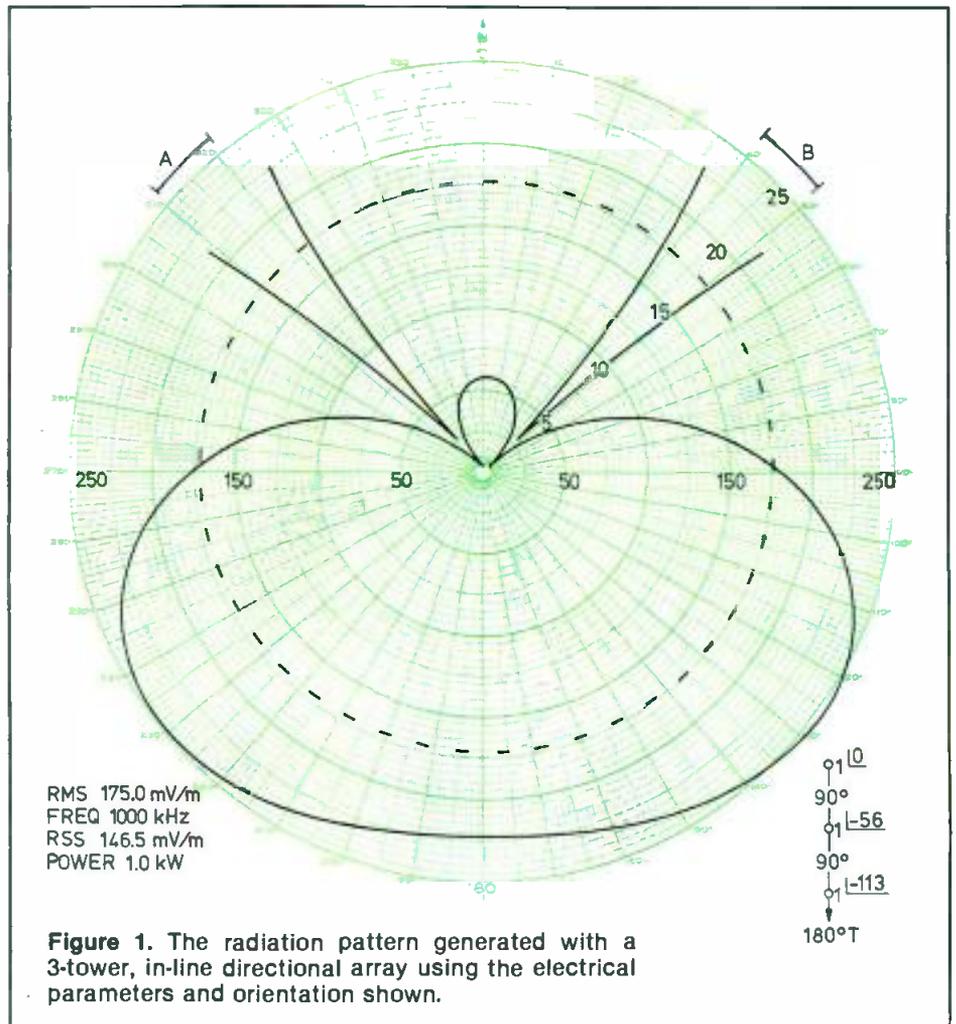
## Bearing

The bearing or azimuth of the towers from the reference tower or point almost always will be specified in degrees from true north. The distinction between true and magnetic

north is vital. In my experience, failing to make this distinction has caused the greatest number of errors in tower placement. Often, surveyors charged with locating power positions attempt to use a magnetic compass and mathematical calculations to determine true north. Some have even used magnetic north rather than true north, which resulted in considerable error.

The magnetic North Pole is not at the true or geographic North Pole. (In fact, it is in the vicinity of 74° north, 101° west, in the islands of northern Canada.) The difference between magnetic and true bearings is called

Continued on page 58



# COMARK

## Comark's RF Transmission Lines and Components

*Simply Superior*



Comark has continuously been the leader in innovative UHF television transmission technologies. The same superior quality, reliability and competitive pricing found in our TV transmitters are also available in our complete offering of transmission lines, components and accessories. For all of your RF needs, Comark's products will meet or exceed your most demanding technical requirements.

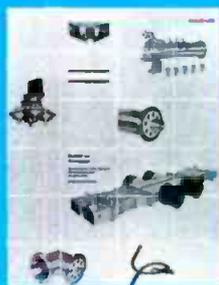
Major product component categories that are offered by Comark:

- Coaxial Transmission Lines
- Waveguide Transmission Lines
- FM Transmitting Antennas
- Elbows
- Couplers
- UHF Diplexers
- Low Pass Filters
- Color Notch Filters
- RF Patch Panels
- Power Dividers
- Quadrature Hybrids
- Switches
- Tuners
- Quickstep Transitions
- VHF Diplexers
- Gas Barriers
- Hangers
- Flanges
- Anchor Connectors
- Clamps
- End Caps
- Impedance Transformers
- Insulators
- O Rings
- Phase Shifters
- Sleeve Couplings
- Turnkey Systems

For your free, engineering design manual/product guide, contact John Molta today.

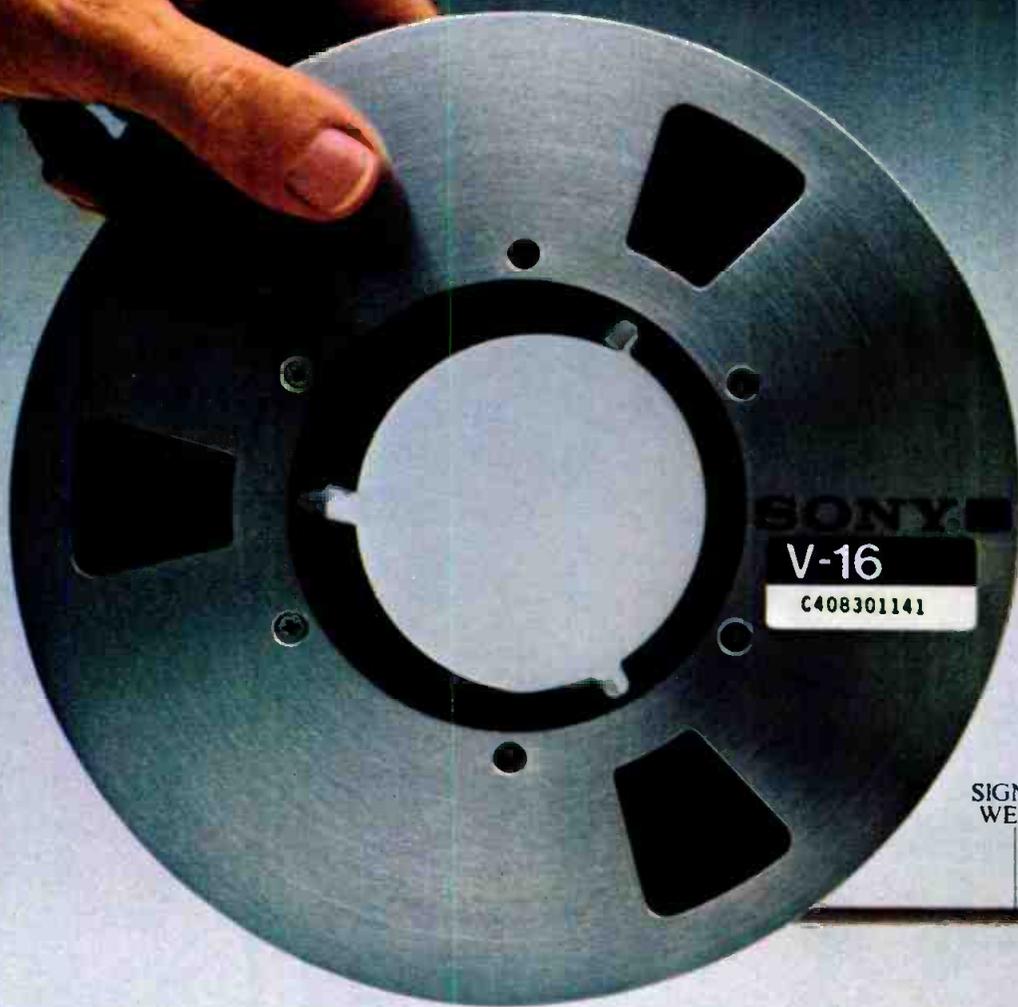
## COMARK

International Headquarters  
P.O. Box 229  
Rt. 57, Feeding Hills Road  
Southwick, MA 01077  
(413) 569-0116 569-5939  
Telex: 95-1159



Circle (34) on Reply Card

# THE SONY 1" T



	JOGGING DURABILITY	GUIDE WEAR-OFF	VID S/
SIGNAL WEAR		STILL TEST	RF OUTPUT

# TAPE MEASURE.

## THE VIDEOTAPE THAT ACHIEVES THE OPTIMUM BALANCE BETWEEN THESE 16 VITAL ELEMENTS.

What good is a recording tape that gives you a terrific video signal-to-noise ratio but falls short in signal wear? Or one that excels in video sensitivity but is dismal in dropouts? Or, for that matter, one that reduces head wear but sticks and slips in the jogging mode?

The answers bear the simplicity of common sense: no good. Which is why Sony created the yardstick for all 1" videotape: the Sony V-16.

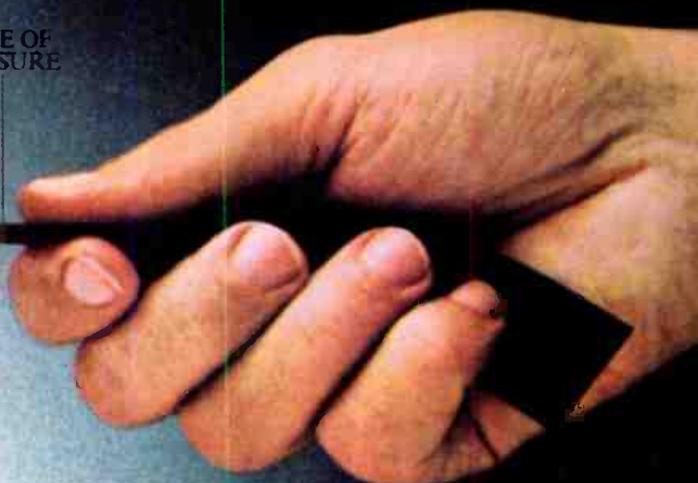
The V-16 is based on the assumption that the only good tape is a perfectly consistent tape. And to achieve this consistency Sony has developed exclusive tape production techniques, created special binding materials, lubricating oils and additives. And then each batch of V-16 is submitted to over 16 quality-control checks where meticulous attention is paid to every detail from dropouts to print-throughs.

Any Sony tape that isn't perfectly balanced in picture quality, runnability, durability and audio will never find its way into your editing suite.

So if you're looking for the best overall performance in a 1" tape, look for the one that's superior **SONY** in 16 points, not just some of them: V-16 from Sony. Industrial Tape Division

© 1984 Sony Tape Sales Company, a division of Sony Corporation of America, Sony Drive, Park Ridge, New Jersey 07656. Sony is a registered trademark of Sony Corporation.

DROP-OUT	AUDIO OUTPUT UNIFORMITY	AUDIO S/N	HEAD WEAR	EASE OF ERASURE
COLOR S/N	AUDIO SENSITIVITY	FREQUENCY RESPONSE	RUBBING NOISE	PRINT-THROUGH



WIDEBAND COMPOSITE/  
NARROWBAND  
SINGLE & DUAL CHANNEL  
950 MHz

**STL**  
INTER CITY RELAY



PTS-10C  
TRANSMITTER

PRS-10C  
RECEIVER

\$5750

from

**Micro Controls, Inc.**

Deliver the purest sound possible with MCI's Wideband Composite/Narrowband Single and Dual Channel, Studio Transmitter Link. With superior phase response over the entire baseband and faithful performance even in congested and intense RF fields, MCI sets the industry standards for quality broadcasting. Ask about our 5 year pro-rated warranty.

**REMOTE  
CONTROL  
SYSTEMS**



\$2450  
Analog Display

Digital Readout Available on  
Studio Unit

Visit Us At NAB Booth #104  
Call or write today for more  
information.

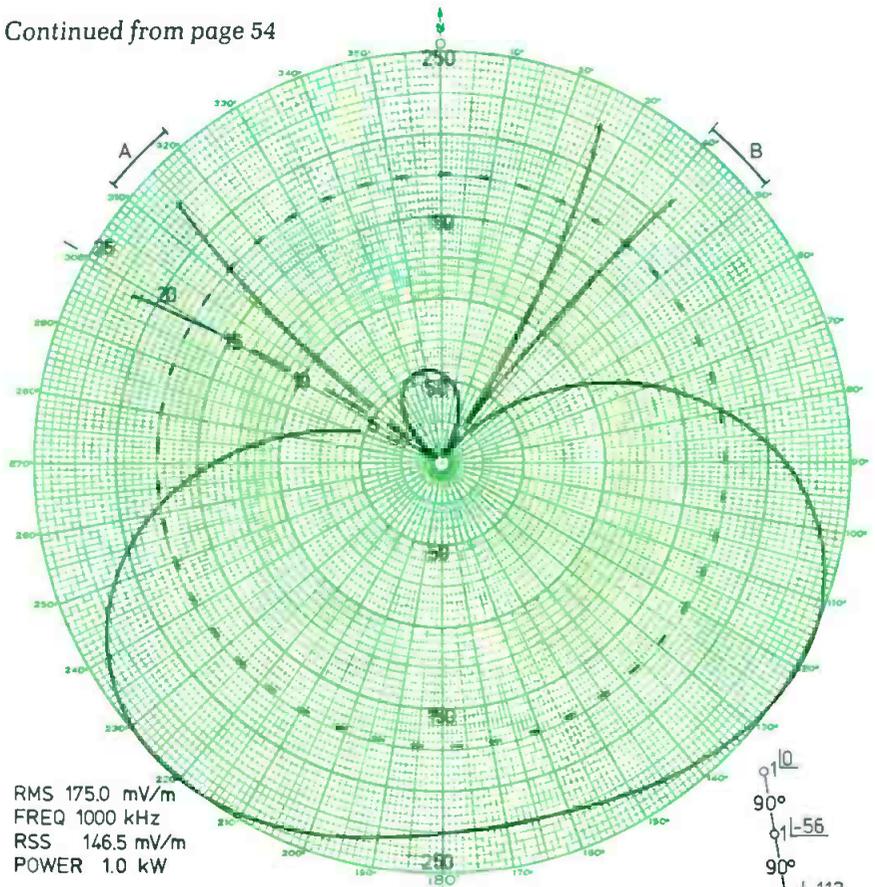
**mci**

**Micro Controls, Inc.**

P.O. Box 728  
Burleson, Texas 76028  
(817) 295-0965

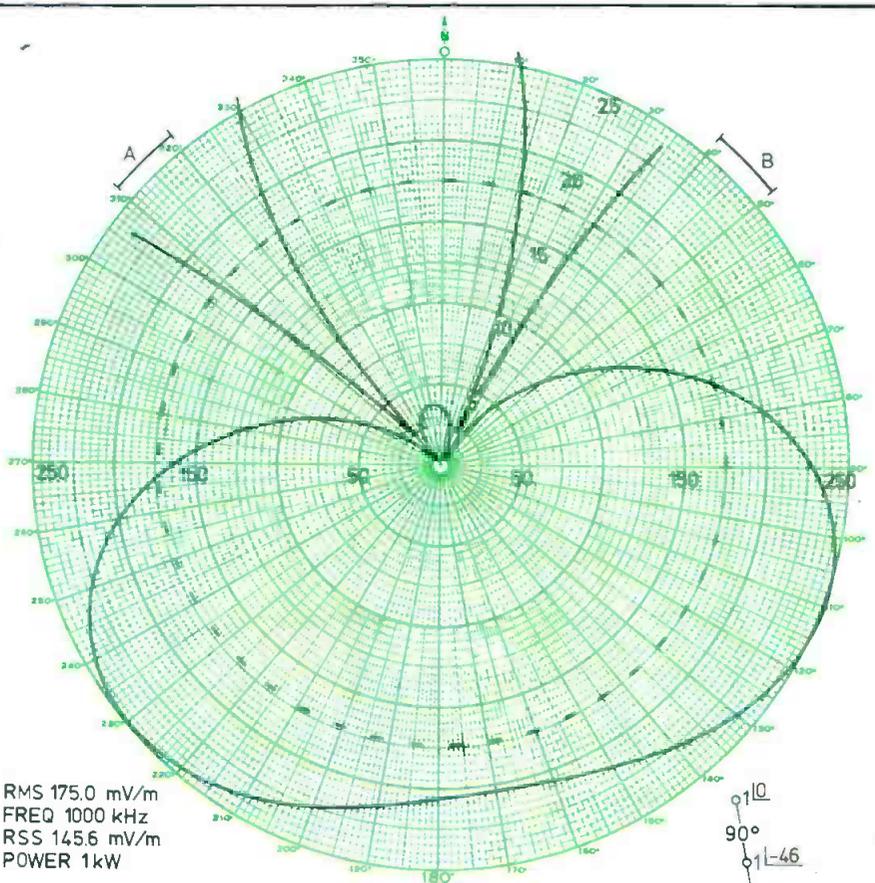
Circle (35) on Reply Card

Continued from page 54



RMS 175.0 mV/m  
FREQ 1000 kHz  
RSS 146.5 mV/m  
POWER 1.0 kW

Figure 2. The radiation pattern produced when the directional array of Figure 1 is rotated to a new orientation.



RMS 175.0 mV/m  
FREQ 1000 kHz  
RSS 145.6 mV/m  
POWER 1kW

Figure 3. The directional pattern generated with the orientation shown in Figure 2, but with different electrical parameters.

The MTR Series Recorders

# WHY IT'S OTARI FOR MORE POST-PRODUCTION PROS.

Today's hot topic is audio post-production. At Otari, it was a hot topic years ago—and still is.

In 1979, we introduced the MTR-90 multi-track recorder which featured our new pinchrollerless tape drive system. It was quickly accepted as a superior performer under synchronizer control—with faster search and lock-up for quicker, easier sessions.

In 1980, we introduced the MTR-10/12 1/4-inch and 1/2-inch machines—the industry's first with microprocessor-controlled transports.

In 1981, the Series II MTR-90 provided even faster, more accurate tape handling, and was the first audio machine to offer

a serial port for computer control of the transport functions.

Along the way, we've worked with every major synchronizer and video editor manufacturer to provide our customers with the interfaces they require. Synchronizer interface connectors are now standard equipment on all MTR Series recorders.

**Our commitment to audio post-production continues.**

In 1983, we adopted the IEC standard for center-track SMPTE/EBU time code recording on 1/4-inch tape. We also developed a 1/2-inch C format audio layback recorder conversion kit for the MTR-90, and an RS232C Serial control port for the MTR-10/12.

Now, we're introducing the EC-400

Series, an advanced tape speed resolver capable of phase lock over a  $\pm 30\%$  frequency range.

These are just a few of the ways we've delivered on our commitment to the audio post-production professional. To get the complete picture, contact your nearest authorized Otari dealer.

**Otari Corporation**  
2 Davis Drive  
Belmont, California 94002  
(415) 592-8311 Telex 910-376-4890



Circle (36) on Reply Card



The EC-401 Resolver: A precision speed controller with Widelok™—Everything necessary to lock a tape machine's speed control track to any internal or external time base reference. Available as a compact, rack mount package, or for the MTR-10/12 as a plug-in module.



Post Sound, Los Angeles

*Technology you can Trust.*

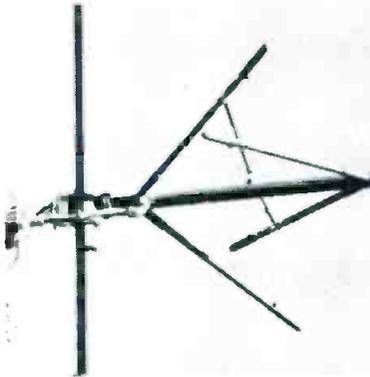


# Cetec Antennas

**WHY BUY JUST AN ANTENNA? WITH A CETEC ANTENNA YOU GET:**



★ HIGH QUALITY ★  
TWO YEAR WARRANTY  
PERFORMANCE THAT'S UNEQUALLED  
RECOGNIZED SUPERIORITY



In today's competitive FM market, you have no reason to consider an antenna that's not the very best. That means a tried and proven Cetec antenna. Over one thousand JSCP Penetrators have built this reputation, and other Cetec models support higher or lower power requirements.

**NOW, DON'T YOU WISH YOU HAD A CETEC? THE EDGE IN PERFORMANCE!**

**CALL THE FACTORY OR YOUR CETEC DEALER**

Cetec Antennas  
6939 Power Inn Rd.  
Sacramento, CA 95828  
Tel: (916) 383-1177  
Telex: 377 321

Circle (37) on Reply Card

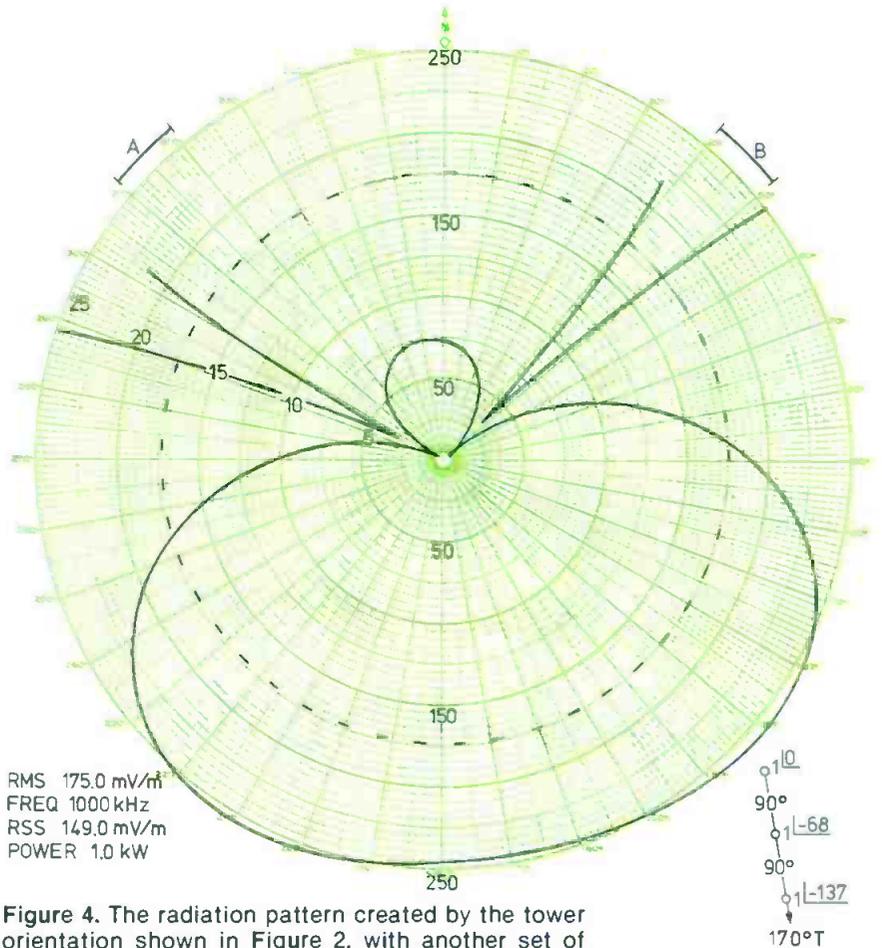


Figure 4. The radiation pattern created by the tower orientation shown in Figure 2, with another set of electrical parameters.

variation or magnetic declination. Declination, a term generally used by surveyors, varies for different locations. It is not a constant. The earth's magnetic field is subject to a number of changes in intensity and direction. These changes take place over daily, yearly and long-term (or secular) periods. The secular changes result in a relatively constant increase or decrease in declination over a period of many years.

In addition to declination, the magnetic fields of the earth are subject to local disturbances, some of which may be severe. In many cases, there may be no way to tell that such a disturbance is present, opening the possibility of considerable error. In short, there are a number of potential errors that can defeat the most careful attempt to locate true north.

The direction of true north can be determined accurately and directly by one of two commonly used methods. A detailed discussion of these methods is beyond the scope of this article, but a general description may be useful.

The first and most common method involves observing the polestar (Polaris). Generally accomplished at dusk, a Polaris shot, or rather a series of such shots, must be reduced by

referring to tables and computations to arrive at true north. This method is well-known, and results accurate to within 0.5' of angle (1/120°) are achieved readily.

The second method involves a solar observation taken at least two hours before or after noon. Accuracy to within 2' of angle (1/30°) is achieved easily. Higher accuracy can be obtained with a series of such shots, given accurate time information obtained easily from WWV. Time signals from WWV are available 24 hours a day by short wave or by calling the National Bureau of Standards (NBS) at 303-499-7111.

Required tables, information and procedures are published annually by the Keuffel and Esser Company in a booklet titled, *Solar Ephemeris*. Of course, major surveying firms should have the required data and expertise to perform either procedure easily and accurately.

Often, surveyors unfamiliar with the degree of accuracy required in this work attempt to locate true north by referring to existing roads, property boundaries or state grid systems. This approach involves nearly as much effort as the celestial methods outlined previously, and because such references frequently are questionable,

The IVES \$6950 all-inclusive editing system outperforms others costing up to twice the price. If you include their add-ons, they cost more money than IVES. If you don't include their add-ons, they don't offer the features of IVES. And with or without add-ons, IVES outperforms them all! Check it out in the Price/Performance Chart. You'll find a lot of blank squares and a few add-ons.

The revolutionary IVES editing system is a complete postproduction 2-VTR system that offers precision SMPTE Time Code or control track editing as well as all pre- and post-editing functions. The exclusive VideoMaster™ control allows you to perform seven different motion control and edit preview functions from a single control. No other editing system even comes close.

The IVES system is the all-in-one affordable, easy-to-operate, self-contained package—no “a la carte” option pricing and no add-ons. There are no cable reconnections required for automatic dubbing or pre-stripping tape. Its user-friendly design and rugged quality construction make the IVES system the “intelligent” choice for any broadcast, electronic news gathering (ENG), cable, corporate or professional video operation.



# Compare The IVES™ Editing System For Price/Performance... There's No Comparison

And delivery is now. Call or write for brochure or the name of your nearest EECO authorized distributor. EECO Incorporated, 1601 E. Chestnut Ave., Santa Ana, CA 92701, Tel (714) 835-6000, TWX 910-595-1550, Telex 67-8420.

The IVES editing system is brought to you from the people who designed the first practical time code editing system.

## EECO®

Computer Controls for Video Production

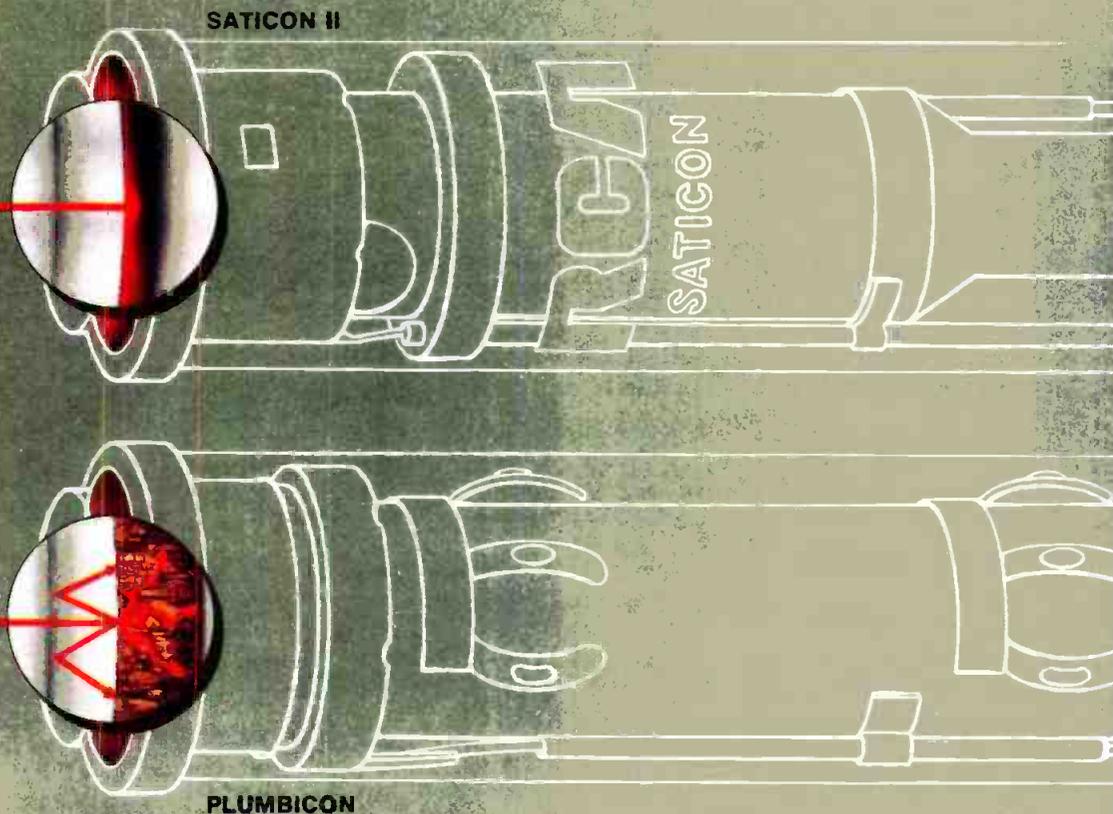
CHECK IT OUT . . .								
EDITING FEATURES	EECO	CONVERGENCE	JVC	PANASONIC			SONY	
	IVES	ECS-90S	VE-92	NV-A500	NV-A970	AU-A70	RM-440	BVE-800
SMPTE time code editing	✓							
Built-in pre-stripping capability	✓							
Built-in audio mixer	✓							
Built-in audio/video routing switcher	✓							
Programmable audio/video fades	✓							
Non-volatile memory	✓							
Printer output	✓							
"Mix and match" VTRs with smart interfaces	✓							
Price	\$6950							

COMPARE THE IVES EDITING SYSTEM WITH THESE... YOU'LL FIND A LOT OF BLANK SQUARES AND A FEW ADD-ONS.

Circle (38) on Reply Card



# Part of your best work may never get past your camera tube.



What you see is not always what you get. The character and quality of your pictures are dependent to a significant degree on the camera tubes you use.



With high performance Saticon\* II tubes, you can expect distinctively cleaner, clearer and sharper pictures. The reason lies in Saticon II's newly improved photoconductor. Developed through computer-aided processes, this thin glassy film allows the light to pass through without color diffusion or distortion. The end result is high resolution, distortion-free color, very low lag, high sensitivity and depth of modulation. Highlight memory (without red trail) is also significantly reduced with Saticon II.

With Plumbicon™ tubes, the polycrystalline structure of the photoconductor causes diffusion of incident light. The



Plumbicon photoconductor is three times thicker than Saticon II's, which limits its resolution.

Make sure your best work gets past your camera and on the air by specifying high performance Saticon II camera tubes in your original equipment and for tube replacements.

For our guide to camera tube selection, contact your RCA distributor or write to RCA Camera Tube Marketing, New Holland Avenue, Lancaster, PA 17603. Or call (800) 233-0155. In Penna., phone collect to (717) 397-7661. Overseas, contact RCA Brussels, Belgium. Sao Paulo, Brazil. Sunbury-on-Thames, Middlesex, England. Paris, France. Munich, W. Germany. Hong Kong. Mexico 16 DF, Mexico.

**RCA**  
Take out the doubt.

\*Used by permission of trademark owner.

Circle (40) on Reply Card

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

# ADDA doe

## MAINFRAME

Modular dual-channel video processor, disk drive controller and switching effects

## CONTROL PANEL

Compact master or remote unit with dedicated keys for still store record/retrieval plus digital effects switching

## ENGINEERING REMOTE

Proc amp controls for each video processing channel

In 1977, ADDA introduced ESP... the Electronic Still Processor. In 1981, the ADDA ESP-C introduced the world to ESP Graphics... multi-layer digital graphics using conventional art techniques.

In 1984, we've done it again!

ESP II combines the digital still store know-how gained from hundreds of ESP system installations, with the modularity and digital effects pioneered in our remarkable family of video processors.

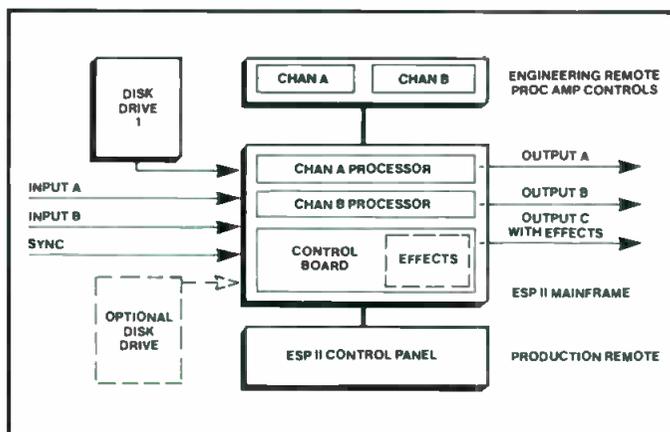
With ESP II, smaller TV stations, cable operations and production houses... even industrial and educational systems can move up to the benefits of quality still store graphics generation and control.

ESP II is a significant contribution to still store technology, combining improvements in disk storage with innovative work in integrated circuits and electronic packaging to create a low-cost, modular system which will extend the use of this versatile production tool to users with smaller budgets.

# s it again.

ESP II . . . dual-channel digital still store break-through combining high signal transparency and modular convenience for cost-conscious graphics generation, still storage & retrieval . . . *plus* digital effects transitions between channels.

The two-channel system with digital effects and a 400-still capacity is priced at \$25,990 plus drives.



Picture quality is comparable with other ESP systems, as ESP II retains the 8-bit, 4-times subcarrier sampling scheme and, since the disk drive data format is the same as well, drives may be passed between systems or even shared in a dual-port configuration. Most popular disk drives can be used.

ESP II can function as two independent freeze frame synchronizers, with a separate third channel for digital effects transitions . . .

horizontal and vertical wipes, fades and dissolves, and *pushes and pulls* (effects not found on normal production switchers).

Control panel measures only 3½ by 19-inches, with dedicated pushbuttons for all key commands and transition effects.

See ESP II in action during our "road show" demonstration tour of major cities. Check with your local ADDA office or write for a schedule.



Learn why "Affordable Excellence" is more than just a slogan.

**ADDA CORPORATION**

Affordable Excellence

130 Knowles Drive, Los Gatos, CA 95030 (408) 379-1500

# The status of SCA

By Jerry Whitaker, radio editor

Broadcasters are, generally speaking, a cautious group of business people who look before they leap into a new concept or technology. The opportunities presented to FM broadcasters by deregulation of the subsidiary communications authorization (SCA) channel is no exception. Despite speculations of large financial returns from SCA use, there has been no stampede to subchannel services. This situation may change, however, as financial realities catch up with technical innovations.

**Broadcast Engineering** conducted a survey late in 1983 of radio and TV station personnel to determine purchasing plans and technical improvement schedules. (See "Research Report: State of the Industry," *BE* December 1983, page 96.) One of the questions included in our survey concerned the use of SCA capabilities by FM stations. The response to that question is shown in Table I. More than one-third of the stations in the Top 50 and Below Top 100 markets said that they currently use their SCA for program or data transmission. Those numbers will change dramatically in the next few years if the response to the next question is any indication. A full 50% of stations in the Top 50 to Top 100 markets said that they planned to become involved in SCA activity to some extent. Stations in the Top 50 markets also showed significant interest in SCA use.

The drawback generally cited to full use of the FM baseband above 53kHz is the need to back off main-channel modulation to prevent overmodulation of the total carrier. The back-off requirement may be reduced, however, by future FCC action that would allow modulation exceeding 100% when one or more subcarriers is being transmitted. This proposal is based on field and laboratory tests that show main-channel modulation

Table I.  
BE questionnaire results on SCA activity.

Category \ Market	Top 50 Markets	Top 50 to Top 100 Markets	Below Top 100 Markets
Stations that currently use SCA	35%	15%	36%
Stations that plan to use SCA	44%	50%	23%
Stations that have no current plans to use SCA	21%	35%	41%

back-off is unnecessary for bandwidth compliance, if certain conditions are met. (See "Modulation Levels During SCA Transmission" on page 76.)

Another problem that worries some FM broadcasters is the possibility of high frequency birdies (beat notes) that can be generated in the demodulator of certain older-design receivers due to intermodulation of portions of the main-channel (stereo) and SCA signals. This problem largely has been overcome through improved receiver design, however, birdies may remain troublesome for years to come with older units still in use. Until audiences upgrade their receivers to newer, quality radios, this situation will persist to some extent.

Another cause of poor SCA performance is improper transmitter tuning and high transmit antenna VSWR. If an FM transmitter generates excessive synchronous AM, subcarrier performance will be compromised. Synchronous AM (also referred to as incidental AM) is caused by one or more narrow bandwidth stages anywhere in the RF chain from the exciter to the power amplifier (PA) tube.

For many transmitters, the point of minimum synchronous AM is not coincident with maximum power. Special techniques must be employed in tuneup of a transmitter for greatest bandwidth and lowest synchronous AM.\*

### New equipment for new expectations

We are seeing now in the field of SCA equipment what occurred a number of years ago with FM stereo generators. Manufacturers have taken a second look at SCA gear with an eye toward top performance. In the past, subcarrier generators were often treated as an afterthought by manufacturers and users. Designs did not change much over the years. Now, however, many of the advances made in stereo generator technology are being applied to SCA equipment.

An example of this trend is the new subcarrier generator system developed by Circuit Research Labs (CRL). The integrated system includes

\*See "Multipath Distortion Reduction Through RF Amplifier Optimization" by Edward A. Schober, *Broadcast Engineering*, May 1983.



# the trendsetters

Unquestionably the industry's standard of excellence  
in broadcast equipment

Our TOMCAT cartridge recorders/reproducers  
and BMX series of broadcast consoles  
deliver trendsetting on-line performance  
in broadcasting systems world-  
wide, from Boston to L.A.,  
Australia to Great Britain.

**TOMCAT:** simply the world's finest. Innovative  
design assures superb sound quality, reliability, and  
low noise operation.

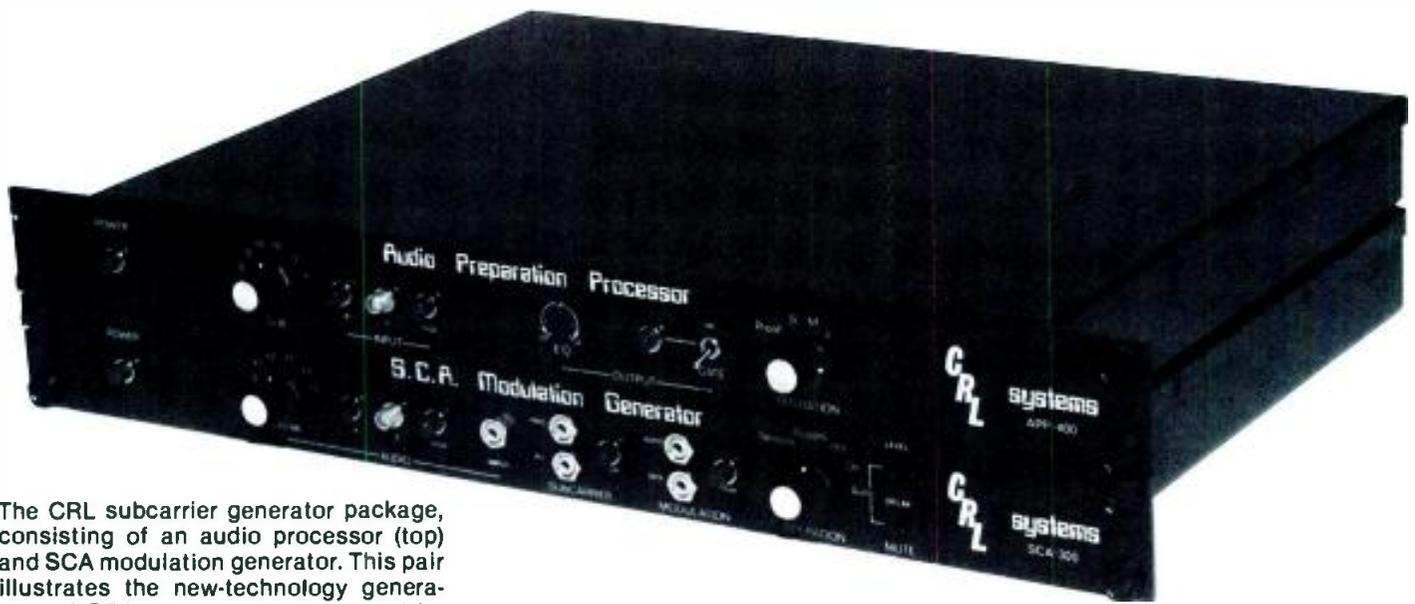
**BMX, Series II:** the ultimate in high performance  
mixing consoles.

Call or write today for free information on our  
complete line of equipment.



PACIFIC RECORDERS & ENGINEERING CORPORATION

2070 Las Palmas Drive - Carlsbad, CA 92008 - 619-438-3911 - Telex: 181777



The CRL subcarrier generator package, consisting of an audio processor (top) and SCA modulation generator. This pair illustrates the new-technology generation of SCA systems manufactured by several companies.

audio processing, a low distortion crystal-controlled digital carrier generator, non-overshooting low-pass filters, pre-emphasis and a dc-coupled data input port.

Audio processing consists of a multiband limiter that incorporates a 150 $\mu$ s pre-emphasis curve (others can be selected in the field) and filters to tailor the low and high frequency response of the input audio. CRL's patented, non-overshooting low-pass filter is designed to protect the main-channel signal from SCA interference. Internal jumper plugs on a digital divider chain determine the subcarrier frequency, which can range from 40-115kHz. A digital automatic frequency control (AFC) maintains the subcarrier frequency within tight limits. The SCA carrier is formed by a digital staircase generator circuit.

Another new technology SCA generator is the Modulation Sciences Sidekick, which offers several unique features. The Sidekick, shown in Figure 1, includes a built-in generator and detector for adjustment of minimum incidental AM, an accurate peak-and-hold deviation meter and integral audio processing. A crystal-controlled frequency synthesizer generates any SCA subcarrier desired.

As shown in Figure 1, a composite (stereo) signal can be input to the Sidekick and mixed with the internally generated SCA signal to produce a composite output that is fed into the broadband input of the exciter. This provision satisfies FCC rules that state: "The addition of FM broadcast subcarrier generators...to a type-accepted FM broadcast transmitter is considered a Class 1 permissive change...provided the transmitter exciter is designed for subcarrier operation without mechanical or electrical alterations to the exciter or other transmitter circuits."\*

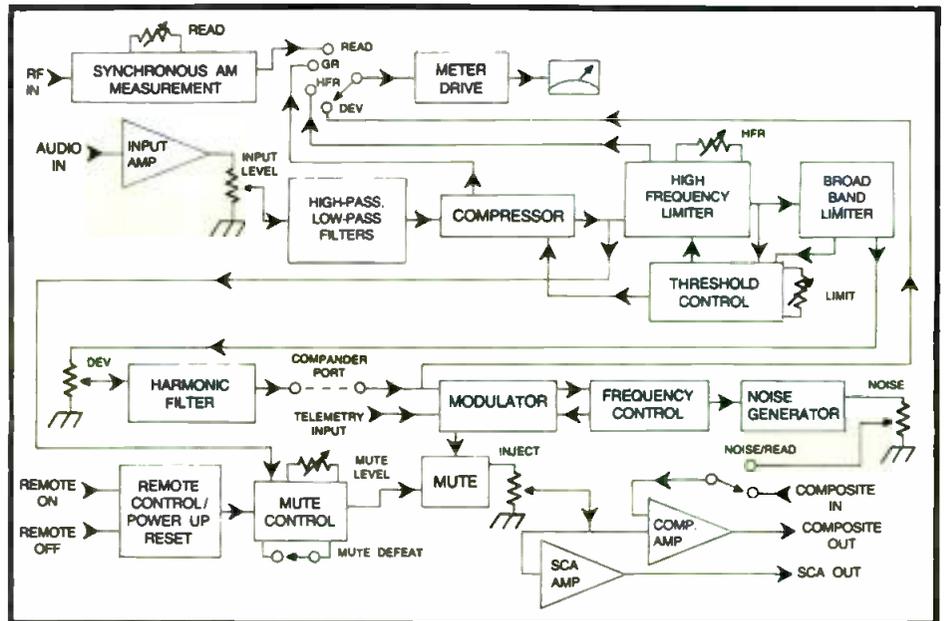


Figure 1. Block diagram of the Modulation Sciences Sidekick SCA generator system. The unit features remote-control capability and a compandor port for external processing of the transmitted signal.

A mixing circuit (such as the one provided in the Sidekick) is an important feature, because some exciters do not have provisions for input of baseband SCA feeds, and the previously mentioned rule prohibits user installation of connectors or circuit board changes for this purpose.

New SCA equipment is manufactured by several other companies. Interested readers are referred to the September 1983 Buyers' Guide issue of BE for a full listing of SCA equipment suppliers and manufacturers.

#### SCA for data transmission

Tests over two New York City FM radio stations have established the feasibility of wide-area SCA data

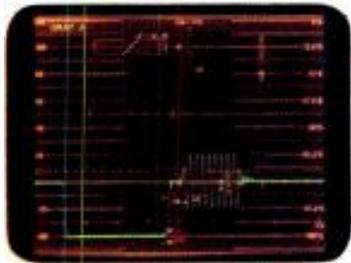
transmission to small, inexpensive receivers. The development program, conducted by Modulation Sciences, with the cooperation of WBAI and WPAT, has shown that data transmission error rates can be as much as five orders of magnitude higher than standard telephone data lines.

Recent FCC deregulation of the FM broadcaster's SCA channel has generated much interest in single-point and multipoint data transmission arrangements. Technical restrictions on SCA systems also have been relaxed, permitting the subcarrier to be directly modulated in any mode (for example, AM, FM and SSB). The only requirement is that the subchannel signal not exceed the allowed bandwidth or generate excessive cross-talk into the main (stereo) channel.

The Modulation Sciences study of the SCA market shows that it will be economical for organizations that send large amounts of data one way to use subcarriers as the transmission medium. Data flowing in the opposite

\*Section 2.1001(h) of the First Report and Order BC No. 82-536, page 24.

# JVC engineers another breakthrough in video cameras.



JVC, a world leader in miniaturization of electronic components, brings you a new option at the highest level of production quality cameras.

**ProCam™ Video Cameras!**

They're available in two models: ProCam 950 with LOC diode gun Plumbicon\* tubes, and ProCam 900 with LOC diode gun Saticon\*\* tubes.

Never before has so much been put into cameras this size. One look at the double-sided circuit boards will give you an idea of how packed with features they are. And you'll see the great results every time you use them.

You'll see great picture quality: Better than 600 Lines Resolution... Signal-to-Noise Ratio of 58dB.

You'll see great performance features: Auto-Shift Registration... Automatic White and

Black Balance... Corner Registration Correction... Matrix Masking... Auto Centering... Flare Compensation... Focus Wobbling... Auto Black Level Stabilization... Zebra Stripe Video Level Indicators in Viewfinder... 2H Vertical Contour Correction... Split Field Color Bar Generation... f/1.4 Prism Optics With Built-In Quartz Filter... Stable RS-170A Sync Output with Color Frame.

You'll see great convenience features: Light Weight... A Pickup Tube Protection Circuit... Compact, Solid Aluminum-Diecast Body... Memory Back-Up... Preheating Circuit... Video Recorder Power Save Circuit... LED Viewfinder Indicators... Digital H/V Variable Blanking. You'll see traditional JVC value... traditional JVC



reliability... traditional JVC flexibility. And you'll see them in distinctly untraditional cameras... but cameras whose advanced circuitry is in the unique JVC tradition.

## ProCam™

For more information, call toll-free

**1-800-JVC-5825**

Or write: JVC COMPANY OF AMERICA  
Professional Video Division,  
41 Slater Drive, Elmwood Park, NJ 07407  
JVC CANADA, Scarborough, ONT.

**Someday  
others will build  
3-tube color  
cameras like JVC.  
Not yet!**



© 1983 JVC COMPANY OF AMERICA

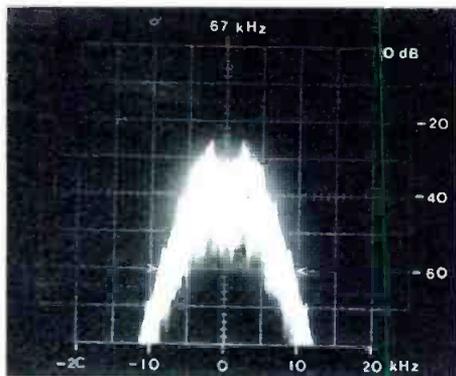
ProCam is a trademark of US JVC CORP

\*"Plumbicon" is a registered trademark of North American Philips Corp.  
\*\*"Saticon" is a registered trademark of Hitachi Denshi, Ltd

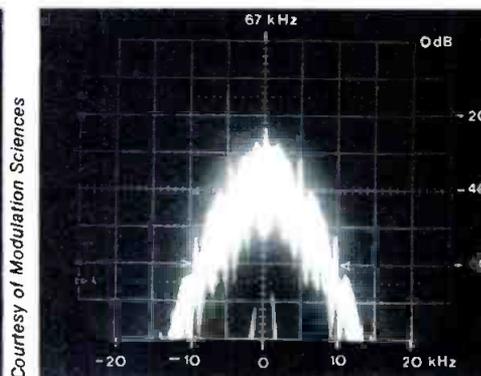
# JVC®

JVC COMPANY OF AMERICA  
Professional Video Division

Circle (43) on Reply Card



(A)



(B)

Courtesy of Modulation Sciences

Shown are off-air spectrum analyzer displays of SCA bandwidth with various types of modulation used in the Modulation Sciences tests. The SCA injection level is 10%. In photos (A) and (B), 0dB is equal to 100% modulation of the main FM carrier. Photo (A) shows the SCA channel modulated with 1200 bits/s audio frequency shift keying (AFSK) data. The occupied bandwidth is 18kHz (to the -60dB points). Photo (B) shows the same subchannel, but with direct carrier modulation at a 4800 bits/s rate. The occupied bandwidth is 20kHz (to the -60dB points). This figure still leaves a 4kHz guard band before the upper edge of the stereo subcarrier channel at 53kHz.

## THE LEGEND LIVES



### LJ-12

#### AUDIO TAPE RECORDER/REPRODUCER

1. Complete microprocessor control of all transport and audio functions resulting in unprecedented operational stability and flexibility.
2. SMPTE compatible with versatile accessory connector containing all vital signals, including RS-232 serial input and output.
3. Digital adjustment and storage of audio parameters eliminates trimpots and allows front-panel adjustment and multiple alignment settings in non-volatile memory (no batteries).
4. Most accurate vari-speed ever offered, with precise digital control of capstan speed from 3 to 36, IPS, and real-time vari-speed correction of the tape timer display.
5. Simplicity by design — in operation and construction.

# LJScully

THE L.J. SCULLY MFG. CORP.  
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.  
203/368-2332

## THE ORIGINAL SCULLYS

Circle (44) on Reply Card

direction, for users requiring some amount of 2-way traffic, can be relayed economically by dial-up telephone circuits, if the back-haul does not exceed 10% of the total information flow.

In recent years, data transmissions have been tried over the SCA channel employing audio frequency shift keying (AFSK). This method, however, requires a good S/N ratio (greater than 20dB) for reliable performance. The practical limit of AFSK, or indirect data modulation of the subcarrier, in a 5kHz channel is 2400 bits/s, according to the Modulation Sciences research.

Based on this information, the company has come up with a system that takes a different approach, namely, shifting the frequency of the FM subcarrier directly. The benefits of using this direct data modulation technique, according to the study, are that a lower S/N figure (typically 12dB) is required for reliable operation, higher data rates (4800 bits/s) can be accommodated, and decoder circuits are simpler and less expensive to build. If required, data rates of up to 9600 bits/s can be transmitted over a single SCA channel by using special encoding schemes.

The main concern most engineers have regarding high speed data transmissions on their SCA channels is the fear of excessive cross-talk into the L+R and L-R channels. Photos (A) and (B) show that even with a high data rate of 4800 bits/s, no excessive bandwidth problems are encountered.

The New York City tests have shown the following results:

- Error rates are greater than one in 10 million (1:10<sup>7</sup>), as opposed to the telephone company typical figure of one in 100,000 (1:10<sup>5</sup>), or lower in some cases.
- Acceptable reception extends 30-40 miles from the transmitting antennas, which are located atop the Empire State Building and the World Trade Center in New York. Both stations involved, WBAI and WBAT, are Class B operations.
- Simple indoor whip antennas



**Quad-Eight** Automated Custom  
Console, Alfred Hitchcock Theatre,  
Universal Studios.

# Thoroughbred

The lineage of the  
248 Component Series  
includes the largest and  
most sophisticated audio  
consoles in the world, and  
over 50 years of Westrex  
film and recording expertise.  
248—a manufactured console  
with custom capabilities and  
an uncompromised heritage—  
Quad Eight/Westrex quality  
and experience!



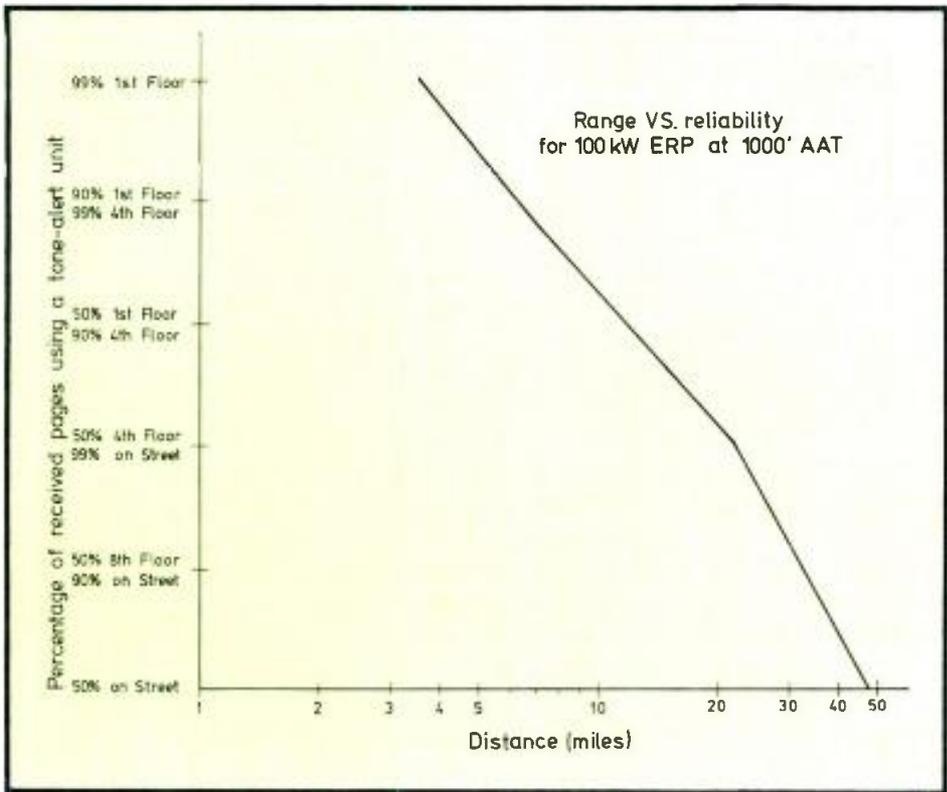
**quad eight/ Westrex**

11929 Vose St., No. Hollywood, CA 91605 USA • Telephone: 818-764-1516 Telex: 662446

Unit 1, Fairway Dr., Bilton Fairway Industrial Estate Greenford, Middlesex UB6 8PW England • Telephone: (10)578-0957 Telex: 923003

Circle (45) on Reply Card

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



**Figure 2.** This graph plots range vs. reliability data received from the Seattle SCA tests. The transmitter power (ERP) is 100kW and the antenna height is 1000 feet above average terrain. Ten percent injection of the subcarrier is assumed. This chart applies only for tone-alert paging, which gives the greatest coverage range and is the predominant method of paging in use. The paging industry generally considers 90% reliability to be the minimum acceptable for most applications.



The Motorola SCA-1000 Tone Alert radio pager can be set to receive SCA transmissions from any one channel in the FM broadcast band.

seem satisfactory in many instances for data reception, at some increase in error rate.

- The analog S/N ratio (which is measured easily) can be used to reliably predict the digital error rate. This fact allows simple and accurate monitoring of the datalink.

- The grey area between accurate and inaccurate reception is small. In technical terms, the knee of the error rate is sharp. That is, the data signal tends to be highly accurate, up to a predictable and sharp SNR point.

Potentially, the method of SCA transmission proven in the New York tests could result in two new data channels per FM station, each with an error rate better than typical telephone company data loops. Perhaps the most important factor to the end user is that this type of system can be assembled with existing technology at a price that is, in many applications, less than conventional wired facilities.

The equipment used in the New York City tests included a new data version of the Modulation Sciences Sidekick SCA generator, two modified SCA receivers and an error rate data indicator.

**SCA for paging**

The new application that most often comes to mind when SCA use is discussed is the personal paging business. Tests on the feasibility of this idea have been conducted in a number of cities by several manufacturers.

One of the programs, sponsored jointly by the National Public Radio (NPR) Ventures Division and Motorola Communications, involved walk-around tests in the Seattle area. Reliability determinations were made for reception in various parts of the city, including high-rise office buildings on a tone-only page receiver. Generally speaking, reception inside office buildings was considered less than acceptable in many cases. However, street-level and suburban-area reception was good. (See Figure 2.)

These results are not surprising, given the nature of SCA broadcasting. FM stereo reception is difficult using a small whip antenna inside a large office building because of the steel and concrete construction usually used. It is no surprise, then, that SCA paging would be marginal in those same areas. It is a safe assumption that an area giving poor reception of an FM station (using a portable radio with the whip antenna collapsed) also will give poor SCA paging reception, if transmitted on that station.

The SCA channel has some well-known deficiencies built into it, namely low injection levels (10% typically),

**Table II.**  
Maximum power output (ERP) and maximum antenna height above average terrain (HAAT) for various classes of service.

Class	Maximum ERP	Maximum HAAT	De-rated value for 10% SCA injection*
Class B FM	50kW	1500 feet	5kW (when at maximum HAAT)
Class C FM	100kW	2000 feet	10kW (when at maximum HAAT)
35MHz and 43MHz RCC	500W	500 feet	*The de-rating shown is an approximation of the effective SCA power resulting from 10% injection of the subcarrier. The listed figures are, in all likelihood, overly optimistic. An accurate determination of the true effective SCA power is the subject of debate at this time.
150MHz RCC	500W	500 feet	
900MHz RCC	1kW	1000 feet	

# The Orban 424A Studio Optimod.

## Explained by us.

**GAIN REDUCTION:** Shows gain of the VCA (0 to -25db). Shows the effect of any control but OUTPUT TRIM and DE-ESSER.

**INPUT ATTENUATOR:** Adjusts drive to compressor/limiter, determining amount of G/R.

**ATTACK TIME:** Adjusts speed of response to input level increase. Fast: Peak limiter & compressor. Slow: Compressor only.

**GATE THRESHOLD:** Determines the input level that causes "gating": VCA gain then moves slowly to IDLE GAIN setting.

**OUTPUT TRIM:** Adjusts VCA gain to control or prevent clipping as required. Effect is seen on VCA LEVEL meter. Not an Output Attenuator (Output Attenuator is located on rear of unit).

**DE-ESSER OPERATE/DEFEAT:** Activates or defeats de-esser control circuitry.

**COUPLED/INDEPENDENT:** Couples A and B gain and gating circuits for accurate stereo tracking.

**COMPRESSION RATIO:** Adjusts compressor from "looser" (2:1) to "tighter" ( $\infty$ :1).

**RELEASE SHAPE:** Linear: Compressor releases at constant rate. Exponential: Release starts slower, then accelerates.

**VCA LEVEL:** Shows peak operating level of VCA. Clipping occurs above approximately +2.

**IDLE GAIN:** Presets VCA gain when in gated condition or anytime unit is DEFEATED. Used for smoothing out transitions and for decreasing audible action of compressor.

**OPERATE/DEFEAT:** Activates or defeats gain control circuitry. Does not bypass any circuitry.

**DE-ESSER SENSITIVITY:** Adjusts threshold of de-essing. De-essing increases as control is turned clockwise.

Also available as a single-channel unit: Model 422A. Ask your dealer for a detailed brochure.

## Reviewed by others.

"In addition to the measured performance being very good the subjective impressions of the unit were excellent. This product has many novel and highly practical features all of which are quite simple to use but need not be used if simplified operation is required. Overall a very good compressor/limiter, well made and easy to service."

Hugh Ford, *Studio Sound*  
November, 1983

"Overall, the 422A/424A should prove to be a system of diverse capabilities, able to tackle the widest variety of material—once the user masters its operation. In addition, its solid construction and excellent service documentation should insure years of reliable operation. Such qualities are typical of timeless designs that tend to retain their value long after the accountants have depreciated them away."

John Monforte, *db Magazine*  
July-August 1983

**orban**

Orban Associates Inc., 645 Bryant Street, San Francisco, CA 94107 (415) 957-1067 Telex: 17-1480

Circle (41) on Reply Card



low modulation levels (6kHz peak deviation) and susceptibility to multipath distortion. These and other factors make personal pager applications difficult to engineer in urban areas. Radio common carriers (RCCs) overcome office-building difficulties by using multiple booster transmitters. FM broadcasters do not have that option, however. RCC systems also are less susceptible to multipath reception problems.

What the SCA lacks in these areas, though, it makes up for in power. Class B and Class C FM stations have available to them much more effective radiated power (ERP) than a single-transmitter RCC could hope for, as shown in Table II.

If SCA paging has a future, and most broadcasters believe it does, perhaps the best end-user field results will come from tone-only units, rather

than voice types, which require a substantially better S/N ratio for intelligible operation.

The photo (page 72) shows the new Motorola Communications SCA-1000 Tone Alert personal pager, which uses a common binary digital encoding scheme compatible with existing automatic paging terminals and encoders. The SCA-1000 is capable of receiving subcarrier transmissions anywhere within the 88-108MHz FM broadcast band.

The Motorola tone pager was used in the NPR Seattle tests mentioned previously.

Any station considering use of the SCA channel for whatever purpose should first carefully study the technical considerations and market potential for its idea. Broadcasters cannot expect instant riches from their long-dormant SCA channel.

Gene Swanzy, senior vice president, Mutual Broadcasting System, put the

The Modulation Sciences Sidekick SCA generator is available in data or audio transmission formats.

matter into perspective at a recent meeting of broadcasters in Massachusetts. He said that FM stations "can't expect money to shower from the sky with the lease of their FM subchannels, but they can expect a substantial amount of revenue for their station if they are creative and willing to put money and hard work into their SCA business. You must treat SCA as you would any other business, by analyzing your options, researching the market and being wary of overblown claims."

**Editor's note:**  
Those interested in additional information on SCA may contact the National Association of Broadcasters for a publication list and pricing information. Contact NAB Services Department, 1771 N St., NW, Washington, DC 20036-2898.

A detailed look at some of the financial and technical aspects of SCA use also is available from Phillips Publishing. Pricing and delivery information on "Making Money With Subcarriers" can be obtained by writing Phillips Publishing, Suite 1200N, 7315 Wisconsin Ave., Bethesda, MD 20814.

A detailed report from Motorola Communications Division on the conclusions reached from the Seattle tests is available by writing Motorola Paging, 8000 W. Sunrise Blvd., Fort Lauderdale, FL 33322. Ask for the publication, "Subsidiary Communications Authorizations and their Application to Radio Paging."

Information also is available from various SCA equipment manufacturers. [:-:-:-)]

**Nothing compares to Amek's TeleVideo Production console.**

Matchless transparency and more useful features than any post production / video mobile console in its price range.

Call or write for details and specifications

**AMEK TELEVIDEO PRODUCTION CONSOLES**

In the US: AMEK CONSOLES, Inc.  
11540 Ventura Boulevard, Studio City, CA 91604 • (213) 508-9788

In the UK: AMEK SYSTEMS & CONTROLS, Ltd.  
Islington Mill, James Street, Salford M3, 5HW, England • 061-834-6747

Circle (47) 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!**

**\$170 F.O.B. N.Y.**

**AUDIO-VIDEO ENGINEERING COMPANY**  
65 Nancy Blvd., Merrick, N.Y. 11566  
Tel. (516) 546-4239

Available on 10 day free trial

Circle (48) on Reply Card

**"Microdyne's satellite radio network gives us better signal quality and saves us over \$120,000 a year."**



*Paul Stone, General Manager, Georgia Radio News Service*

### Reduced costs — fast payback

State and regional networks need all the money they can save. That's why the Georgia Radio News Service installed a Microdyne SCPC satellite radio network system.

They found that it reduced monthly distribution costs 80% while improving signal quality.



*At Microdyne we manufacture nearly everything in the system, from the precision-molded 5-meter uplink antenna . . .*

Where the network once paid \$12,000 a month for land lines to feed their 105 affiliates, they now lease a 10-dBw carrier on Westar IV for about \$2,000 a month. That results in a savings of \$120,000 a year.

"We expect a fast payback on

the equipment," General Manager Paul Stone adds.

### Greater programming flexibility

But lower costs and superior performance aren't the only advantages of a Microdyne radio network. Our system is frequency agile and has an optional bandwidth selection feature that lets you change formats when you change channels.

That means you can receive any of the many radio programs now being carried on a single satellite. And that gives you more programming options and greater flexibility.

### Turnkey systems

At Microdyne we manufacture nearly all of the components that make up a satellite radio network, from the uplink antenna to the downlink demodulator. And we not only design and build custom systems, we can also manage the complete instal-

lation. So all you have to do is tell us what you need and when you need it.



*. . . to the rack-mounted downconverter and unique bandwidth selectable, frequency-agile demodulator that lets you change formats when changing channels.*

And of course all of our products are backed by our 48-hour repair or replacement policy and our 24-hour toll-free number for emergency engineering support.

### Let us custom-tailor one for you

If saving thousands of dollars a month while improving performance appeals to you, call our Marketing Department at the number below. Ask for our free brochure on satellite radio systems. It could brighten your budget for years.



**Microdyne Corporation**

P.O. Box 7213 • Ocala, FL 32672 • (904) 687-4633 • TWX: 810-858-0307

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

# Modulation levels during SCA transmission

By John Hidle, P.E., vice president, Engineering, ABC Radio, New York, NY; Harry Priester, chief engineer, WLS-FM, Chicago, IL; and Alfred Resnick, P.E., chief engineer, WLS-AM, Chicago, IL\*

The main drawback many FM stations have seen to use of their SCA channels has been the need to back off main-channel modulation to prevent peaks of frequent recurrence exceeding 100%. Tests conducted by National Public Radio (NPR) and Westinghouse Broadcasting and Cable have shown that stations that add subcarriers at low injection levels above the stereo (L-R) channel need not reduce main-channel modulation to remain within the bandwidth limitations of the FCC rules. A laboratory study performed by Westinghouse and authored by Harrison Klein in November 1982 concluded that a maximum modulation limit of 115% should be permitted when SCA sub-

carriers are used. The tests, performed at the Broadcast Electronics manufacturing facility in Quincy, IL, showed that the higher limit is technically viable without objectional increases in occupied bandwidth because of the unique spectral characteristics of low deviation subcarriers. The report also concluded that stereophonic or monophonic transmissions without any SCA subcarriers present should continue to be limited to 100% modulation.

ABC, in a follow-up to the earlier bench tests, examined the same types of parameters as the Westinghouse study, but in actual over-the-air conditions. ABC was granted experimental authority to perform the measurements with modulation limits beyond those allowed in the present FCC rules to gather the necessary data. Assisting in this effort was Harry Priester, WLS-FM, Chicago; Alfred Resnick, WLS-AM, Chicago;\* and Klein.

The tests, which closely followed the procedures contained in the Westinghouse engineering report by Klein, were conducted with the cooperation of Klein and other engineers from Group W Radio. The results of the measurements, which approximated those observed under laboratory conditions, have been submitted to the FCC in support of changes proposed in BC Docket 82-536.

## Testing procedure

WLS-FM (94.7MHz), the ABC-owned FM station in Chicago, has dual transmitting facilities. One is located at the top of the John Hancock Building and the other at the Sears Tower. The Hancock Building installation, consisting of parallel RCA transmitters and the associated filters, transmission line and multistation Alford antenna, comprised the transmitting facilities for the test. The Sears Tower plant, including the main radiating antenna, its associated transmission line and bandpass filter,

was used as the receiving system for the test. The transmitting and receiving antennas both are non-directional in azimuth and are separated by almost one mile. This configuration provides an essentially free-space propagation environment.

The transmitting system, as shown in Figure 1, consisted of a Broadcast Electronics FX-30 exciter fed by an Orban 8100 stereo generator and two Broadcast Electronics FC-30 SCA generators, one operating at 67kHz and the second operating at 92kHz. Two RCA 5kW transmitters operating in parallel fed the 10-element (2-bay) cavity-backed radiator (CBR) Alford 8819 antenna through a 12-station combiner. Monitoring was provided at each stage of the system, as shown.

Provisions were made for application of either program audio or signal generator inputs to the Orban 8100. The SCA generators were fed with test tones or frequency shift keying (FSK) data signals. No changes were made in tuning the RCA transmitters and all equipment was adjusted for normal program operation, except when measurements were being made pursuant to the experimental authority authorization (modulation levels exceeding those permitted by the present FCC rules).

At the Sears Tower, the received signal was fed through a bandpass filter and directional coupler to a Tektronix 492P spectrum analyzer for display and photography. (See Figure 2.)

For each test spectrum photographed, the pilot level was checked and program audio levels were adjusted to produce the peak modulation specified for stereo content. The SCA injection levels were adjusted while viewing the spectrum baseband. SCA modulation levels were verified by observing the station's carrier when modulated by the particular subcarrier alone. Bessel function first-order sidebands were used for this purpose.

The transmitted radio frequency

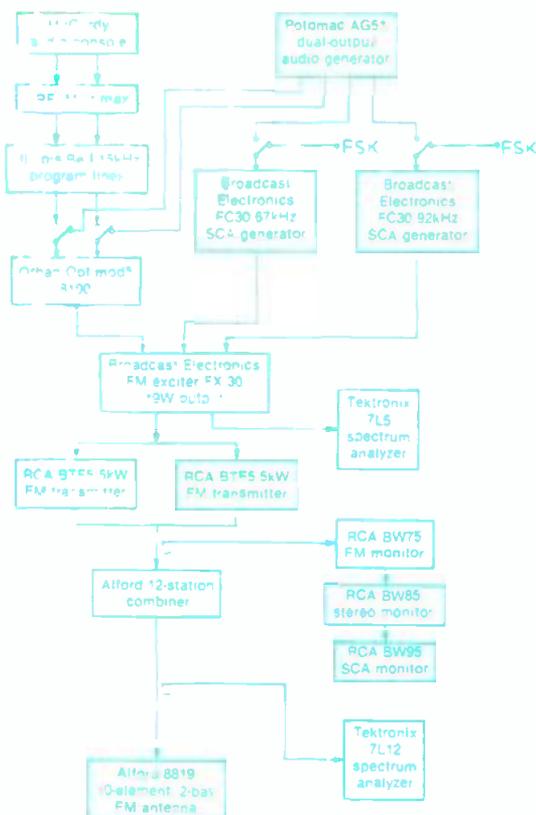
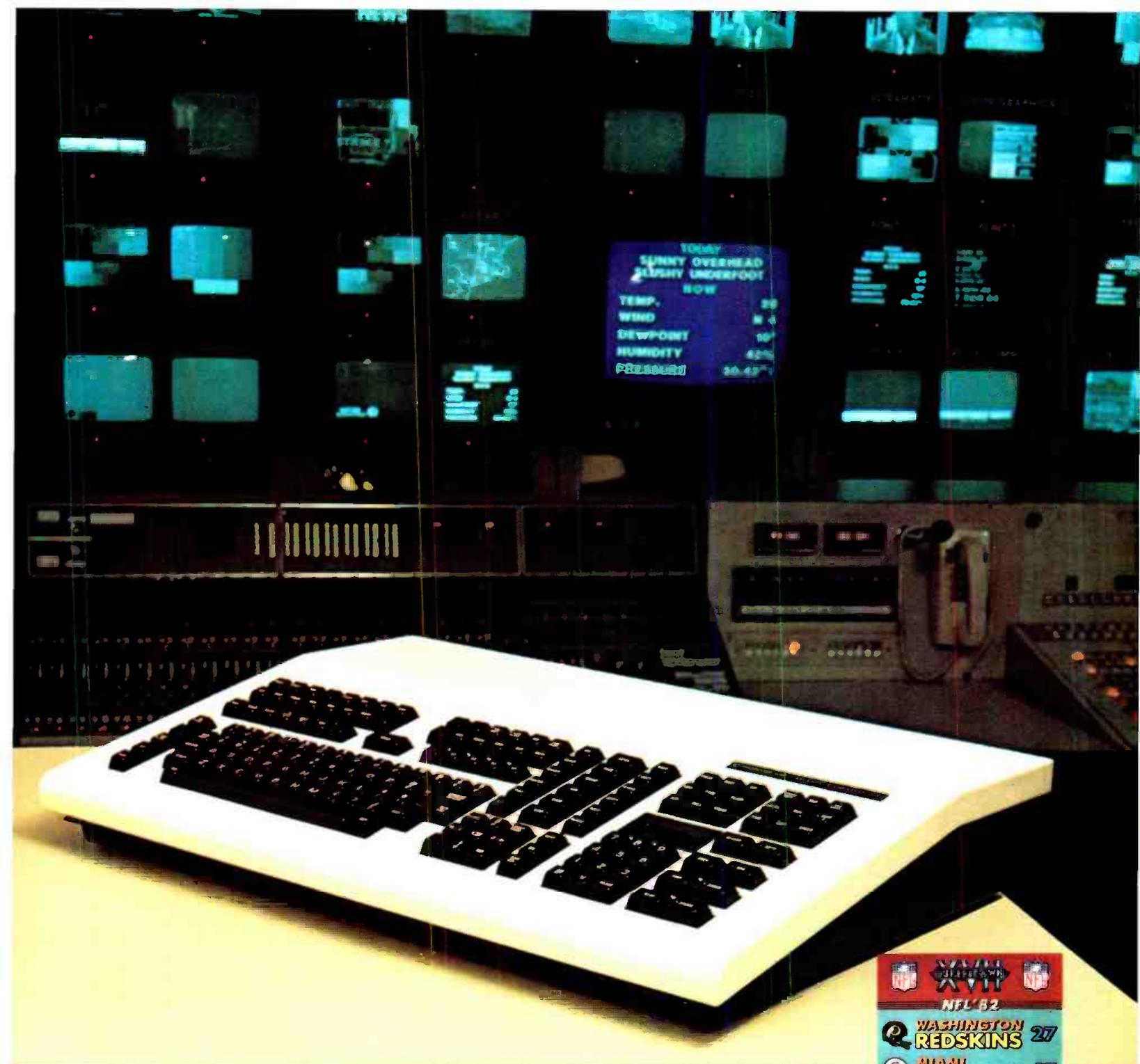


Figure 1. The transmission system at the Hancock Building site used in the ABC Radio tests.



TODAY  
 SUNNY OVERHEAD  
 SLUSHY UNDERFOOT  
 NOW  
 TEMP. 39  
 WIND N 4  
 DEWPOINT 30  
 HUMIDITY 42%  
 PRESSURE 30.43"

# Vidifont® Graphics V. Performance that's picture perfect.

Picture crisp, clean, coordinated graphics that capture attention, provide information and create a distinct perspective that sets you apart.

Picture the Vidifont Graphics V. Combining the features and functions of character generation, graphics, animation and information displays into a single integrated system. All the creative tools you need for news, dial-up services such as satellite weather and sports, commercial spots, promos, elections and special programs.

Vidifont Graphics V allows multiple-user access of up to eight channels. On-line creativity is combined with off-line input, making it easy to update and display new information.

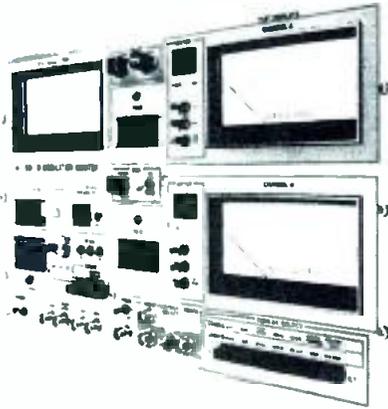
Vidifont. The picture of performance in over 500 TV and production studios around the world. Call or write Thomson-CSF Broadcast, Inc., 37 Brownhouse Rd., Stamford, CT 06902. Tel. (203) 965-7000. TWX (710) 474-3346. Telex 6819035-Answer Back 6819035 TCSB UW.



 THOMSON-CSF BROADCAST, INC.

Circle 50 on Reply Card

# More Tests More Accuracy Less Time ...



## The QEI Model 691 Tuneable Stereo & SCA Modulation Monitor \*

That's right, QEI's 691 performs more than 40 proof-of-performance, sound quality and troubleshooting tests (up to 4 tests simultaneously) with greater accuracy and in less time than possible before.

Most functions and test connections are on the front panel in easy to read, easy to use groupings. QEI's auto-ranging meters guarantee correct readings every time and SCA capability is a simple matter of an optional plug-in module.

\* FCC Type Approval No. 3-244

For the full story and complete specs on the QEI 691, call us or write to:

## QEI Corporation

One Airport Drive  
P.O. Box D  
Williamstown, NJ 08094  
(609) 728-2020



Circle (51) on Reply Card

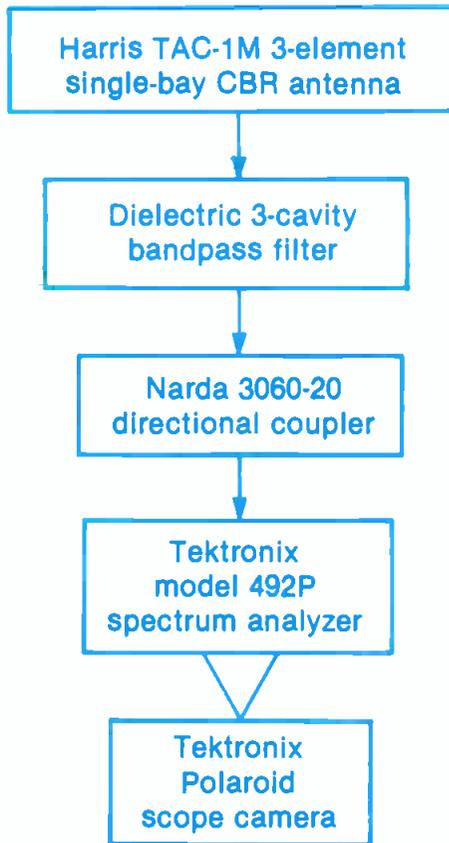


Figure 2. The Sears Tower receiving system used in the SCA experiments.

spectrum at the origination point was observed at a sample port after the Alford combiner, where all of the Hancock station carriers are present. Observation at this stage was to verify first-order sideband levels only.

Combined modulation then was applied to the station carrier. The received signal at the Sears Tower site was observed with the Tektronix spectrum analyzer in a Max-hold mode. Program material applied was identical for each spectral photograph. Some tests were conducted while applying 500-baud FSK data to one SCA generator and test tones to the other. As the Westinghouse report noted, no difference in the spectral distribution was observed between cases with fully modulated SCAs and unmodulated SCAs.

Spectrum analyzer photos for single SCA subcarrier operation at the 100% limit and proposed 110% limit are shown in Figures 3(a) and 3(b) for 67kHz systems and in Figures 4(a) and 4(b) for 92kHz systems.

As can be seen in the photographs, large signal strength variations can be observed 200kHz below WLS-FM. This seems to be caused by WKTI in Milwaukee, which operates at

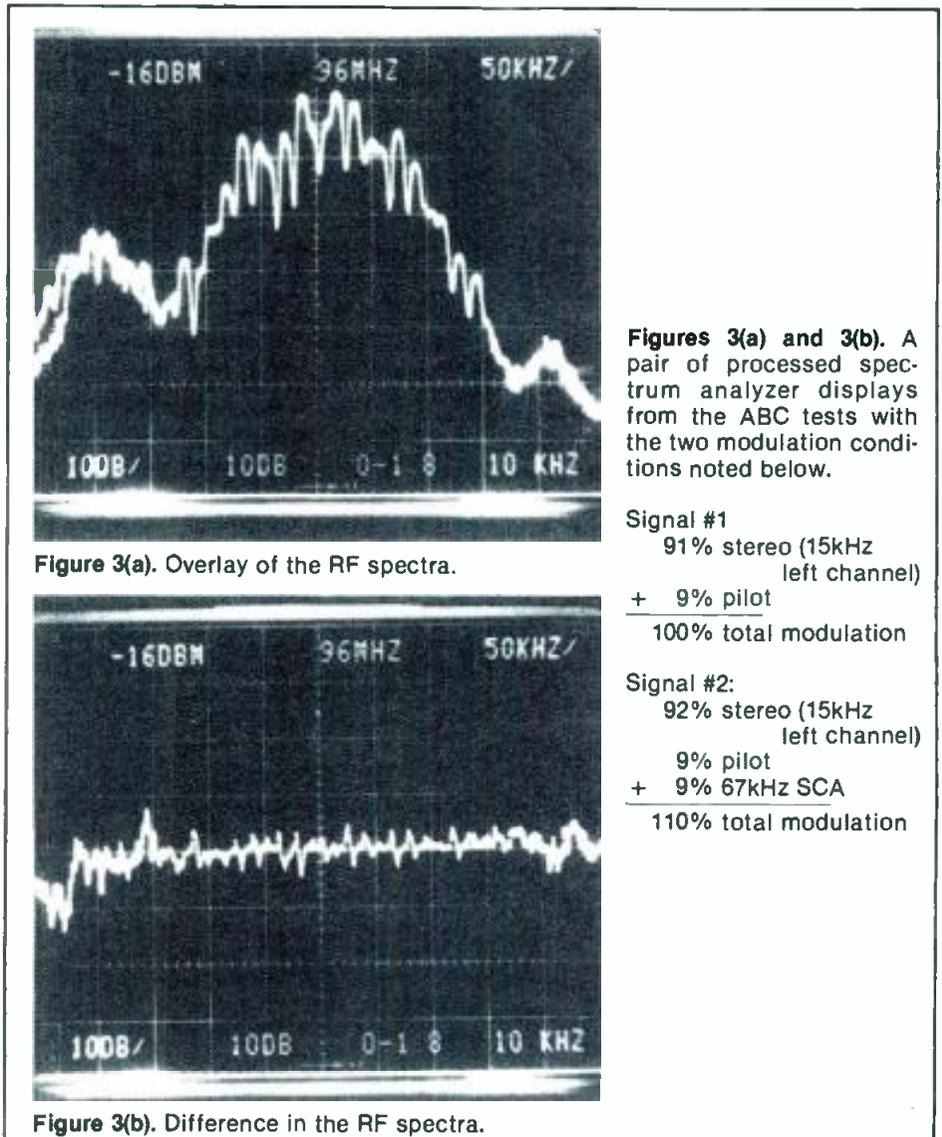
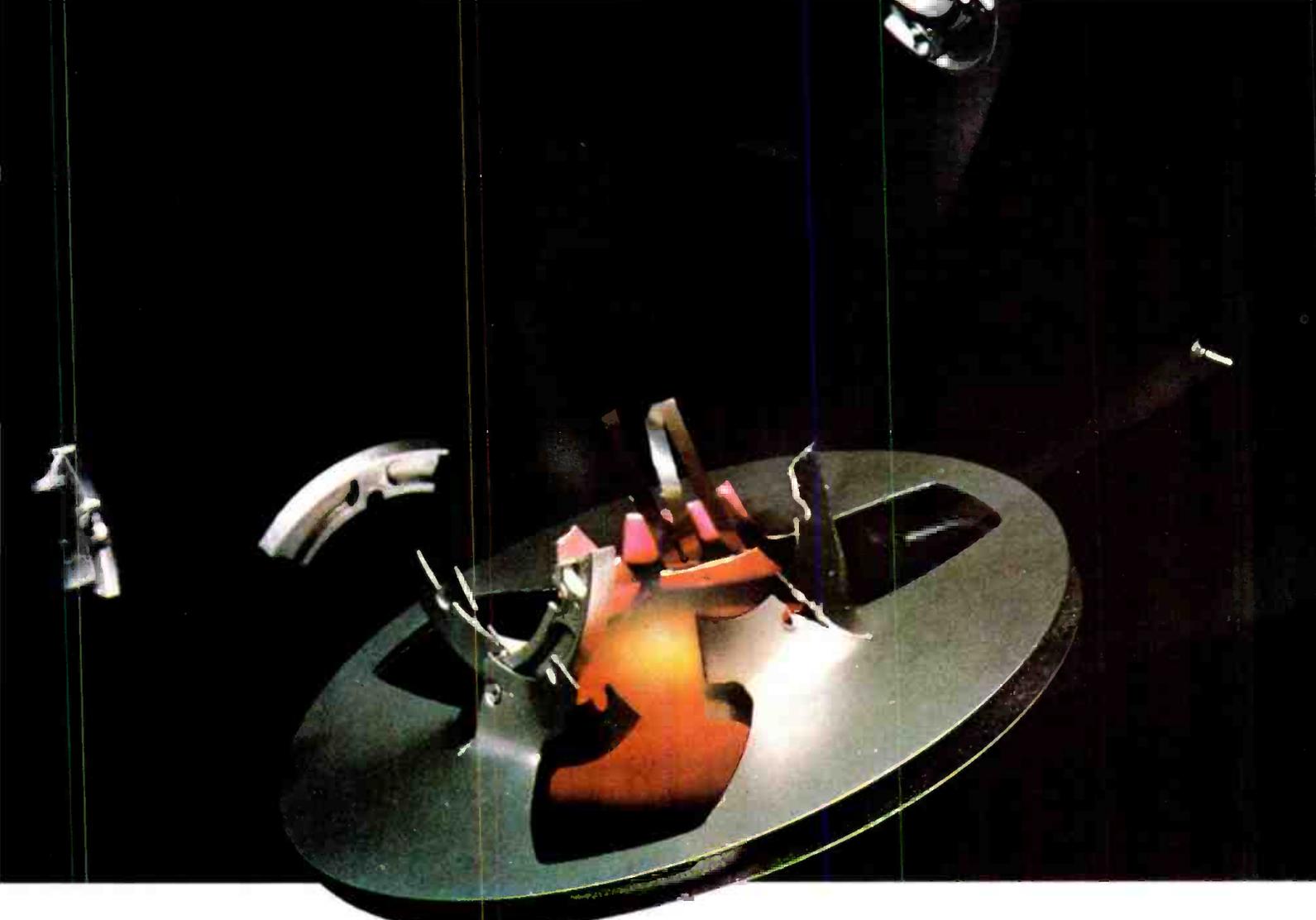


Figure 3(a). Overlay of the RF spectra.

Figure 3(b). Difference in the RF spectra.

Figures 3(a) and 3(b). A pair of processed spectrum analyzer displays from the ABC tests with the two modulation conditions noted below.

- Signal #1  
91% stereo (15kHz left channel)  
+ 9% pilot  
100% total modulation
- Signal #2:  
92% stereo (15kHz left channel)  
9% pilot  
+ 9% 67kHz SCA  
110% total modulation



## Ramko Research Explodes The Reel To Reel Versus Stereo Tape Cartridge Myth!

**FACT:** There is now a stereo cartridge system so advanced that you can't tell the original material from the reproduction. A system that performs like a professional reel to reel, yet has all the advantages inherent in the tape cartridge format. The PhaseMaster from RAMKO RESEARCH. The only cart system in the world that allows AM or FM to program in full stereo. Spots, special effects, Beethoven, or hard rock. Consistently, everytime, cart to cart, machine to machine. Not only that, but there are over 300 systems that have been field proven for the last 1½ years. No bugs, no surprises. What you see and read about is what you get.

**MYTH:** Tape cartridges do not have the mechanical stability nor precise enough guidance systems to produce truly high quality, wide separation, stereo.

**FACT:** The new PhaseMaster completely eliminates this problem via its exclusive electronic, real time, tape path and phase correction circuitry. No pretesting of carts or adjustments to make. It is so sophisticated and responsive that you can actually bend, twist and move the cart in and out while playing, without any discernable difference between the original source material and that which is being reproduced. In fact, in all of

our demonstrations to broadcast managers and engineers, none could tell the difference between an A/B comparison of the record played and that simultaneously reproduced on the PhaseMaster. In addition, this exact reproduction will be repeated on any other PhaseMaster, regardless of head and tape guide alignment (within reason) or cart warpage. No other machine in existence, reel to reel or cart, has this ability.

**MYTH:** Only reel to reel provides the low noise and distortion, and the wide response demanded by my listeners.

**FACT:** We are willing to match the PhaseMaster against anything you are currently using or anticipate buying. Judge for yourself or ask for our comparison guide. We believe you'll agree with us (and our competitor's engineers), that RAMKO has indeed advanced the state of tape cartridge technology far beyond what was believed possible.

**TO SUM IT UP:** If you are stereo formatted and looking for the best, most effective way to program your station, then the PhaseMaster is your answer. Whether it's highbrow or punk rock, you will experience the best of both worlds with all the quality demanded by even your most discerning listeners.

Find out for yourself the whole PhaseMaster story. From its superior mechanics for long term wear and stability, to the totally unique phase correction circuitry and 2 year warranty.



Contact your nearest rep or dealer today, or call RAMKO RESEARCH toll free, (800) 821-2545, for your full color, descriptive brochure. Hurry though, your competition may have already ordered theirs.

**RAMKO RESEARCH**

11355-A Folsom Blvd.  
Rancho Cordova, California 95670  
(916) 635-3600 Telex: 176493 RAMKOSAC

© 1983 Ramko Research  
Circle (52) on Reply Card

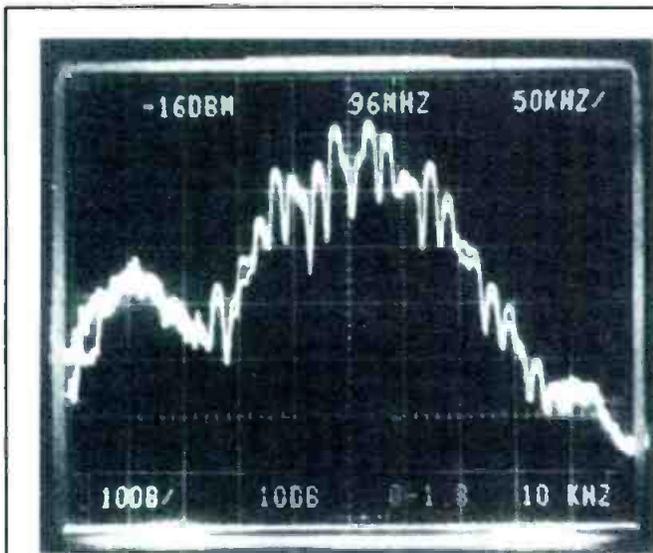


Figure 4(a). Overlay of the RF spectra.

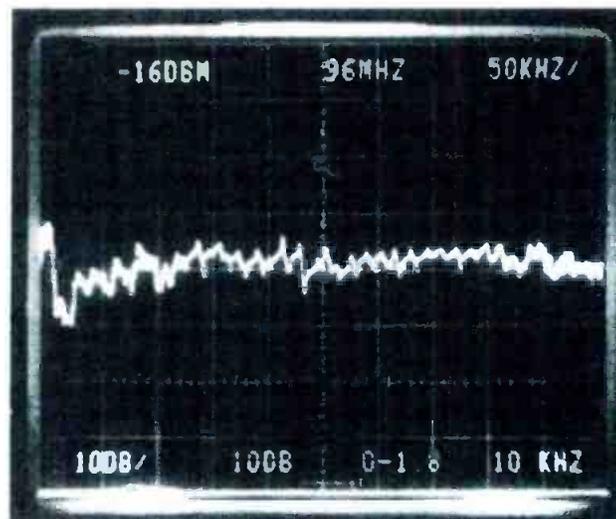


Figure 4(b). Difference in the RF spectra.

94.5MHz. A substantial part of the propagation path for this signal is over water and it exhibits propagation anomalies. Using an extremely high receiving antenna (1535 feet) causes reception of the WKTI signal at a far higher level than would be present when using an antenna closer to ground level.

#### Conclusions

Examining data gathered in these tests yields results substantially agree-

ing with figures taken under laboratory conditions. Total modulation levels of 119%, when employed during times of SCA subcarrier transmission, produce emissions that easily comply with the occupied bandwidth requirements of Section 73.861 of the commission's rules. Total modulation levels of 119% when employed for stereophonic program material transmission alone, however, produce a spectral distribution that exceeds in amplitude the spectral distribution

Signal #1:  
 82% stereo (15kHz left channel)  
 9% pilot  
 + 9% 92kHz SCA  
 100% total modulation

Signal #2:  
 92% stereo (15kHz left channel)  
 9% pilot  
 + 9% 92kHz SCA  
 110% total modulation

ing with figures taken under laboratory conditions. Total modulation levels of 119%, when employed during times of SCA subcarrier transmission, produce emissions that easily comply with the occupied bandwidth requirements of Section 73.861 of the commission's rules. Total modulation levels of 119% when employed for stereophonic program material transmission alone, however, produce a spectral distribution that exceeds in amplitude the spectral distribution



**QUANTUM**  
AUDIO LABS, INC.  
A GULLFAT COMPANY

1909 Riverside Drive  
Glendale, California 91201  
Telephone (213) 841-0970

**SERIES 22**  
BROADCAST/PRODUCTION  
MODULAR CONSOLES

IN FAST WHEEL FOR  
OUR CUSTOMERS



Circle (53) on Reply Card

## Two New Products



**MODEL A2** — Digital frame synchronizer with digital comb filter provides field or frame freeze on command..... \$7,995.00

**MODEL H2** — TBC frame synchronizer also has the digital comb filter. This TBC has infinite window (full frame) and provides field or frame freeze. Only 3.58 feedback required, ADV sync feedback unnecessary..... \$8,495.00

Contact:  
 (408) 225-1425



**APERT-HERZOG CORPORATION**  
 7007 Realm Dr. B3, San Jose, CA 95119

Circle (54) on Reply Card



CELWAVE helps you shrink the globe with advanced communications technology.

And if our name isn't familiar yet, you're sure to recognize our products. And our people.

That's because CELWAVE is successor to Phelps Dodge, beginning our corporate life with the broadest array of proven, high tech antenna systems available. Anywhere.

It includes every type of base station antenna (some still going strong after 25 years)... marine and vehicular antennas... FM and educational antennas... combiners and duplexers.

CELWAVE. Part of your world. Because we specialize exclusively in communications equipment of outstanding merit.

We bring you Phelps Dodge quality and experience

And expanding technology that makes the globe smaller.

**CELWAVE**

Route 79, Marlboro, NJ 07746 • Tel (201) 462-1880 • TWX (710) 722-3861  
In Europe: Frejasvej 30 DK-3400, Hillerød, Denmark • Tel (02) 26 36 36  
Telex 42164 PDHMP DK

**CELWAVE...We're at home in your world**

Circle (55) on Reply Card

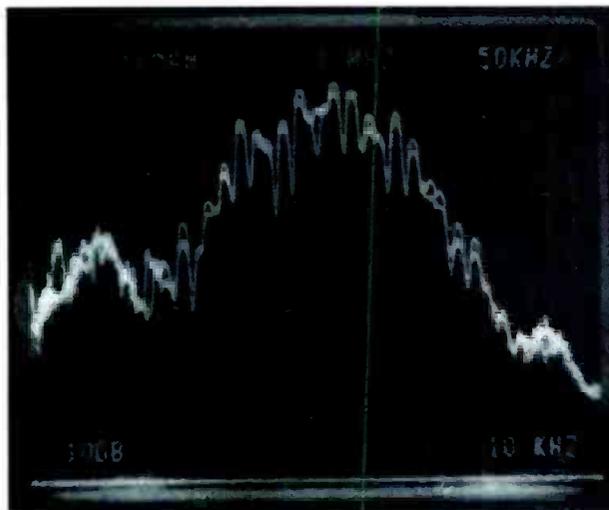


Figure 5(a). Overlay of the RF spectra.

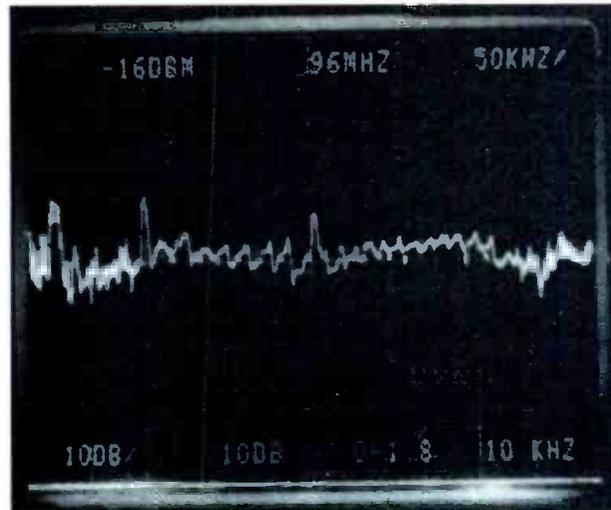


Figure 5(b). Difference in the RF spectra.

produced with 119% total modulation during times when two SCA subcarriers are being transmitted. (See Figures 5(a) and 5(b).

Based on this work and earlier studies, ABC recommends that the commission seriously consider amending the rules to permit total modulation levels above 100% when SCA subcarriers are transmitted. To this end, ABC recommends that the combined peak level for total main-channel modulation including stereo

Figures 5(a) and 5(b). A pair of processed spectrum analyzer displays from the ABC tests with the two modulation conditions noted below:

Signal #1:

92% stereo (15kHz left channel)  
9% pilot  
9% 67kHz SCA  
+ 9% 92kHz SCA

119% total modulation

Signal #2

110% stereo (15kHz left channel)  
+ 9% pilot

119% total modulation

pilot not be reduced when SCA subcarriers are transmitted, provided the carrier modulation by the combined arithmetic sum of all subcarriers below 75kHz does not exceed 10%, and modulation of the carrier by the combined arithmetic sum of all subcarriers above 75kHz does not exceed 10%.

Adoption of this modification of the rules would remove a major roadblock to the increased use of subcarriers in FM broadcasting. |:-:~)))))

# SCA & CRL

## Dollars and Sense

The FCC has made it possible . . . Now **CRL** makes it practical. Our NEW SCA 300 subcarrier generator solves the problems associated with SCA.

**CRL** has developed new technology to take the worry out of leasing your SCA. Main Channel interference . . . 80 db down! Maximum fidelity for music . . . 10 to 7000 Hz! Your coverage will be **DRAMATICALLY** improved over typical systems now in use . . . as much as 6 db increase in loudness. Best of all the price is reasonable . . . only \$1400 for the generator; \$2550 for the SCA 2 system. **CRL** invites you to try before you buy.

Call Bob Richards now at **1-800-535-7648** for complete information or your **FREE** two week trial. It makes a lot of sense.

**Circuit Research Labs, Inc.**  
Tempe, Arizona



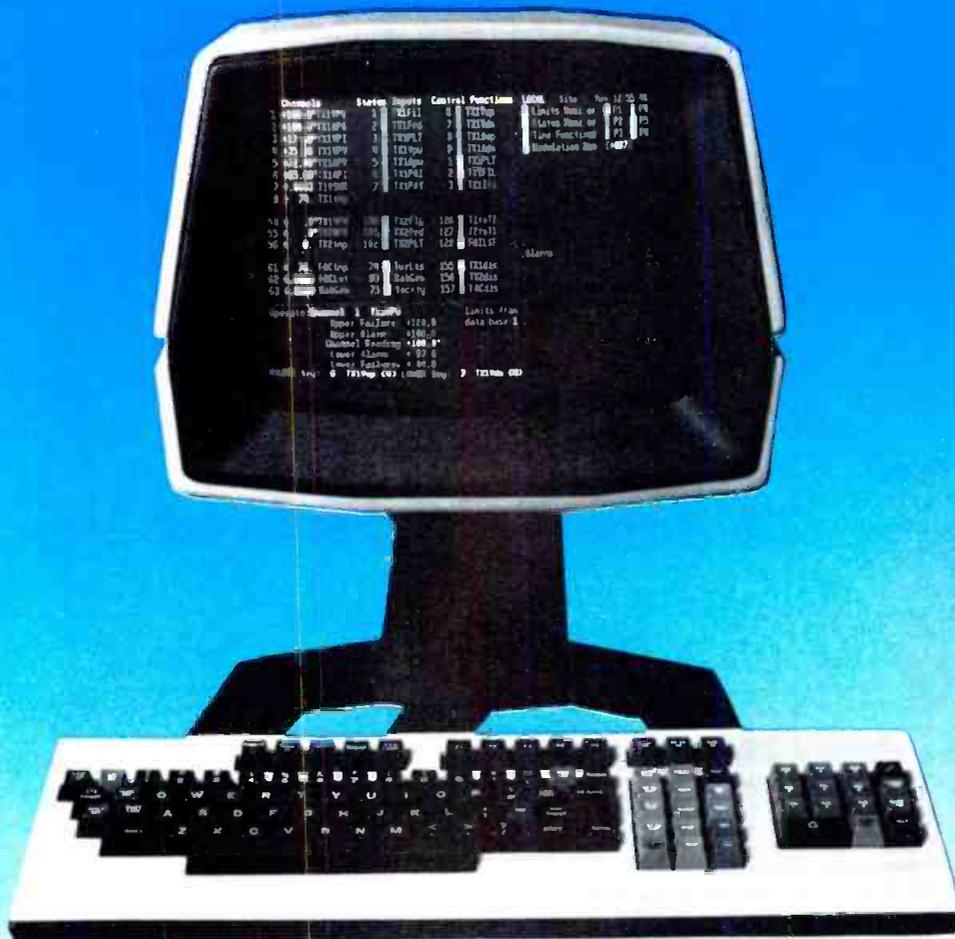
The SCA 2 system



THE PROCESSING SPECIALISTS

Circle (56) on Reply Card

Now . . . remote, automatic control  
of your entire transmitting facility . . .



## Harris 9100 Intelligent Remote Control System

In its various configurations, the Harris 9100 provides intelligent remote control; automatic transmitter control; automatic logging; plant protection through intrusion and fire alarms; and automatic control of tower lights and building temperature. It can even exercise your standby equipment...and operate up to three remote sites from a single location!

The Harris 9100 watches over your transmission system and physical plant. It makes decisions automatically, based on pre-programmed limits...with a minimum of operator intervention. Quite simply, it is the most intelligent re-

mote control system on the market.

Improve your manpower allocation. Increase plant protection. Maximize equipment life. The Harris 9100's automatic features are unmatched.

Whether you're AM, FM, TV or Satellite (or any combination), the Harris 9100 Intelligent Remote Control System is designed for you—for your security, efficiency *and* savings. For more information, contact Harris Corporation, Studio Division, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.



# The AM stereo challenge: AM stereo VS. FM stereo

By Dave Obergoenner, chief engineer, KSD-AM/KSD-FM, St. Louis, MO

The question many AM radio station managers are asking themselves is whether AM stereo and improved receiver designs can make AM comparable to FM in audio quality. Based on tests performed at KSD Radio in St. Louis, MO, the answer is yes.

KSD-AM last fall became the first AM station in the St. Louis, MO, area to broadcast in stereo. To educate the public (as well as station employees) to the quality offered by high fidelity AM, KSD-AM held a press conference and open house to demonstrate the capabilities of its new Motorola system.

Attendance by the public and local media was good. We set up a number of different listening positions using various AM stereo receivers, speakers and headphones. Component systems costing from \$400 to \$10,000 were used in the demonstration. The Delco Electronics Division of General Motors lent us two 1984 Buick automobiles equipped with its new AM stereo/FM stereo radios, which should be available as factory-installed options on some 1984 Buicks this month.

The Delco radio comes with a 25W power amplifier, separate bass and treble controls, a fine-sounding FM section and a high quality dual-bandwidth AM stereo system.

With the battery of top-of-the-line receiving equipment assembled for the open house, the stage was set for a detailed comparison of AM stereo and

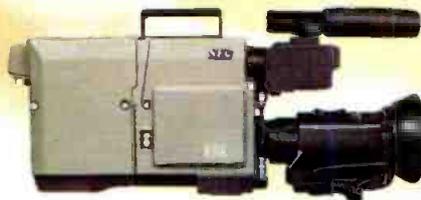


KSD-AM's control room, shown during the stereo demonstration tests.



Lou Eads (at right) of Delco Radio demonstrates the company's new AM stereo receiver to a member of the press during the KSD AM stereo/FM stereo comparison.

# EVEN THE HAIRIEST SITUATION CAN'T SHAKE UP THE FIRST 3-CHIP CAMERA.



Some gripping news from NEC: the ENG camera has come of age. Our new SP3 packs so many features into 7.3 lbs., it's a small wonder.

With three CCD chips instead of tubes, the SP3 can take all the abuse your crew dishes out, and never needs registering. It produces broadcast quality pictures with over 500 lines of resolution. And better still, you can use it with any format — VHS, Beta,<sup>™</sup> or 3/4 inch.

To find out more about the SP3, the most newsworthy camera around, call NEC at 1-800-323-6656. In Illinois, call 312 640-3792.

## NEC

### IMAGINE WHAT WE'LL DO NEXT

NEC America, Inc., Broadcast Equipment Division  
130 Martin Lane, Elk Grove Village, Illinois 60007



Circle (58) on Reply Card



The author (at right) demonstrates the performance of the AM stereo system at KSD with members of the local media.

FM stereo. For the tests, KSD-AM and KSD-FM played the same music selections at the same time. Both stations used CRL System-4 audio processors, set to identical parameters. The stereo enhance L-R processing control on the AM stereo limiter was switched off for the tests because it would have given AM an unfair advantage in separation.

#### Results

Because these were listening tests, the responses varied, depending on the person. The "average" listener thought that AM sounded slightly brighter than FM on some of the receivers, due to peaks in the 6-8kHz region caused by transmitted high frequency equalization. The fast roll-off above 6kHz or 8kHz (depending on the selected receiver bandwidth) of the Delco radio AM section was noticeable to more trained ears, when compared to FM. With the more expensive component systems, in particular the Phase Linear T-5200 AM/FM tuner (which will deliver frequency response exceeding 10kHz), the difference was less noticeable. It was more similar to the difference between two high quality speakers or phono cartridges. The AM S/N figure was greater than 55dB, and stereo separation was good on all radios tested (similar to FM).

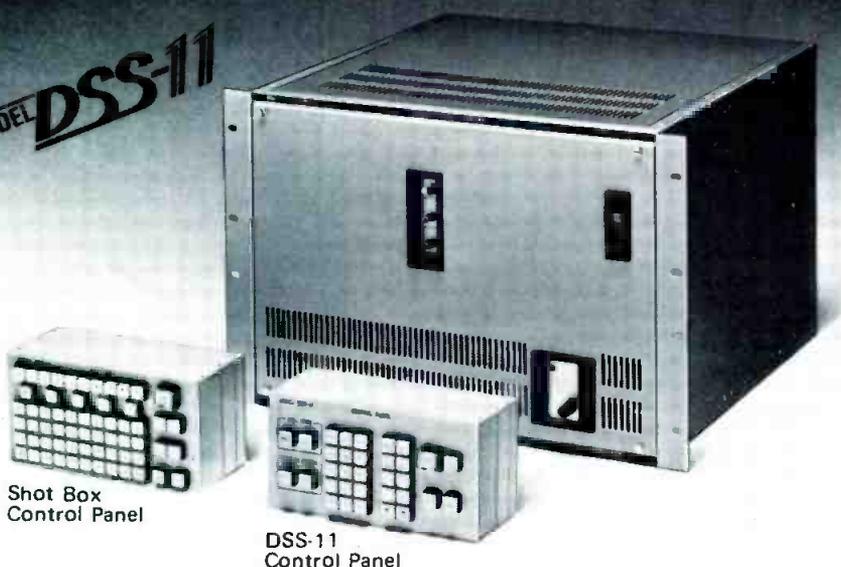
These results were achieved using KSD's daytime non-directional antenna or the nighttime 4-tower directional array. There virtually was no difference between the received quality of the daytime and nighttime signals. The AM and FM transmitting facilities are located approximately 10 miles from the site of the listening tests.

The comparisons left little doubt that high fidelity AM stereo can compete with FM as a quality programming source. A "thank you" is in order to those receiver manufacturers that have had the nerve to venture into the uncharted waters of high fidelity AM stereo. The ball is now in our court, and broadcasters must make their move.

!:-:-)))

# The Only Digital Still Store for Less than \$40,000

MODEL **DSS-11**



Shot Box  
Control Panel

DSS-11  
Control Panel

The DSS-11 is the world's only digital still store with the quality and resolution required for broadcasting applications priced under \$40,000. Although the DSS-11's compact modular design is ideal for OB vans, an on-board Winchester disk drive provides 160 megabytes of storage for up to 1,000 fields. It can also be simultaneously interfaced with up to seven additional disk drives. Superb stills reproduction is guaranteed by the CC-SPF system. And the fast access time of 0.35 sec even for frames makes the DSS-11 perfect for either studio or OB applications. Call NTI America for a free demonstration. The DSS-11: the most cost-effective digital still storage on the market.



**NTI America, Inc.**

1680 North Vine Street, Los Angeles, California 90028  
® Phone: (213) 462-8945 Telex: 215468

*Inquiries from sales representative are invited.*

Circle (59) on Reply Card

# Optimod-FM. The Preeminent Processor.

ADULT	AOR	CHR (Rock)	COUNTRY	BLACK/URBAN CONTEMPORARY	BEAUTIFUL MUSIC
WYNY New York	KMET Los Angeles	WLS Chicago	WMAQ Chicago	WKTU New York	KJOI Los Angeles
KHTZ Los Angeles	KLOS Los Angeles	KIIS Los Angeles	KIKK Houston	WRKS New York	WLAK Chicago
WBZ Boston	WLUP Chicago	WXKS Boston	KSCS Dallas	KUTE Los Angeles	KOST Los Angeles
WCCO Minneapolis	WLLZ Detroit	KIQQ Los Angeles	KILT Houston	WKYS Washington, DC	WJR Detroit
KRTH Los Angeles	WAPP New York	WCAU Philadelphia	WWWW Detroit	KRLY Houston	KMEZ Dallas
WBBM Chicago	WCOZ Boston	KRTH Los Angeles	KSAN San Francisco	KACE Los Angeles	KSFI Salt Lake City
WRAL Raleigh	KMEL San Francisco	WKQX Chicago	KZLA Los Angeles	WGPR Detroit	WEZI Memphis

Ratings leaders in *every* format have overwhelmingly chosen OPTIMOD-FM to get and keep their competitive edge.

They know that OPTIMOD-FM's patented technology lets them have the sound they want—whether loud and punchy, or totally transparent.

They know that OPTIMOD-FM can be configured to obtain no-compromise results from *any* STL: composite, dual-microwave, or phone lines.

And they know that they can count on Orban's quality, reliability, and customer service.

You can't go wrong with The Preeminent Processor.

To find out how you can join the winners already using OPTIMOD-FM Model 8100A, contact your favorite Orban Broadcast Dealer or call direct.



**Orban Associates Inc.,**  
645 Bryant Street,  
San Francisco, CA 94107

Toll Free: (800) 227-4498. In California (415) 957-1067. Telex: 17-1480

**orban**

ORBAN PROCESSING KEEPS YOU COMPETITIVE

Circle (60) on Reply Card

# Field trials:

# JVC KY-950 ProCam

By Carl Bentz, television editor

Traditionally, *Field Reports* published in **Broadcast Engineering** have been based on one facility's applications and evaluation of a piece of equipment. Departing from tradition, this article reports findings from engineers at three different types of TV facilities.

When I first saw the JVC KY-950 and KY-900 ProCam cameras, in a pre-introductory demonstration early in 1983, I was impressed. The picture quality that was generated under adverse conditions was much better than what I had expected at a price of about \$27,000.\* At the same time, I could not help thinking of a previous model, the KY-1900U, which had been considered almost a throw-away camera by some broadcasters at its less than \$10,000 list price. Unfortunately, many factors that allowed the low cost of the earlier unit also were factors that met resistance from broadcasters.

Because of the picture quality in a poorly lighted conference room, the name ProCam and a 1-button auto-registration feature, I became interested in developing a plan to put a ProCam through its paces. I told David Walton, product manager for JVC, that I would like to place the KY-900 Saticon or the KY-950 Plum-bicon into three somewhat diverse, but realistic, service situations—a CATV local origination effort, a commercial TV station and a PBS affiliate. All three selected operations do a significant amount of studio and remote production. He agreed to the arrangement.

### CATV setting

Before I delivered the KY-950 to the first test site, I unpacked the camera to make sure that no damage had oc-

curred in shipment. The camera, 14X Fujinon lens and viewfinder arrived housed safely in a suitcase-type transport case. Foam held everything firmly in place, including an ac-adapter/power supply. A separate container held the Anton-Bauer B20 battery and charger. Soon I had mounted the battery and was watching pictures in the viewfinder.

When I delivered the camera to the studios of TeleCable of Overland Park, KS, Steve Paschang, studio engineer, quickly cabled the KY-950 into the video switcher. Gen-locked with color black, a single adjustment was needed for in-phase color bars. Referring to the instruction manual helped locate the appropriate subcarrier adjustment inside the camera.

For the next week, Paschang and his staff used the camera in the studio and with a remote production vehicle. For both applications, the performance was considered adequate. The camera was easy for the non-technical operators to use and seemed to wear well. Auto color balance and registration functioned well.

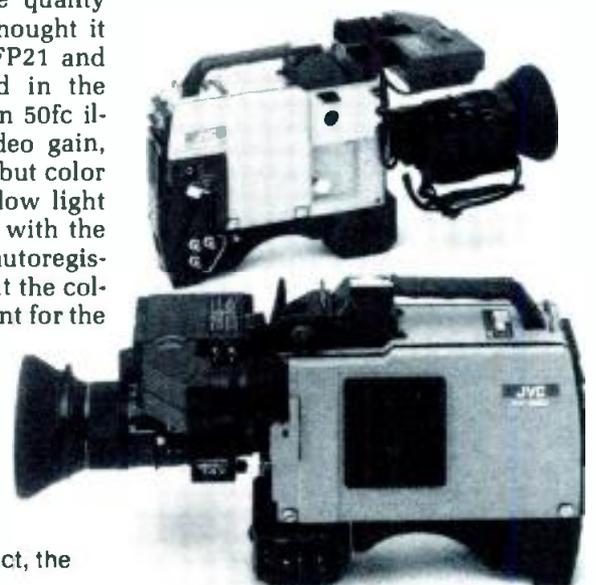
For Paschang, the picture quality seemed acceptable, but he thought it did not match the Hitachi FP21 and FP22 cameras already used in the TeleCable studio. In less than 50fc illumination, with +18dB video gain, noise began to be a problem, but color remained acceptable at the low light level. Paschang was pleased with the compact package and the autoregistration feature, but he thought the color bar switch was inconvenient for the operator.

If new camera purchases were to be considered, Paschang said that the KY-950 would be among his possible choices for an ENG/EFP-type camera.

### Commercial station

The second stop for the camera on the Kansas City tour was at KCTV-TV 5, where Joe Snelson, chief engineer, assigned Clifford Lynch, ENG maintenance supervisor, to put the camera through its paces.

After using the camera for more than a week, Lynch said that not only did the camera perform excellently, in adverse lighting, to 60fc, but also noise did not seem to be a problem for him. Low light color remained acceptable. The automatic features, including registration, and good sharp pictures were outstanding qualities of the camera, he said. The 14X lens and its macro qualities were sufficient for most ENG requirements, as was the color balance. Placed only in ENG use, the KY-950 needed no adjustments during the period, but



The KY-950 and its sister product, the KY-900

\*Price varies according to lens options and accessories.

## Manufacturer's specifications: **KY-950 ProCam**

Optical system:	3-tube prism (f/1.4) with bias light
Lens mount:	bayonet-mount
ND and color temperature:	turret-type four positions close, 3200°K, 5600°K, 5600°K + 25% ND
Pickup tube:	2/3-inch diode-gun Plumbicon XQ3427
Sensitivity and S/N ratio:	f/4.5, 2000 lux (200fc); 58dB nominal
Sensitivity selection:	normal, +9dB, +18dB
Minimum illumination:	f/1.7 38 lux (3.6fc) (+18dB switch on)
Registration:	0.1%, 0.2%, 0.4%
Horizontal resolution:	600 lines at center (G-CH)
Contour correction:	dual-edged, horizontal and vertical
White balance:	automatic, with 8-bit digital memory, 3200°K preset provided
Black balance:	automatic, with 8-bit digital memory
Black level:	automatic
Encoder:	NTSC (IQ)
Color bar generator:	RS189A split-field bars (switchable to full-field bars)
Synchronizing system:	RS-170A SSG or gen-lock by composite video or blackburst; color framing pulse output
Auto iris:	+50% (one-half f/stop), normal and -50% (one-half f/stop), level selector provided
Output signals:	composite video signal 1Vp-p, 75Ω; test output for black-and-white monitor (R, G, B, -G and encoded output 1Vp-p, 75Ω) mic signal -52dBm, balanced or -20dBs unbalanced (switchable); earphone signal from VTR playback (8Ω)
Power consumption:	12Vdc, 1.95A (without viewfinder and lens)
Weight:	10 pounds (without viewfinder and lens)

Lynch said that the physical layout of the circuitry lend itself to good access for maintenance.

Although Lynch was pleased with the camera and its performance, he said that he could not suggest that the station purchase ProCams. The opinion was based, in this case, not on the product, but on previous experiences and difficulties in obtaining replacement parts. The fast pace of a leading news operation cannot afford to wait around for parts, he said, which has been a common problem for him with JVC products in the past.

### PBS environment

John Long, chief engineer, KCPT-TV 19, Kansas City, was the third user of the test camera. Again used for ENG/remote production for more than a week, Long said he thought the camera performed excellently in nearly every way. His main complaint dealt with color fidelity at a lighting level of 25fc. Luminance noise, however, did not become a problem for him at that level.

According to Long, the camera was well-planned for both non-technical operators and engineers. No adjustments were required during his use of the unit, but he took the time to look it over closely. His observations led to conclusions that the physical layout of the camera and the completeness of the instruction manual take the maintenance man into consideration.

At KCPT, the camera performance matched that of Ikegami cameras normally used for remote productions. The lens was adequate and the auto-registration feature was helpful. The

operation was sufficient to cause Long to say that he would consider the ProCam in possible future camera purchases.

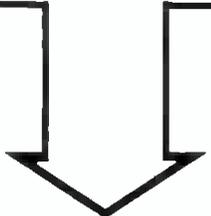
### The ProCam approach

Before introducing the ProCam line, JVC had been considered a consumer and industrial equipment manufacturer. With the new line, however, a different approach was required. Not only does the KY-900 series incorporate prism-optics instead of dichroic mirrors, high grade Plumbicon (XQ3427) or Saticon (H9386D) pickup tubes and highly stable circuitry, but also the company's product support program has changed. JVC, aware of past part supply difficulties for its own products (as well as for other manufacturers), initiated a plan to improve the support of broadcast users. At the New Jersey US headquarters, a separate operation from other product lines includes a board exchange program, a large inventory of replacement parts and an express shipping service to speed parts to their destinations.

### Final notes

Based on short trial periods in three TV facilities, the KY-950 camera performs on a level with many of the ENG/EFP cameras currently on the market. The variations among the users' comments are based on their facilities' needs, test environments and investigators' personal opinions.

The accompanying sidebar, selected from the manufacturer's specifications, will allow you to draw your own conclusions. | :? ->)))|



## IN OUR CONTINUING EFFORTS TO SERVE YOU...

From time to time, Intertec Publishing Corp. makes its subscriber lists available to carefully screened companies or organizations whose products, services, or information may be of interest to you. In every case, list users must submit their promotional material for approval. They may use the list only once.

No information other than name and address is ever divulged, although names may be selected by segments to which the particular offer might appeal.

We are confident that the majority of our readers appreciate this controlled use of our mailing lists. A few people may prefer their names not be used.

If you wish to have your name removed from any lists that we make available to others, please send your request, together with your mailing address.

Direct Mail Mgr.  
Intertec Publishing Corp.  
P.O. Box 12901  
Overland Park, KS 66212

# AES-'83/New York: A landmark in digital

By Bill Rhodes, editorial director

- Oct. 8-12
- New York Hilton
- 202 exhibitors
- 6000 attendees
- 10 technical sessions
- 81 technical papers
- Nine workshops

Traditionally, **BE** has not done an in-depth replay of Audio Engineering Society (AES) conventions. However, rapid advances in digital technology, especially as demonstrated at the 74th AES Convention (AES-'83), have prompted us to provide extensive coverage.

AES-'83 gave unprecedented attention to digital and analog signal processing and to broadcasting. Advances in audio were covered in 10 technical sessions, in specialized workshops with presentations and hands-on equipment operations, and in evening demonstrations of the compact disc technology.

## Technical presentations

Technical sessions included the following:

- Digital recording and broadcasting;
- Signal processing: Analog;
- Studio design;
- Sound reinforcement;
- Loudspeakers, transducers and low frequency system alignment;
- Loudspeakers: Network considerations;
- Signal processing: Digital;
- Psychoacoustics;
- Test and measurement; and
- Disc recording and multichannel sound.

The majority of the papers from these presentations will appear in future issues of the *AES Journal*, but the full set of pre-print papers are available from the Audio Engineering Society for a nominal fee.

## Workshops

Workshop formats included a combination of presentations, panels of experts to field questions and hands-



George Currie, new head of the Sony Professional Audio Products Division, opened the press conference on the DASH (Digital Audio Stationary Head) format agreed upon by Sony, Studer, Matsushita and MCI/Sony.

## AES-'83 awards/fellowships

The Awards Committee, under the chairmanship of Ray Dolby, selected the following persons for special merit:

- **Carolyn Davls**—Board of Governors Award for contributions to audio education and for chairmanship of the 66th convention in Los Angeles;

- **Milton Putnam**—Honorary Membership for lifelong contributions to studio design and to the design and production of audio instruments and equipment; and

- **Richard Heyser**—Silver Medal for the development of time delay spectrometry and its use in the study of loudspeaker and room acoustics.

AES Fellowships were

presented to the following persons:

- **Dr. Roger Lagadec** of Studer for contributions to digital signal processing and recording;

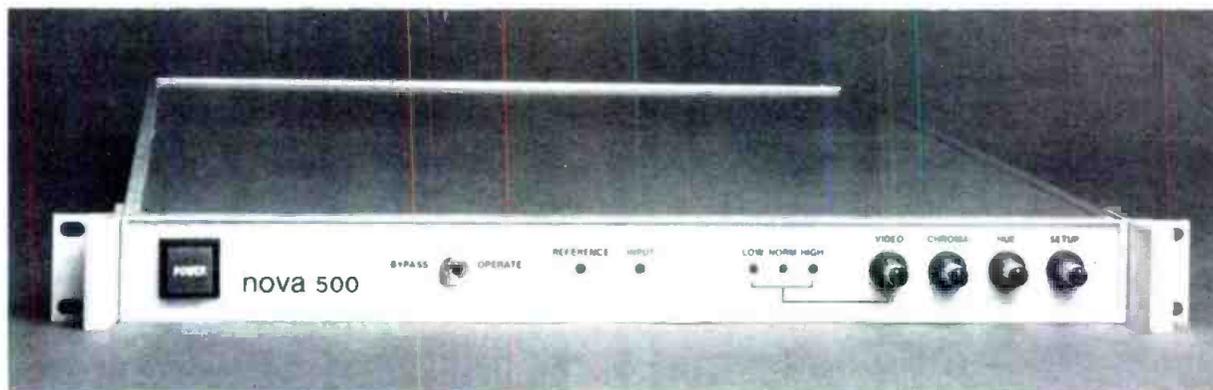
- **Dr. George C. Maling Jr.** of IBM for contributions to the field of acoustics and to the development of national standards;

- **Dr. Max V. Mathews** of Bell Telephone Labs for pioneering work in the computer generation of musical signals; and

- **Roland J. Zavada** of Eastman Kodak for leadership in the standardization of audio, motion picture and TV systems—much of which has been coordinated through the activities of the SMPTE.

# innovative 500

*because digital performance  
doesn't have to cost  
a lot . . .*



The **nova 500 Digital Time Base Corrector** defines a new industry standard. For the first time, digital performance doesn't have to cost a lot.

The **nova 500** will time base correct all  $\frac{3}{4}$ " and  $\frac{1}{2}$ " non-segmented video tape recorders which accept sync and derived subcarrier inputs. The result, full bandwidth time base corrected signal.

Only one rack unit high (1.75"), the **nova 500** fits into even the most cramped van or equipment rack. A weight of only 10 lbs. enhances portability in field applications.

8 bit 4X subcarrier sampling is employed for maximum picture fidelity. Advanced design memory provides 32 lines of video

storage. Proven technology allows operation with less than 50 Watts of power dissipation.

All active components are temperature cycled, burned-in and tested PRIOR to assembly into the **nova 500**. Each system is thoroughly burned-in after test for added reliability. Power supplies operate at no more than 55% of their rated capacity.

You compare! The **nova 500 Digital Time Base Corrector** . . . the best things do come in small packages!

For further information and pricing contact: **nova systems, inc.**

20 tower lane, avon, ct 06001  
(203) 677-5252



For the press announcements on DASH, representatives from MCI/Sony, Matsushita, Sony and Studer answered questions from the press regarding DASH features and applications.

on demonstrations of the latest audio equipment. Scheduled workshops included the following:

- Hands-on digital;
- Recording studio operation;
- Stereo TV mic techniques;
- SMPTE code and synchronizing;
- Console troubleshooting;
- Sound track audio;
- Tape machine maintenance;
- Digital recording; and
- Grounding and shielding.

### Exhibits

A stronger focus on digital audio and growing interest in stereophonic/multichannel audio for television have given the audio field a much-needed economic boost, which produced a record turnout of exhibitors and attendees at AES-'83.

New products also abounded, but space does not permit a review. Instead, a listing of equipment exhibitors (page 96), with Reader Service Numbers, is included so that readers may request new product information.

### Press meetings

Several events that took place in press meetings and special booth demonstrations are noteworthy.

• **Digital Audio and DASH.** Four major audio forces announced their agreement on a digital audio format called DASH (Digital Audio Stationary Head). The proponents involved were Matsushita Electric Industrial Company Ltd. and Sony Corporation, both of Japan; Willi Studer AG of Switzerland; and MCI (a division of Sony Corporation of America) of the United States.

The new format combines features of the original format jointly promoted by Sony and Studer with new developments from all of the com-

## SGL WABER® RACK MOUNTS

*Convenient, Easy to Install!*

SGL WABER Rack Mount Multiple Outlet Strips are ideal for electronic rack enclosures. You get instant power distribution from either front, back, or a combination of both ... choose the model that best suits your needs.



Model 911 Series (front view)



Model 911 Series (back view)

**UR** Underwriters  
Laboratory  
Recognized

All models feature:

- 6 "U" ground outlets (3 duplexes)
- Master switch with built-in pilot light
- Circuit Breaker protection
- Fit standard 19" rack enclosure
- 14/3 SJT power supply cord with molded plug
- Maximum rating: 15A, 125VAC, 60Hz, 1875 Watts, continuous duty

Choose the right outlet strip or spike and noise suppressor to meet your specific needs from our FREE catalog!

SGL WABER/a division of SGL Industries, Inc.  
300 Harvard Ave., Westville, NJ 08093  
In NJ (609) 456-5400/Toll-free (800) 257-8384

Circle (61) on Reply Card

## Condor THE PREMIER DIGITAL DISPLAY CLOCK FOR BROADCAST TIMING

ET SERIES-ELAPSED TIMERS

- ET 500  
3 1/2 in. digits
- ET 505  
2 in. digits



**COUNTS UP • COUNTS DOWN •  
DISPLAYS TIME OF DAY •**

• Functions may be switched back and forth without disruption • Remote Control Panel with Push Button Setting Switches allows Easy Time Setting from a distance • Bright LED Displays • Select Display Size — 3 1/2 inches or 2 inches • Simple to operate and to select desired function • Optional Time Base will continue all functions in the event of power failure • Panel mount available • Walnut, brushed aluminum or gold finished frames.



OTHER MODELS AVAILABLE

WITH COUNT UP ONLY  
WITH COUNT UP/TIME OF DAY  
WITH COUNT DOWN/TIME OF DAY

## Condor EASY READING DIGITAL DISPLAY CLOCKS

"C" Series - 3 1/2" LED Display

• Large 3 1/2" high display • 31 LED lamps per digit • Viewing possible from 100 feet away or more • Bright red numbers in black background • 12- or 24-hour format • 4-digit (hours, minutes), or 6-digit (hours, minutes, seconds) • Walnut, brushed aluminum, or gold finished frames • Panel mount available • Dim: 4-digit (18-3/8" x 5-3/8" x 1 1/2"), 6-digit (27-3/8" x 5-3/8" x 1 1/2").

"2" Series - 2" LED Display with similar features as above

CALL OR  
WRITE FOR  
COMPLETE  
CATALOG AND  
SPECIAL  
INDUSTRY  
PRICES



**FELDMAR Watch and Clock Center**

WORLD'S LARGEST SELECTION OF STOPWATCHES  
CHRONOGRAPHS, FINE WATCHES AND CLOCKS  
9000 W. PICO BLVD. Dept. BE  
LOS ANGELES, CA 90035 (213) 272-1196

Circle (62) on Reply Card

# Think of EV as your mike expert.



**The RE20.  
There's a reason  
it has become  
a studio standard.**

The lack of a consistent "studio sound" is a problem many broadcast engineers wrestle to overcome every day. The simplest and often least expensive way of establishing and maintaining this consistent sound is the use of a professional-quality studio microphone.

The RE20, for example, is uniquely suited to eliminating the sonic variables caused by different mike techniques.

"Single-D" microphones have proximity effect. The RE20 doesn't, and its unique dual-tube Variable-D design not only assures uniform frequency response independent of working distance but also regardless of the talent's position within the cardioid pickup pattern.

The RE20 also eliminates the vocal inconsistencies often heard in post production when studio voice-overs are added to tapes recorded in the field with omnidirectional mikes.

If a consistent "studio sound" is your objective you should consider the Electro-Voice RE20.

Many Electro-Voice Professional Microphone Dealers can arrange a hands-on trial at no cost to you. For more information please contact your EV dealer or write to: Greg Silsby, Market Development Manager/Professional Markets, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.

**EV** Electro-Voice<sup>®</sup>  
SOUND IN ACTION

a **gulton** company

Circle (64) on Reply Card



Sampling rate	Tape speed		
	Fast	Medium	Slow
48kHz	76.2cm/s (30ips)	38.1cm/s (15ips)	19.05cm/s (7.5ips)
44.1kHz	70.01cm/s (27.56ips)	35cm/s (13.78ips)	17.5cm/s (6.89ips)

Tape width	¼-inch		½-inch	
	Normal	Double	Normal	Double
Track density				
Digital tracks	8	16	24	48
Aux. tracks	4	4	4	4
Digital audio channels	Fast	8	16	24
	Medium	—	8	—
	Slow	2	4	—

panies. Representatives from each of the DASH proponents told the press that they hoped their common recording format would be the basis for the universal format required by the audio industry.

The agreement on a new format takes into account recent developments in technology, including the

possible use of thin-film heads, a format for low speed recording with increased robustness in signal processing and the recommendation of the AES Standard Committee on Digital Audio for standardization of the 48kHz sampling frequency.

DASH's specifications and features allow it to accommodate a wide varie-

ty of future technological improvements (such as thin-film heads) while retaining compatibility. It will be submitted as a proposal for an international specification, and also will be actively promoted among digital audio manufacturers and users as the recommended format for stationary-head digital audio recording.

The DASH format covers a range of applications from 2-channel recorders (19.05cm/s, ¼-inch tape) to 48-channel recorders (76.2cm/s, ½-inch tape), suitable for broadcasters, top studios, small studios or production houses.

The format has three versions—fast, medium and slow—depending on tape speed. The necessary number of tracks to record one channel is one, two and four, for fast, medium and slow versions, respectively.

The tape speed and sampling rates for DASH are shown in Table I.

The track density and channel number for DASH are shown in Table II. Double track density is possible by using state-of-the-art thin-film heads, keeping the compatibility with the normal track density for the initial half number of tracks.

According to those proposing DASH, the future of the format is bright for the following reasons:

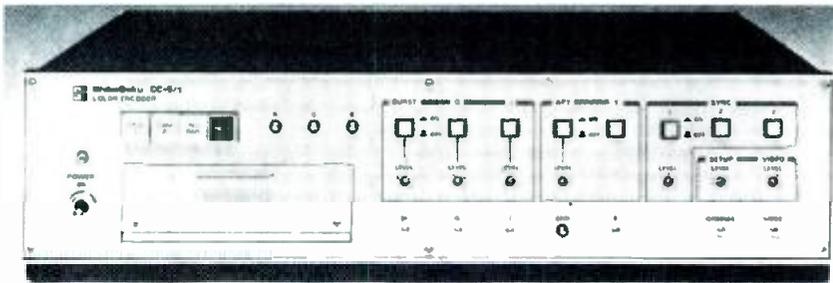
- Adaptation of thin-film heads will increase the number of recorders with double track density in the future, providing versatility and tape economy to end users. Tapes recorded at normal track density can be played back on double-density recorders.

- By using a common configuration from 2-channel to 48-channel recorders, manufacturers can take advantage of production and servicing efficiency. Also, with development of LSI, further reductions in size, weight, power consumption and cost will be possible.

- **Digital mixing.** In a bold move, Rupert Neve introduced the industry's first all-digital audio mixing console, the Neve DSP (Digital Signal Processing). With all main-signal processing in digital (PCM) form, the DSP console was designed to launch high quality facilities into the digital audio era. Key applications include broadcasting, recording, mixdown, post-production dubbing, live mixing, theater sound and compact disc mastering.

According to Barry Roche, president, Rupert Neve, the DSP enables broadcasters and recording studios to take full advantage of the digital audio revolution by offering a mixing console system that keeps analog circuitry and conversion to a minimum. All fundamental aspects of recording—for example, gain control, equalization, compression, limiting and time delay—are performed in the

# THE TRUE MEASURE OF PERFORMANCE



## ASACA/SHIBASOKU • CC-5 Color Encoder

The CC-5 is the new world standard color encoder for use with all character generators, chroma keyers and computer graphics systems.

- 2 RGB inputs plus 3 composite video outputs. Additional outputs include R-Y, B-Y, chroma, Y, I and Q.
- Split field color bars generated internally.
- Aperture correction.
- Phase of output signal may be varied from 0°–360°.
- Remote controllable.
- Available in NTSC; PAL B, M, N; and SECAM Systems.

Measure your performance with the best.

ASACA/SHIBASOKU CC-5. From RGB to a clean, accurate, composite color signal.



ASACA/SHIBASOKU CORP. OF AMERICA  
12509 Beatrice Street, Los Angeles, California 90066  
Sales, Service: (800) 423-6347 • (213) 827-7144

Circle (65) on Reply Card

# Be sure they all get the picture

## with General Electric Professional Large Screen Video Projection

With General Electric's exclusive system for bright, sharp professional-quality pictures, up to 25 feet wide, General Electric Professional Large Screen Video Projectors are making presentations more dramatic, more productive, and more convenient.

Whether videotape, live transmission, TV programming or data direct from your computer, the pictures projected can be seen by everyone in the room, all at once, even when room lighting is provided so viewers can take notes and refer to written material.

The color projectors show every viewer the same accurate color reproduction. An exclusive General Electric system registers the colors for you, eliminating time-consuming manual adjustments.

Portable and flexible, General Electric projectors are being used in a great variety of applications, including both rear and front projection. Ask our applications experts whether yours can be added to the growing list, which includes:

**Education:** Medical, dental, engineering, computer science instruction.

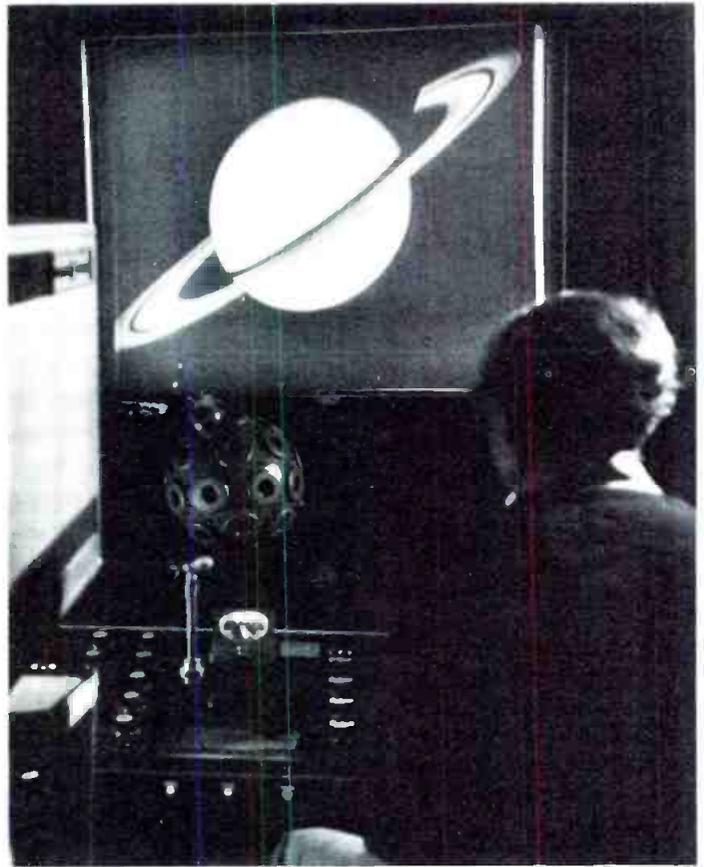
**Business:** Sales meetings, industrial training, product presentations, real-time display of computer-generated data, teleconferences.

**Aerospace and Defense:** Situation displays, simulator training.

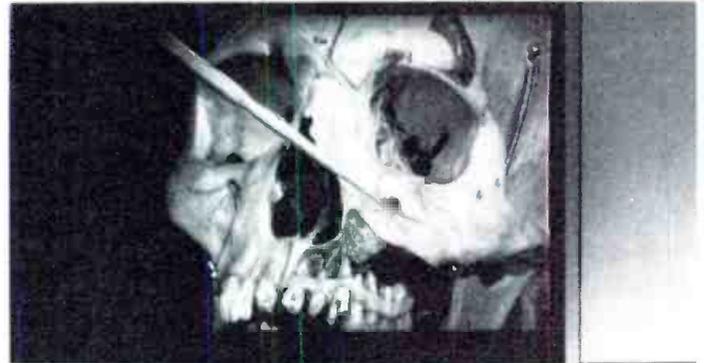
**Entertainment:** Theatre television, closed-circuit TV events, overflow crowds, special effects.

**Television Production:** Backgrounds for news programs, special effects, data display, program previewing.

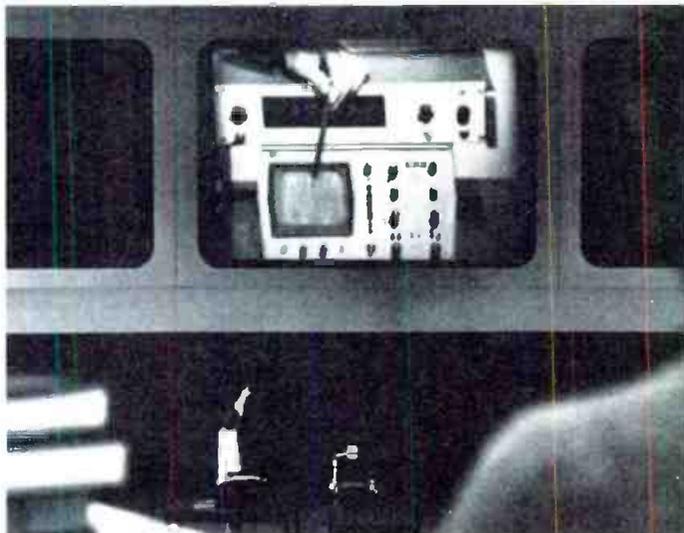
Call or write: General Electric Company, Video Display Equipment Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152.



**SELL-OUT CROWDS** at Fiske Planetarium, Boulder, watched live NASA transmission presented by General Electric projector.



**MINUTE DETAIL ENLARGED** by General Electric projector for 150-student classes at Upstate Medical Center, Syracuse.



**ENGINEERING INSTRUCTION** displayed by General Electric projector in 820-seat auditorium at University of Cincinnati.

GENERAL  ELECTRIC

Circle (66) on Reply Card

# THE SOURCE

## For all your equipment needs



- AKG • Amperex • Ampex
- Atlas • Audiopak
- Audio Technica • Belden
- Broadcast Electronics
- CRL • CSI • Crown
- Cablewave Systems • DBX
- Deltalab • Electro-Voice • EXR
- Fidelipac • Inovonics
- Jampro-Cetec • JBL • Leader Instruments • Lexicon • 3-M
- Marti • Micro-Trak • Nortronics

Orban Associates • Otari • Phelps Dodge • Revox • Russco  
 • Shure • Sola • Staco • Stanton • Surcom • Tapco  
 • Technics • Telex • Urei • VIF and many more.

Call us for fast shipments from stock **305-651-5752**



Telex 51-4733 ELECTREX MIA

**ELECTREX COMPANY** © 1983

18680 N. E. 2nd Avenue, Miami, Florida 33179

Circle (111) on Reply Card

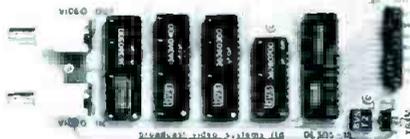
*Quality*

*Economy*

*Delivery*

## **(bvs)** RACK MOUNTED VIDEO DELAYS

### DL 505 SERIES



- 75Ω, isolated grounds between channels
- equalized to 5.5MHz
- one signal channel per board
- 16 PC boards in 3-1/2" high frame
- delays from 10ns to 1900ns
- precise timing via gold jumpers & fine trim
- wider range per board than Brand 'M'

Circle reader number for full catalog of **(bvs)** delay lines and filters.

### **broadcast video systems**

1050 McNicoll Avenue, Agincourt, Ontario M1W 2L8  
 Telephone (416) 497-1020 Telex 065-25329

Circle (112) on Reply Card

Want more information on advertised products? Use the Reader Service Card.

## Equipment exhibitors

Use the Reader Service Numbers to obtain information.

AB Systems Design	(400)
A.C.E.S.	(401)
ACO Pacific	(402)
ADC Magnetic	(403)
AKG Acoustics	(404)
AMI/Concepts Design	(405)
ANT Telecomm. Ltd.	(406)
APSI	(407)
Acoustic Design	
by Jeff Cooper	(408)
Acoustilog	(409)
Adams-Smith	(410)
Advanced Music Systems	(411)
Agfa-Gevaert	(412)
Allen & Heath Brenell	(413)
Alpha Audio Acoustics	(414)
Altec Lansing	(415)
Amber Electro Design	(416)
Amek Consoles	(417)
Ampex	(418)
Anchor Systems	(419)
Anvil Cases	(420)
Aphex Systems	(421)
Ashly Audio	(422)
Association of Sound & Communications Engineers	(423)
Audico	(424)
Audio Arts Engineering, Div. of Wheatstone	(425)
Audio & Design Recording	(426)
Audio Developments	(427)
Audioforce	(428)
Audio Kinetics	(429)
Audio Magazine/ CBS Publications	(430)
Audiotechniques	(431)
Audio Video Automations	(432)
Audio Video Consultants	(433)
Automated Studio Tech.	(434)
BASF Systems	(435)
BES	(436)
BOSE	(437)
BTX	(438)
Beyer Dynamic	(439)
Big Briar	(440)
Brooke Siren Systems Ltd.	(441)
Bruel & Kjaer Instruments	(442)
Brystron Ltd.	(443)
C-Tape Developments	(444)
Calibration Standard Instruments	(445)
Calzone Case	(446)
Canare Cable	(447)
Cetec Gauss	(448)
Cetec Vega	(449)
Clear-Com Intercom	(450)
Community Light & Sound	(451)
Connectronics	(452)
Countryman Associates	(453)
Crest Audio	(454)
Crown	(455)
dbx	(456)
DOD Electronics	(457)
Datatronix	(458)
Dawn Audio Recording Technology Institute	(459)
Design Direct Sound	(460)
Digital Entertainment	(461)
Dolby Laboratories	(462)
Dyno My Piano, MSC	(463)
EEC/Sony AV Products	(464)
EXR	(465)
Eastern Acoustic Works	(466)
Electro Sound	(467)
Electro-Voice	(468)
Emilar	(469)
Eventide	(470)
FM Acoustics Ltd.	(471)
Fairlight Instruments	(472)
Fender Musical Instruments	(473)
Fostex	(474)

# FILM QUALITY VIDEO NOW

## With DigiVision's New Compact High Resolution Converter.

DigiVision brought high resolution television to the world with its DRGB-343 digital high resolution converter. We'd invite you to compare it to our competitors, but we don't have any . . . you might say we invented an industry.

Our business is enhancement of *standard* full-motion color NTSC or RGB television signals. Take an input from a video camera or tape recorder, video laser disk or even off-air broadcast signal, feed it to the DRGB-343 and watch a dramatic transformation take place.

Using a 1000-line video display, you'll see a motion-compensated, high resolution picture free of the color distortions and single pixel uncorrelated noise you thought were normal. Discover, for the first time, that a television picture can have depth and reality.

**HOW MUCH IMPROVEMENT?** A standard NTSC picture which has an equivalent of 283,000 resolution elements becomes a 1,340,000-pixel masterpiece. With 24 bits per pixel, the color palette is true-to-life. Video noise is reduced dramatically, while image stability is improved and raster scan lines eliminated.

### HOW WILL YOU USE THIS NEW TOOL?

In business management applications, DigiVision's DRGB-343 will make transmitted data . . . charts, educational matter, text . . . legible, even when projected onto a large screen. No more purple and green complexions on your corporate officers.

**WE'RE SHIPPING THE REMARKABLE NEW COMPACT DRGB-343 NOW.** If you'd like to see how legibility and fidelity can help you get the whole picture, contact us . . . we're ready right now!

### APPLICATIONS

**Business Management Information Systems**

- Video Teleconferencing
- Education & Training
- Large Screen Projection Systems
- Seismographic & Other Simulated Information Displays

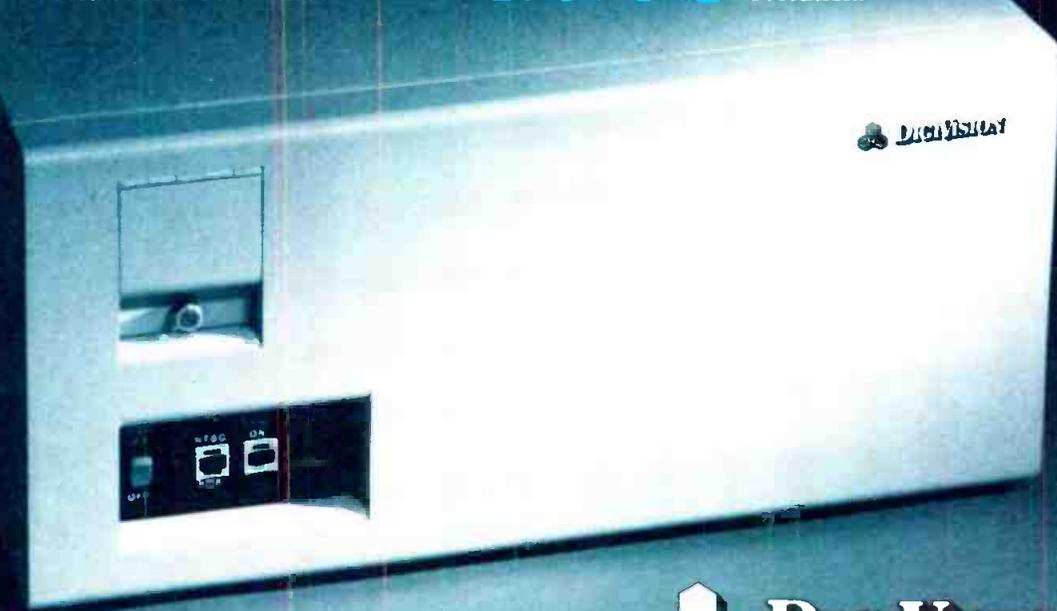
**Military**

- Education & Training
- Command and Control Systems

**Medical**

- Hospital & University Education & Training
- Diagnostic & Imaging Displays

**DRGB-343** The High Resolution Revolution!



**DIGIVISION**

*Get the picture!*

DigiVision, Inc.  
4980 Carroll Canyon Road  
San Diego, CA 92121 • (619) 481-9988

Circle (87) on Reply Card

Furman Sound	(475)
Gauss Loudspeakers	(476)
Gold Line	(477)
Gotham Audio	(478)
Grass Valley Group	(479)
The David Hafler Company	(480)
HM Electronics	(481)
Harrison Systems	(482)
Heino Ilsemann GmbH	(483)
Hill Audio Ltd.	(484)
ICM Switzerland	(485)
IQS	(487)
ITAM/JC Audio Distributors	(486)
Ibanez Pro. Products	(488)
Infonics	(489)
Inovonics	(490)
Interface Elec.	(491)
Intl. Audio	(492)
Intl. Musician & Recording World	(493)

JBL/UREI	(494)
JRF/Magnetic Sciences	(495)
JVC	(496)
King Instrument	(497)
Klark-Teknik Elec.	(498)
Kurzweil Music Systems	(499)
Lexicon	(500)
David Lint Associates	(501)
Loft & Loftech Pro. Audio	(502)
MCI, a Div. of Sony	(503)
MICMIX Audio Products	(504)
MOGAMI Products Div./ Marshall Electronics	(505)
MXR Innovations	(506)
Marshall Elec.	(507)
Martin Audio Ltd.	(508)
Martin Audio Video	(509)
Matsushita Electric	(510)
Melkuist Ltd.	(511)
Meyer Sound Labs	(512)

Midas Audio Systems Ltd.	(513)
MiLab/Creative Trade, CTAB AB	(514)
Mitsubishi Electric Sales America	(515)
Modular Perfection	(516)
Modular Sound Systems	(517)
Motorola Piezo Ceramic	(518)
Music Tech.	(519)
NEI	(520)
NTP Elektronik A/S	(521)
Nady Systems	(522)
Nagra Magnetic Recorders	(523)
Neutrik Products	(524)
Rupert Neve	(525)
New England Digital	(526)
New York Audio Labs	(527)
Omnimount Systems	(528)
Orban Associates	(529)
Ortofon	(530)
Otari	(531)
Passport Design	(532)
Peavey Elec.	(533)
Penny & Giles	(534)
Pentagon Industries	(535)
Philips	(536)
Pioneer Elec.	(537)
Pro Sound News	(538)
Publison Audio Professional	(539)
Pulsar Labs	(540)
QSC Audio Prod.	(541)
Quad-Eight Elec.	(542)
Quantec	(543)
Quantum Audio Labs	(544)
RAMSA/Panasonic	(545)
Reasonable Alternatives	(546)
Recording Studio Equipment	(547)
Red Acoustics Ltd.	(548)
Renkus-Heinz	(549)
Restoration	(550)
SCV	(551)
SIFAM/SELCO	(552)
Sagamore Publishing	(553)
Saki Magnetics	(554)
Samson Music Products	(555)
Sansui Electronics	(556)
Schoeps/Posthorn Recordings	(557)
Sears Sound	(558)
Sennheiser Electronic	(559)
Sequential Circuits	(560)
Sescom	(561)
Shure Brothers	(562)
Simmons Group Centre	(563)
Solid State Logic	(564)
Sonosax	(565)
Sony Pro. Audio Products	(566)
Sorco Products	(567)
Soundcraft Electronics	(568)
Sound Ideas Sound Effects Library	(569)
Sound Technology	(570)
Soundtracs	(571)
Sound Workshop Pro. Audio Products	(572)
Stanton Magnetics	(573)
Studer Revox	(574)
Studio Sound	(575)
Studio Technologies	(576)
Symetrix	(577)
Syton Electronics BV	(578)
3M/Magnetic Audio/Video Products Div.	(579)
TEAC	(580)
TOA Electronics	(581)
Tannoy Ltd.	(582)
Tektronix	(583)
Telex Comm.	(584)
Trident Audio Developments	(585)
Turbosound	(586)
URSA MAJOR	(587)
Ultimate Support Systems	(588)
Valley People	(589)
Vesta Fire	(590)
Whirlwind Music Dist.	(591)
White Instruments	(592)
Wireworks	(593)
Xedit	(594)
Yamaha Int'l.	(595)

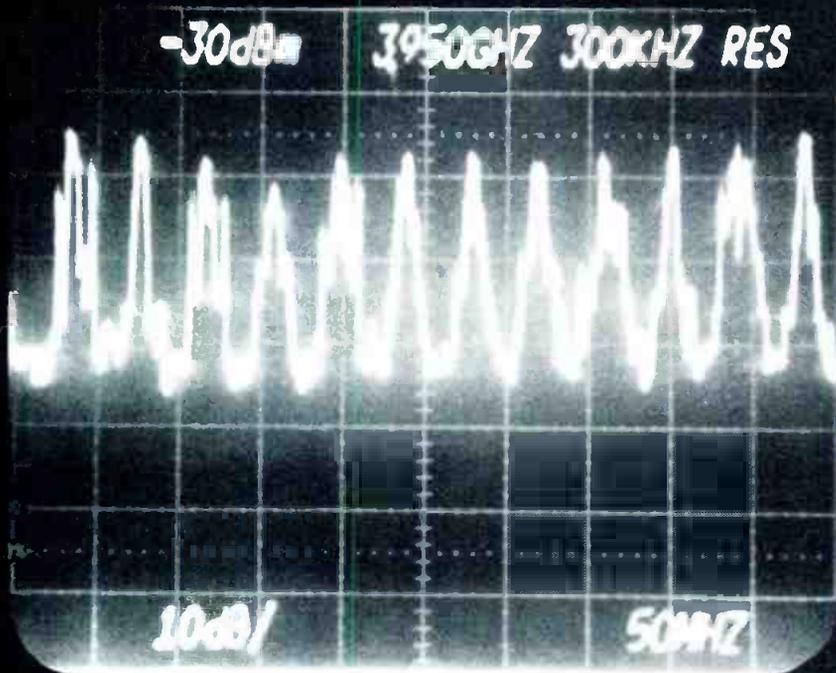


Photo Courtesy of Compucon, Inc.

## THE PROBLEM

### Radio Frequency Interference.

Your horizontal transponders are being eaten up by RFI in the 3.950 GHz band. Levels as shown would be difficult to filter and require shielding.

## THE SOLUTION

### RFI Shielding™ and Edge Treatment.™

Proprietary edge and shielding designs optimize the diffractive and absorptive qualities of lightweight, cost effective materials in modular configurations.

## THE SOURCE

### VSC Corporation.

VSC offers RFI Shielding™ and Edge Treatment™ in a variety of configurations for C Band Transmit and Receive applications. Write or call Terry Lynch at VSC. Telephone (505) 869-2922.

### VSC CORPORATION

Box 9340 International Airport  
Albuquerque, New Mexico 87119



© 1984 VSC

Circle (68) on Reply Card

# THE WORLD'S ONLY FULLY DIGITAL TELECINE IS NOW IN AMERICA!

It's the MARCONI LINE ARRAY TELECINE B3410—the telecine that not only delivers a new standard of quality for film-to-tape transfers but can appreciably add to your productivity and profits!

The reasons are simple. The Marconi B3410's fully digital processing and CCD image sensors deliver an extraordinarily true video picture. And the Marconi B3410 does not require time-consuming tweaking, day-to-day adjustments and set-up arrangements that rob you of valuable hours of productive work.

The Marconi B3410 delivers full performance within two minutes from the time you switch on. Moreover, there is no registration

drift and no tubes to replace. It interfaces with all available color correctors, converts into all international standards and—by its very digital nature—is designed to have an exceptionally long life.

And, because the Marconi B3410 is distributed and supported by A.F. Associates—America's largest designers and builders of video systems—there is no lack of engineering backup and spares on both the East and West coasts!

Call us today for prices, availability, delivery: Richard Lunniss or Marc Bressack in New Jersey (201) 767-1000 or Noel Parente in California (213) 466-5066.



## THE MARCONI LINE ARRAY TELECINE B3410



**A.F. ASSOCIATES INC.**

ADVANCED SYSTEMS AND PRODUCTS FOR THE VIDEO INDUSTRY

AFA PRODUCTS DIVISION/100 STONEHURST COURT, NORTHVALE NJ 07647 (201) 767-1000

Circle (69) on Reply Card

# Whisper Glide™

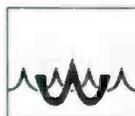
The "High Performance" fader that "FEELS" as good as it sounds



## WHISPER GLIDE ...

The new name in professional audio faders. Absolutely the SMOOTHEST action in faders available ... AND ... with superior MystR® conductive plastic elements. Continuous, computer-generated, noise-free output functions provide excellence to the serious audio professional.

Available in 100 and 65 mm lengths. Linear, modified audio, logarithmic tapers. The SMOOTH choice for Broadcast and Recording Mixer Service. Even the price "FEELS" good.



**Waters Manufacturing, Inc.**  
Longfellow Center,  
Wayland, MA 01778  
(617) 358-2777 - (617) 893-6900.

Circle (70) on Reply Card

## When accuracy Counts... Count on Belar for AM/FM/TV MONITORS



**BELAR**  
AM MODULATION MONITOR

**BELAR** CALL ARNO MEYER (215) 687-5550  
**ELECTRONICS LABORATORY, INC.**  
LANCASTER AVENUE AT DORSET, OEVON, PA. 19333 • BOX 826 • (215) 687-5550

Circle (71) on Reply Card

## RACK MOUNTABLE VIDEO DELAY LINES

A complete Rack Mountable series of Videc & Pulse Delay Lines, with the capability of replacing up to 1450 feet of 75 ohm coaxial cable. The units reduce size, weight, installation costs, save time and effort in making delay changes.

Part No.	Delay Range (Nano-Sec.)	Delay Steps (Nano-Sec.)	Method of Variation	Maximum Insertion Loss @ 100 KHz (db)	Amplitude Flatness At Any Delay Setting 100 Hz to 5.5 MHz (db)	Max. Rise Time (Nano-Sec.)
VRM0255	0-255	1.0	Slide Switch	.40	.4 Max.	20
VRM0637	0-637.5	2.5	Slide Switch	*1.00	.4	28
VRM1275	0-1275	5.0	Slide Switch	*3.00	.4	33
VRM2270	0-2270	10.0	Slide Switch	*3.00	.5	40
VRS0317	0-317.5	2.5	Strap	.40	.5	26
VRS0635	0-635	5.0	Strap	.75	.5	35
VRS1270	0-1270	10.0	Strap	1.50	.5	37
VRS2260	0-2260	20.0	Strap	3.00	.5	40

\*±.2db variation at any delay setting.



Call/Write for Video Delay Lines and Video Filters Catalog  
**ALLEN AVIONICS, INC.**  
224 EAST SECOND ST.  
MINEOLA, NY 11501  
Phone: 516-248-8080

Circle (72) on Reply Card

digital domain. As a result, Roche told the press, digital tape machines can be interfaced with the console without conversion, thus removing the problems of changing formats between digital and analog.

Internally the DSP is capable of using 32-bit words, which eliminates concerns about system overloads. With all audio signals in digital format, audio and control signals are routed together, making the system fully assignable and easily reconfigured to almost any audio balancing requirement. As a result, each sound engineer (or session) can have a personalized floppy disc that can be used to set the console controls to previously assigned positions in seconds.

Although the DSP may seem rather expensive, it becomes more attractive if you consider the complete system cost rather than the cost of the DSP



Dr. Toshi Doi, deputy general manager, Sony Audio Products Group, presented a historical perspective on the DASH format. Doi was the scientist mainly responsible for the development of the compact disc system.

alone. The use of fiber-optics for signal routing and remote controls puts the DSP into a new dimension for installations, as compared to conventionally wired systems.

To date, four DSPs have been ordered, with the BBC, CTC Studios, Tape One Studios and the British Museum being the early customers. The first delivery, to the BBC, was scheduled to be installed in a mobile van in time for airing Christmas music from King's College in Cambridge, England.

AES attendees saw only working sections of the DSP, rather than a complete system. However, the BE staff saw a prototype of the system in operation at the Neve facilities last

# Pick a number from 9 to 52!

You've just chosen the ideal DC voltage to phantom-power these new ATM electret microphones.

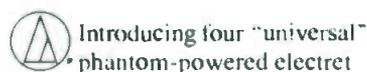
ATM11R

ATM10R

ATM31R

AT8501

ATM91R



Introducing four "universal" phantom-powered electret microphones. Designed to work from external power, internal regulation automatically handles any voltage from 9 to 52 VDC without adapters, switches, or rewiring. Just plug in and enjoy. With current drain a mere 0.3 mA at 9 volts (4 mA at 12-52V) a 9V battery lasts thousands of hours, not just the 60 or 70 hours typical of other mikes.

When your power supply isn't available, or isn't enough, use ours. The new AT8501 Dual Battery Supply holds two 9V batteries. One to use, and one in reserve. Instant switchover and test LED eliminates guesswork. And spares are as near as the closest shopping center. Neat!

But convenience and versatility are just two of the advantages of the new ATM models. All-new electronics provide plenty of headroom inside the microphone with no more than 1% THD even when used in acoustic fields of 141 dB SPL. Which sets new standards for clean sound even close-up to big brass or inside a powerful drum kit.

And the sound you hear is wide-range and *musical*. Presence without peaks. Highs to 20,000 Hz but without a raspy "edge." Yet despite their responsiveness, these new ATM microphones have the "Road Tough" reliability proved so often on stage and in the studio.

Before you add another microphone, compare our sound, our convenience, our reliability, and our cost. Write for literature and list of nearby ATM microphone specialists. Get great sound...right from the start! AUDIO-TECHNICA U.S., INC., 1221 Commerce Drive, Stow, Ohio 44224. (216) 686-2600.

Circle (73) on Reply Card

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

audio-technica®



Dr. Martin Jones, group technical director, Neve Electronic Holdings, described to the press the advanced circuitry used in Neve's DSP, the world's first all-digital mixing console.

year following IBC-'83 in Brighton, United Kingdom.

#### The compact disc

The compact disc (CD), although still in its infancy, is maturing rapidly. Nevertheless, considerable controversy is being generated within the industry as to the quality of the sound being offered in CD players, especially in first-generation players for the consumer market.

Despite that factor (to be expected in the emergence of a new technology),

the convention featured much action concerning the CD.

- Philips displayed its new CD mastering system and its professional broadcast CD player.

- Sony introduced its CD modular system for professionals, the CDS-3000 control unit and the CDP-3000 player(s). A variation of the CDP-5000, the new system is designed for programming CDs in broadcast radio and TV stations and for professional audio production applications. Sony also announced that it is making its CDA-5000 CD quality control analyzer available for quality assurance of CD masters and replicated discs. Also, Sony held a press conference to introduce its new CDP-200 player. A more affordable player than the CDP-101, it also has new index search features for accessing specific music passages. Suggested retail for the CDP-200 is \$700.

- Sansui demonstrated its CD player, the PC-V1000.

- dbx announced that a transcoder is being developed to convert, in the digital domain, its CPDM (Com-panded Predictive Delta Modulation) to the PCM (Pulse Code Modulation) format necessary for mastering CDs.

- PolyGram distributed data describing the design and production of CDs.

- Many major exhibitors used CD players to demonstrate the audio quality of their systems, although the CD players usually were kept behind the scenes.

- During the convention, the National Academy of Recording Arts and Sciences granted the President's Merit Award to Sony and N.V. Philips for their development of the CD digital audio system. Highlights of this presentation were replayed at Sony's press conference.

#### Future conferences

The AES announced changes in conference plans at AES-'83. The schedule calls for one convention each year in North America and one elsewhere. There also will be two theme conferences each year, one in the United States and one abroad. The theme conferences will have restricted exhibits.

- The first theme conference will be held May 11-14, 1984, at the Disneyland Hotel in Anaheim, CA. The topic will be "The Recording Arts and Sciences."

- The next full convention will be held March 27-30, 1984, at the Palais de Congress in Paris.

- The next full US convention will be held Oct. 8-11, 1984, at the New York Hilton.

## You'll meet your match with our EDITING CONSOLES

No matter what VTR equipment you use, Winsted offers Editing Consoles to match your requirements! Our designs are based on consultations with professional users like yourself.

You've chosen your VTR equipment carefully, to meet your specific needs. Now choose the Editing Consoles that fit your equipment - quality consoles from Winsted.

For our free full-color FULL-LINE CATALOG call us toll free:

800-328-2962  
TELEX: 910-576-2740

# Winsted

9801 James Circle  
Minneapolis, MN 55431



Circle (74) on Reply Card

## upMC

from CALAWAY ENGINEERING

### upMC is today's interface for today's machines



available for:

AMPEX/VPR-80\* OTARI/5050 IIII  
SONY/BVH-2000\* SONY/BVU-800/820\*  
SONY/BVW-10\* ADAMS-SMITH 2600

Compatible with ISC Superedit\* and  
CMX\* Computer Editing Systems

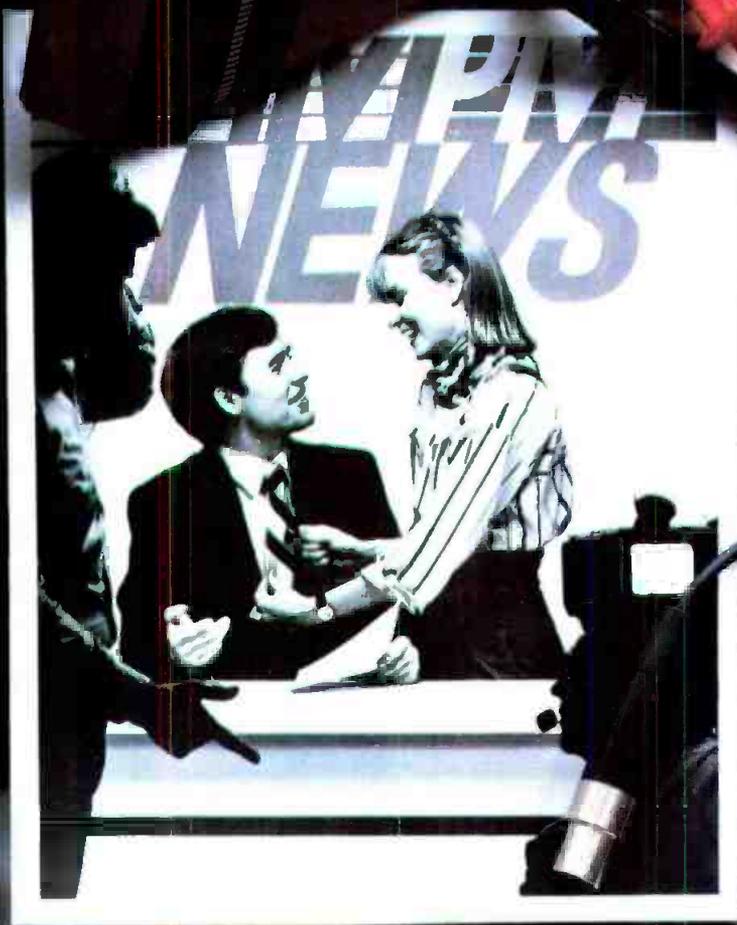
\*Registered Trademarks of Ampex, Sony,  
Orrox Corporations & Interactive Systems Company



CALL OR WRITE  
**CALAWAY ENGINEERING**

49 SOUTH BALDWIN AVENUE / P.O. BOX 323  
SIERRA MADRE, CA 91024 / (818) 355-2094

Circle (75) on Reply Card



## Our new lavalier mic makes everyone look good. Introducing the SM83.

People in news broadcasting have been using the same lavalier mic for a long time. But our new Shure SM83 is out to change all that. It's just what everyone has been asking for in an omnidirectional condenser microphone.

**On-camera talent** like the SM83 because its electronics provide for a dip in the mid-range, giving both male and female voices a smoother, more natural sound. And unlike its Japanese counterpart, the SM83 unplugs from the battery pack for easy storage.

**Sound engineers** appreciate the SM83 because its tailored frequency response requires less equalization. They like its low-frequency rolloff too, which quiets on-air rumbling and mechanical and clothing noise.

**Set directors** are impressed with the SM83's neat appearance on camera. The cord exits from the side and disappears from view, running down behind a tie, shirt or blouse.

**Production assistants** enjoy the SM83's mounting versatility. It comes with a single clip that works either vertically or horizontally, a double clip that holds two mics, and a universal mount that can be sewed, pinned or taped to clothing.

**Repair technicians** love the SM83's easy maintenance. The cartridge is easily accessible by unscrewing the end cap. And cable replacement requires only a screwdriver and tweezers: no soldering is necessary.

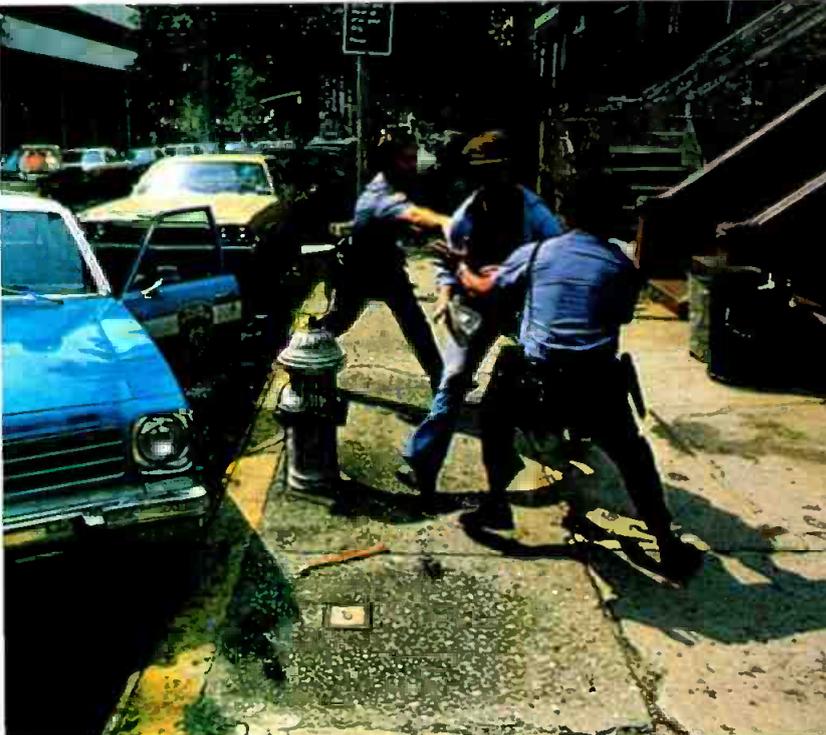
**Field crews** are also big fans of the SM83 because its electronic pack is powered by a standard 9-volt battery or by a mixer's phantom supply.

For more information on the Shure SM83, the little mic with big advantages, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204. (312) 866-2553.

# SHURE

THE SOUND OF THE PROFESSIONALS®...WORLDWIDE

Circle (76) on Reply Card



BVP-3 configured as camera/recorder; BVW-3 with BVV-1 Betacam recorder.



BVP-3, CA-3 Adapter & 10' cable to BVU-110 3/4-inch portable VTR.



# THE ONLY THING WON'T SHOOT IS

Folk wisdom would have you believe that nothing can be all things to all people.

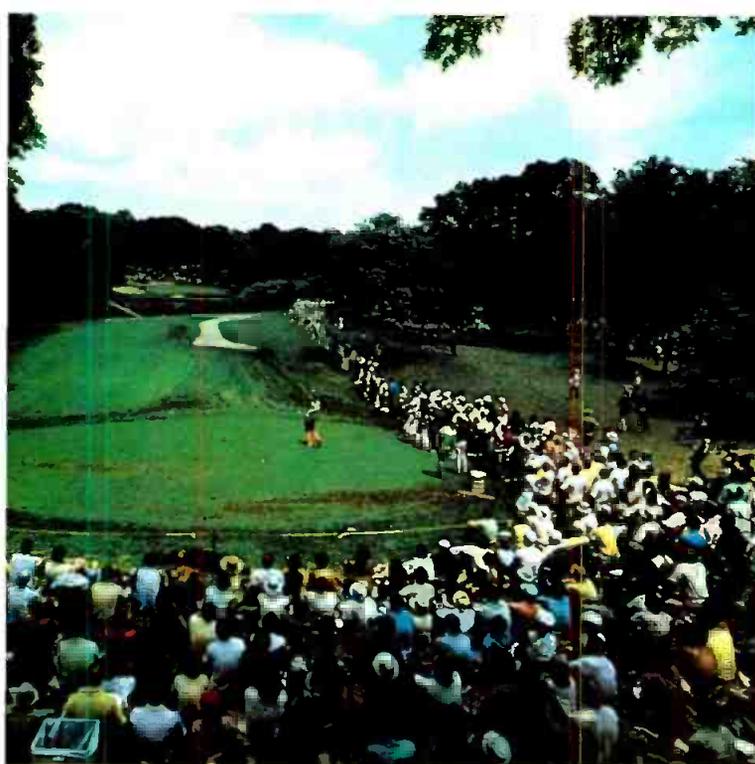
Obviously, those folks were not familiar with the Sony BVP-3. A camera whose broad appeal (in terms of image quality, price, weight and size) is equaled only by its exceptionally wide range of applications.

To start with, for those of you who shoot with a typical camera/cable/VTR configuration, the Sony BVP-3 offers an untypical choice: Record composite video on any 3/4" or 1" system. Or component video on our own highly regarded 1/2" Betacam™ format. With up to 30' of cable in between.

Step into the studio with a BVP-3 equipped with our new CA-30 Adapter and you can lay up to 1,000' of multicore to your Camera Control Unit. Or add a Digital Command Unit and stretch over a mile of Triax between your camera (or cameras in genlock) and the control truck. The exact same Digital Command Unit also includes all the necessary interfaces for a microwave, telephone modem and radio link. For those situations where no amount of cable can be used.

And, of course, you can always couple the BVP-3 to a Sony Betacam Recorder and get the absolute ultimate in compact, lightweight,

Sony Broadcast Products Company, 1600 Queen Anne Rd., Teaneck, NJ 07666. © 1984 Sony Corp. of America. Sony is a registered trademark and Betacam is a trademark of Sony Corp.



BVP-3, CA-30 Adapter, Digital Command Unit & 5,000' Triax to Camera Control.



BVP-3, 5" Viewfinder, CA-30 Adapter & 1,000' multicore to Camera Control Unit.



# THE SONY BVP-3 YOUR BUDGET.

film-style ENG/EFP shooting systems.  
NOT JUST MORE CAMERA CONFIGURATIONS. MORE CAMERA PERFORMANCE.

Still, for all its flexibility, the BVP-3's strongest point remains its reasonability. Because what you're getting is the state-of-the-art camera. At a base price of just \$20,000.\* A price that includes the image-making abilities of the Sony-perfected  $\frac{2}{3}$ " mixed-field Diode Gun tubes with their incomparable resolution, registration, S/N ratio and balance. The lightweight, heavy-duty camera body. The automatic setup and operational functions.

\*U.S. list price (includes camera head with tubes and viewfinder).

The built-in microphone. And all the rest.

Plus, you're getting a camera system that can grow with you. Becoming a camera/recorder one day, a studio camera the next.

In fact, any way you configure it, in performance, flexibility, price, size, you name it, the Sony BVP-3 is a camera worth looking into.

Which is easy enough to arrange. In NY/NJ, call (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6046; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; in the West (213) 841-8711.

**SONY**  
Broadcast

## DAY and NIGHT SERVICE FOR Continental AM & FM TRANSMITTERS

Continental Electronics offers 24-hour professional engineering service and parts for Continental and Collins AM & FM transmitters.

Whenever you need service or parts for your Continental or Collins equipment, phone our service numbers day or night.

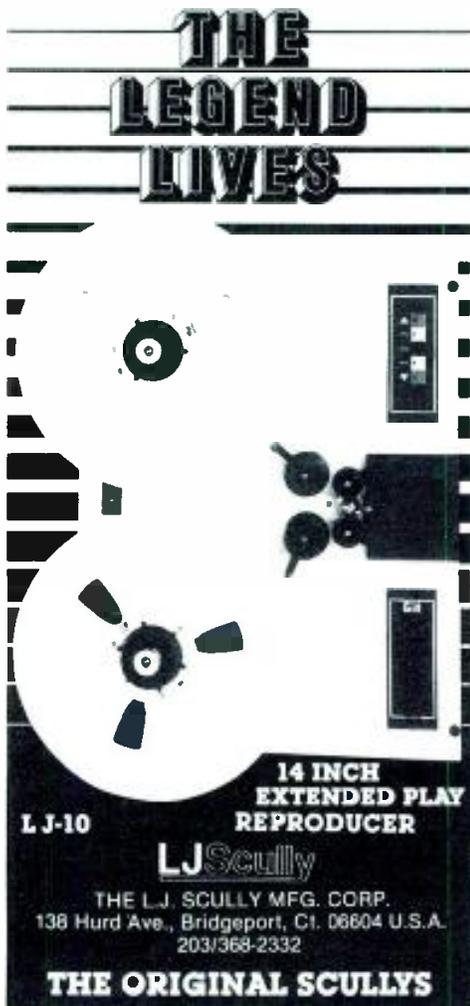
**(214) 327-4533**  
**(214) 327-4532 parts**

Continental Electronics Mfg. Co.  
Box 270879 Dallas, Texas 75227  
Phone (214) 381-7161

*Continental*  
*Electronics* 

1 kW thru 50 kW AM & FM transmitters and related equipment  
©1983 Continental Electronics Mfg. Co. 5332

Circle (77) on Reply Card



**THE  
LEGEND  
LIVES**

**L J-10**

**14 INCH  
EXTENDED PLAY  
REPRODUCER**

**LJ Scully**

THE L.J. SCULLY MFG. CORP.  
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.  
203/368-2332

**THE ORIGINAL SCULLYS**

Circle (78) on Reply Card

## Corporate profile:

# TEAC

By Carl Bentz, television editor



QUALITY · COST · DELIVER

**TEAC**  
TOYOOKA FACTORY

Artwork on buttons worn by TEAC workers stresses the corporation's concepts. The design of the "C" is a reminder that people are the basis of success.

The QCD buttons, worn by workers, and QCD signs, which hang over the assembly lines at TEAC's Toyooka factory, are more than symbols of an employee incentive promotional program. Quality, Cost and Delivery are concepts that have driven the TEAC Corporation since the introduction of its first product more than 28 years ago. The QCD idea, although not visually stressed at the Mitaka headquarters or the Murayama factory, is present in the atmosphere of all three facilities located in Tokyo.

TEAC means much more than just the original company name—Tokyo Electro-Acoustic Company. TEAC also stands for Technology, Excellence, Ability and Creativity, a translation also reflected in the corporation's policy statement from Katsuma Tani, president and founder of TEAC: "We respect sincerity, value originality and manufacture superior products to meet the needs of the world."

TEAC products often have been included in systems by other manufacturers, based on records of excellence, reliability and cost. TEAC expertise also may be found in cooperative ventures, one of which was with the Sony Corporation in the development of the U-matic format videotape recorder in 1966. TEAC's VCRs continue to be used in projects such as the NASA space shuttle program.

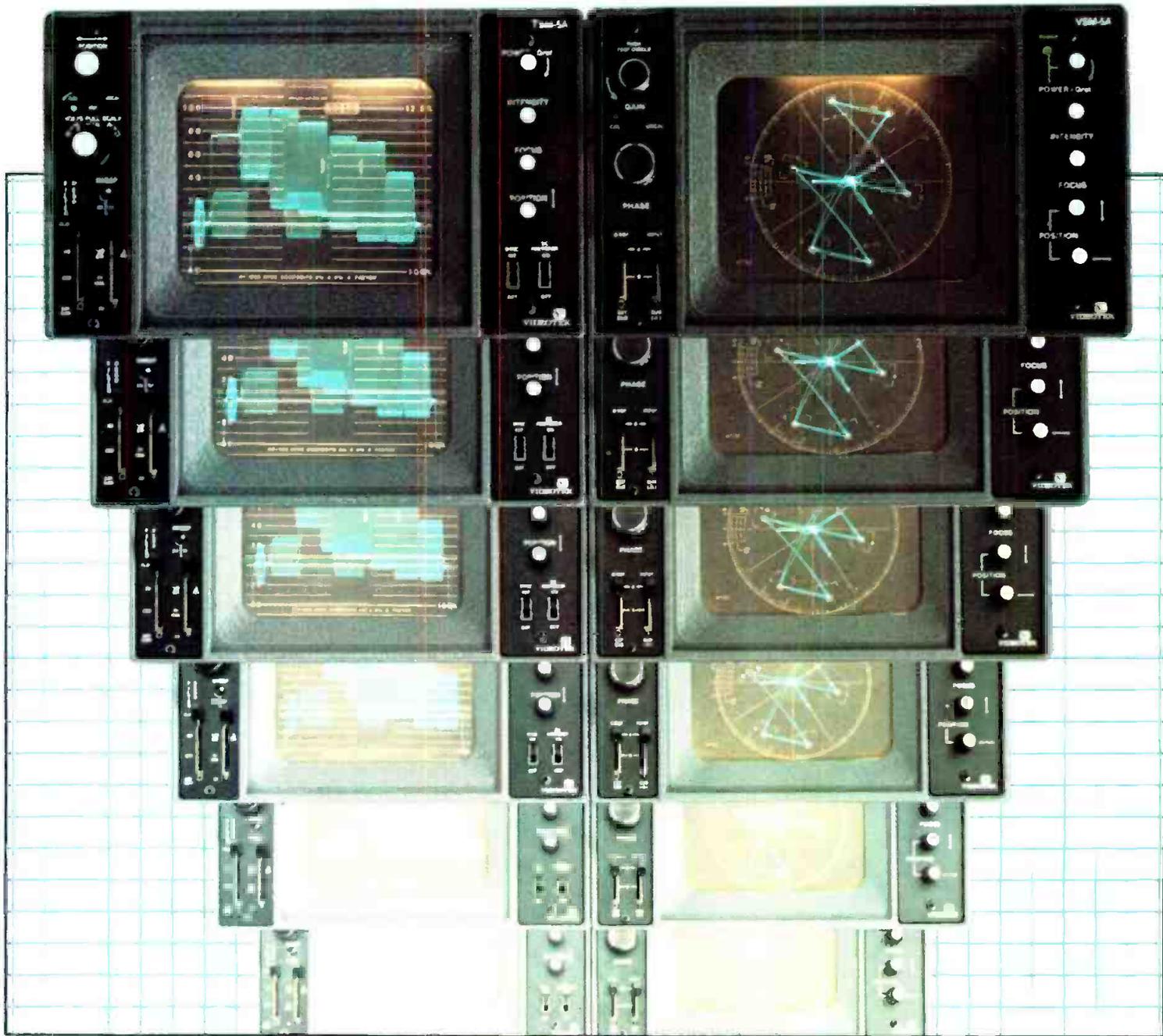
The TEAC product line revolves around equipment for the storage and retrieval of information. A major part of the company's business centers on systems of cassette and open-reel data instrumentation recorders. Also in the data field are floppy and Winchester disk units, for which the company holds a top share of the domestic Japanese market and has many OEM accounts in the United States.



Katsuma Tani, although more than 70 years old, continues to take an active part in the operation of TEAC.

Consumer-oriented audio products, with open-reel decks and cassette-based systems using integral Dolby noise reduction, are more widely known in the United States. Several models include interfacing for dbx noise reduction as well. TEAC professional audio products, under the subsidiary name TASCAM, are increasingly important to professional audio users around the world. For broadcast and production applications, TASCAM markets audio mixing consoles for music recording, sound rein-

# Moving up!



In only 3 short years, the Videotek TSM-5A Waveform Monitor and VSM-5A Vector scope are heading for the top of the video test equipment market. But that should come as no surprise. Just like our industry-leading line of Color Monitors, the TSM-5A and VSM-5A combine state-of-the-art engineering, innovative features, proven



reliability, and competitive pricing for outstanding waveform/vector scope value. And our aggressive product back-up and 2-week delivery policy are setting service standards that thousands of broadcasters, production houses, and video users worldwide have come to depend on. **Move up with Videotek.**

**The Cadillac of Exciters  
for under \$5,000<sup>00</sup>**



The SMX-40 is a fully frequency synthesized, FM Stereo Multiplex Exciter with over 30 watts of absolute RF drive power and extensive status indication and protection, rivaling *all* competitive exciters presently available *at any price*.

**FEATURES:**

- Frequency Synthesized in 10 kHz Increments
- DC Switching Power Supply
- 5-30 Watt (Adjustable) Wideband Power Amplifier
- Harmonic Filter in Output for Stand Alone Transmitter

**PARAMETER: SPECIFICATION:**

FM Signal-To-Noise - 70 db below 100% mod  
 Ratio ..... at 400 Hz (75 db typical)  
 Composite  
 Intermodulation  
 Distortion ..... 2% or less (.09% typical)  
 Composite Audio  
 Response ..... ± 0.2 db, 30 Hz-100 kHz  
 Composite Stew Rate 12 V/usec (symmetrical)  
 Frequency Stability ..... ± 300 Hz 0° to 50°C, Direct FM

Write for Sales Literature  
and complete Specifications



P.O. Box 694, Cleburne, TX 76031  
(817) 295-7771

Circle (80) on Reply Card

forcement and on-air installations. Also, multichannel control consoles are matched by open-reel recording equipment, interfaceable to SMPTE-based editing systems. Cassette decks, emulating many typical open-reel features, include the same engineering approach and manufacturing care that go into the other products.

**The beginning**

Tokyo Electro-Acoustic Company was formed on Dec. 24, 1956. Tomoma Tani brought a homemade 3-motor, 3-head stereo tape recorder to his brother Katsuma for an inspection. Katsuma, the elder of the two, already known in Japan as the "King of Sound Technology," was impressed sufficiently to organize the new com-

pany to manufacture the tape recording system.

Tani's work in audio products preceded the tape recorder, however. A graduate of the Tokyo Institute of Technology, he worked for a time with Tokyo University's aircraft research center. But as time passed, and Tani's personal opinions and feelings changed, his love of fine music directed his interest toward acoustics. Among the early products developed by Tani and the Tokyo Television Acoustic Company, which later merged into today's TEAC, was a phono disc-cutting system. The first Japanese-designed disc-cutter was soon modified to include models for on-site recording of audio program-

Continued on page 112



Only a few of more than 3000 different recording system designs are kept in the TEAC museum at the Mitaka headquarters building.



**3/4" Video  
Cassettes**



**RELOADABLE!**

Only COARC rebuilds and reloads your 3/4" U-Matic video cassettes with new 3M Scotch Brand Videotapes in this special way:

1. ALL labels are removed from used cassette by special COARC process which does not scratch or damage cassette.
2. Many reloaders spool directly into the cassette without inspecting or cleaning the inside. COARC opens, inspects and rebuilds every cassette. INSIDE and out.
3. Friction pads, tape wipers and door latches are replaced if necessary. Tape guides are inspected for excessive wear.
4. Under clean room conditions new videotape is placed in cassette already on the spool with tension rigidly controlled.
5. COARC will custom load any length from 3 minutes to 62 minutes.

COARC "like new reloads" cost considerably less than new cassettes, and custom loading lets you save even more by getting exactly the length of tape you need. Both 3M Color Plus or Agfa 297 MB Videotape available. Contact:

**COARC™**

P.O. Box 2, Route 217 Dept. D3  
Mellenville, New York 12544 (518) 672-7202

Circle (81) on Reply Card



## It was driving Arthur out of his tree.

Fidelipac builds the broadcast industry's most rugged, most reliable audio cartridge, by far.

Now, you know, we load those cartridges with tape from manufacturers whose tape meets our specifications. And we're very picky about those specs.

Every time we discover a hub with uneven oxide coating; poor surface bonding; ragged edges or spotty lubrication, Arthur Constantine,

our VP Sales, goes out of his tree. He'll ship miles of the stuff back to where it came from, before he'll send twenty five feet of it out to you.

That's the way he is. That's the way we all are.

And that's why seven out of ten radio stations around the world use Fidelipac Tape Cartridges.

There's simply no way we'll compromise the quality of our product.



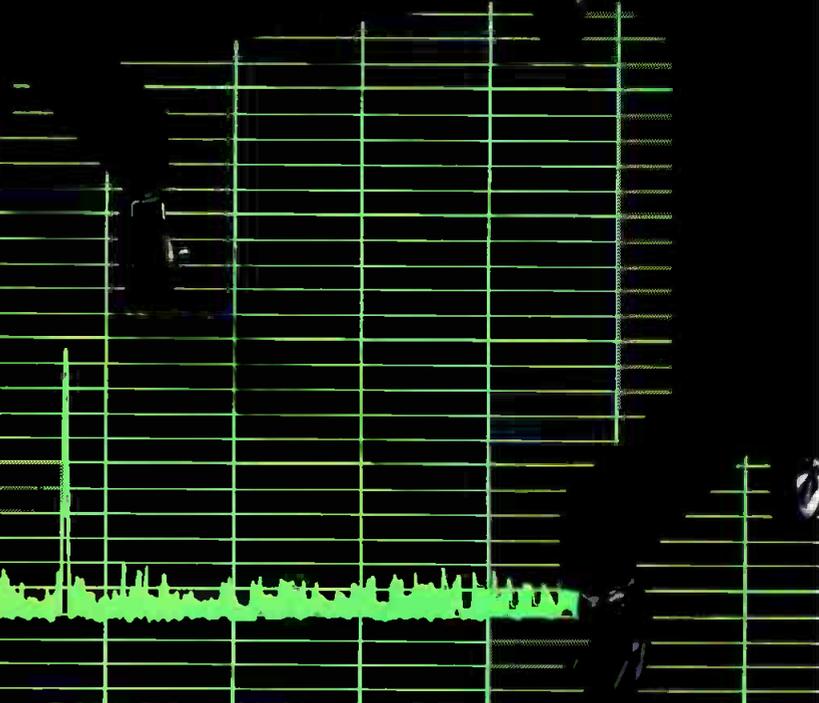
**FIDELIPAC®**  
BROADCAST TAPE PRODUCTS

Fidelipac Corporation □ P.O. Box 808 □ Moorestown, NJ 08057 □ U.S.A. □ 609-235-3900 TELEX 710-897-0254 □ Toll Free 800—HOT TAPE

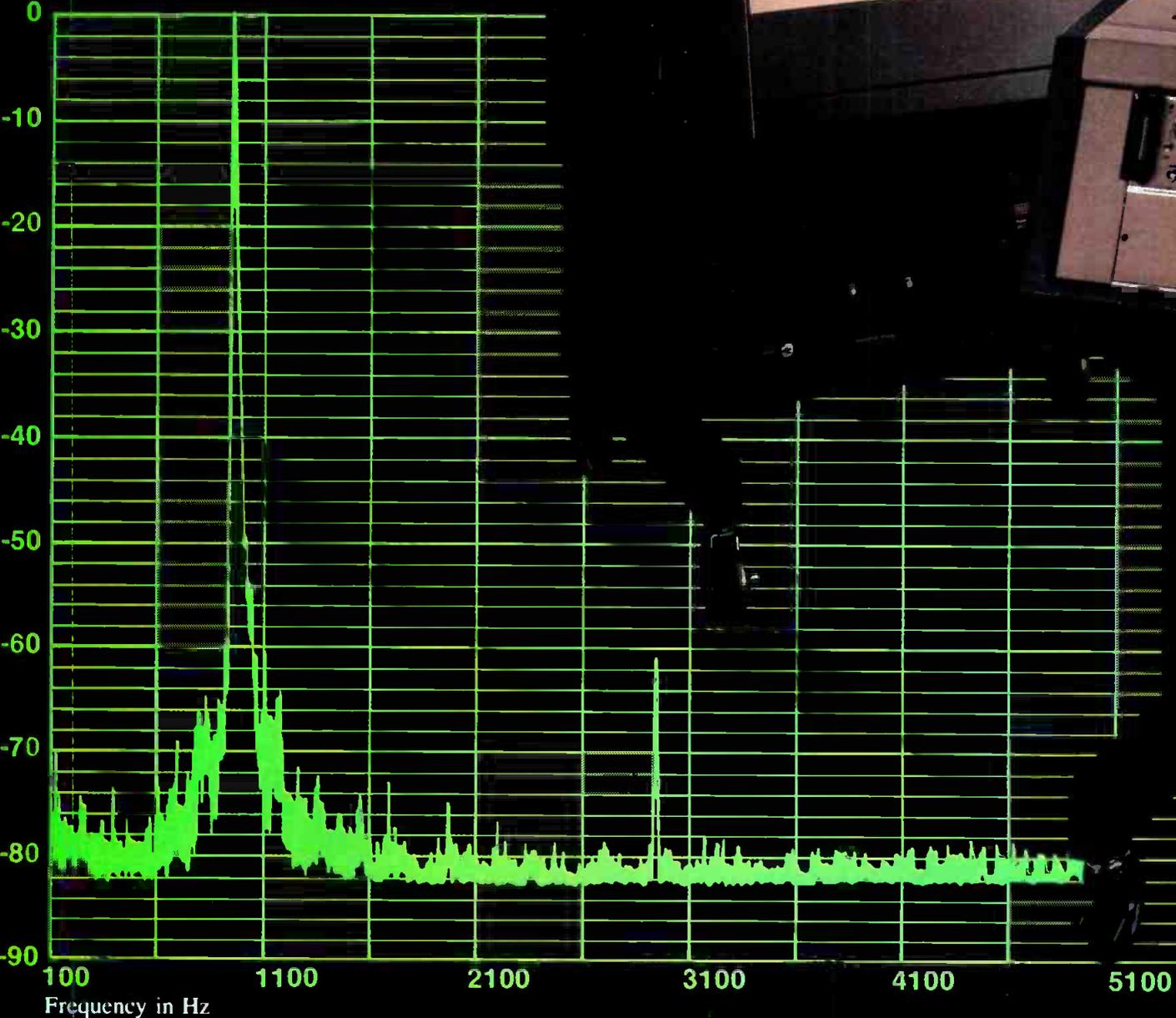
Circle (82) on Reply Card  
[www.americanradiohistory.com](http://www.americanradiohistory.com)



JH-110B-2-HP

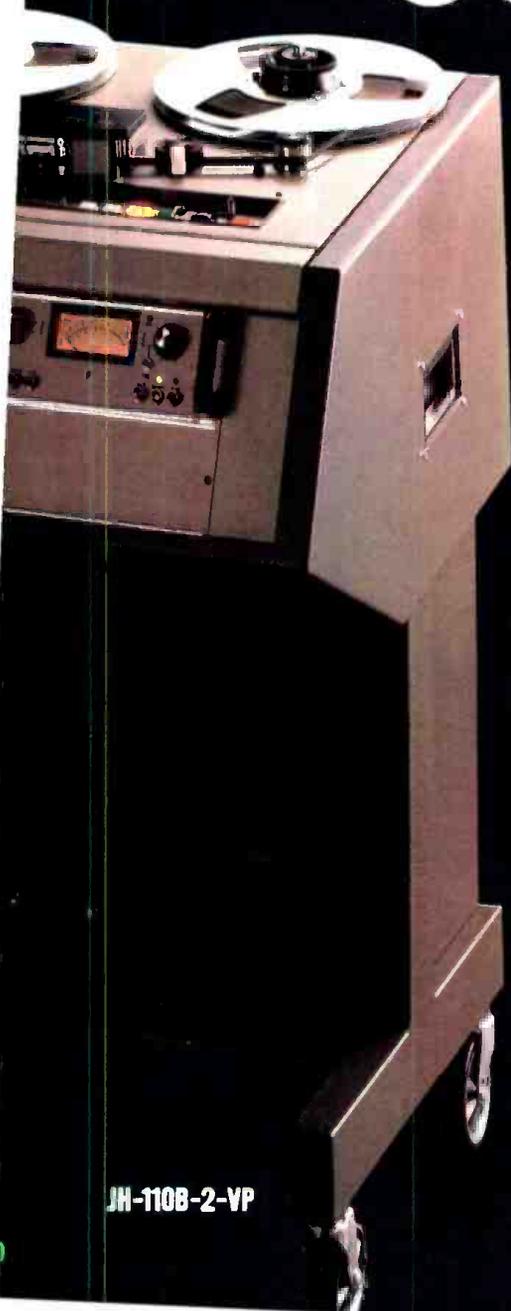


Amplitude in dBm



DISTORTION/PURITY OF SIGNAL

# DOES MCI REALLY OUTPERFORM THE REST?



In a world filled with claims and counter claims for high performance audio products, sometimes it's hard to separate opinion from fact. That's why MCI has provided complete graphic proof of all important tape recorder/reproducer performance characteristics. Now available in a handy Engineering Notebook, these curves and their accompanying methodology form the standard by which all other tape recorders must be judged.

If performance matters in your broadcast or teleproduction application, don't be fooled by "simple specmanship." And if you want to decide for yourself how the JH-110 Series measures up to comparable units, just ask Sony Professional Audio to arrange for a demonstration.

Does MCI really outperform the rest? We'll let you decide. For your free copy of the Engineering Notebook and more information about our demonstrator program, contact Professional Audio Products, Sony Communications Products Company, Sony Drive, Park Ridge, New Jersey 07656.

**SONY**  
Professional Audio

JH-110B-2-VP

ming. The disc recorder and, later, tape recording systems were adopted by the Japanese Broadcasting Company, NHK. A driving force today in the development of new, improved broadcast communications, NHK urged Tani to design a slow-motion color playback system that won acclaim for its use during the 1964 Tokyo Olympic Games.

**Storage/retrieval**

From the first designs executed by



Quality, Cost, Deliver is stressed, symbolized by a banner at the reel-to-reel assembly line in the Toyooka factory.

# Spill Coffee In Our Faders! You Still Get Great Sound!



## Custom Audio Series Consoles

- P&G's newest splashproof faders. (Most boards still use older, unprotected P&Gs.)
- Clear, crisp sound without hums, pops or RFI.
- Human-engineered layout for mistake-proof operation. (Recently chosen by blind operator who mixes by touch.)
- Full five year limited warranty.

**CALL TOLL-FREE 800-231-5870**

(Texas, Alaska, Hawaii call collect 713-782-4592)

**Logitek** Electronic Systems, Inc.

3320 BERING DRIVE • HOUSTON, TEXAS 77057 • (713) 782-4592

Tani to the more recent TASCAM products, which include the prototype FXZ-100 fixed-head digital audio recorder and an optical disc write/read system, the ultimate goal is information storage and retrieval with high accuracy. Whether the information to be stored is a digital or analog data-stream, or perhaps Tani's musical favorites (ranging from Beethoven's symphonic works to Rachmaninoff's piano concertos), the result of the process must stress accuracy.

The accuracy of the TEAC floppy disk drive has created a demand for production of the FD series 3- and 5¼-inch disk systems to increase from about 100,000 units per month during the latter half of 1983 to more than 150,000 units per month early this year. To meet the demand, an assembly line system has been instituted that includes automated and manned stations. Even with the larger number of units, a failure rate in the floppy disk product of 0.3% or less will be maintained, according to a TEAC representative. The FD series units may be found in many computer products in the United States as well as in Japanese products. The 5¼-inch Winchester drive units, an SD-506 with 6Mbyte and SD-412 with 12Mbyte storage capacities, both housed in the same space as a typical 5¼-inch floppy drive, are no less important.

To maintain accuracy in reproduction, TEAC's staff includes separate divisions for TEAC and TASCAM products. Even though many of the same signal handling processes may be used in data and audio recording products or in audio mixing, individual engineering design groups ensure that the intricacies of each process are not overlooked. To make sure that the products meet the industry's needs, much consideration is given to feedback from equipment users. In addition to such feedback, some staff members have worked in the record-

Circle (93) on Reply Card



All assembly lines are constructed with people in mind to make movement from one work station to another as easy as possible.



Every recording head constructed in the factory is placed *in service* for a complete checkout before it is released to the assembly department.

ing situation, checking to see how an audio console might be improved for simpler operation, to find ways to increase operation facilities of a reel-to-reel recorder and to create a cassette-based system that almost equals the reel-oriented recorder.

Extra effort taken for operational simplicity, with increased reliability and performance, has been an important part of the TASCAM program. The first products introduced by Tani and his associates stressed professional quality and performance. TASCAM equipment for the professional market also emphasizes quality and performance with an equal stress on providing equipment for the industry at as low a cost as is realistic.

Many details are taken into consideration during the design of each product. In audio consoles, each mixing channel allows microphone, line and multitrack recorder inputs to be connected at all times, with switch

selection of the desired signal. No repatching is required, saving on possible plugging errors as well as connector failures, and adding to reliability. In recorders, specially designed heads are manufactured by TEAC at the Toyooka factory for audio and data recorders, allowing punch-in edits to be performed in audio without level changes often found in such situations. Automated component insertion and wave soldering add to circuit board reliability. Capstans and flywheels are manufactured and spin-balanced to exacting tolerance requirements within the factory.

#### The people

The success of TEAC and TASCAM products is based on the efforts of many people. Certainly the leadership, provided by Tani, is a guiding force. The work of Norio Tamura,

Continued on page 119

## Video Switcher



**SERIES 1500** 6 x 1 Passive Video Switcher provides a simple and economical means of manually switching one of six sources to one output.

Auxiliary switching contacts are included for user wiring of additional switching functions such as audio and control circuits.

- ★ Reliable operation
- ★ Auxiliary switch contacts for audio or control circuits
- ★ Lighted push button option
- ★ Legendable buttons

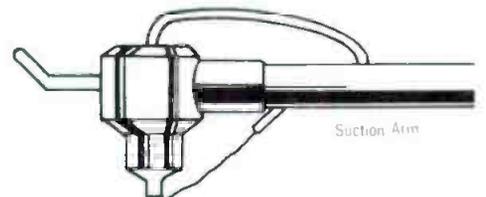
## DYNAIR

5275 Market St., San Diego, CA 92114  
Phone 619/263-7711  
TWX 910/335-2040

Circle (86) on Reply Card



**KEITH MONKS**  
Record Cleaning Machines  
the Original,  
the Best,  
for Years.



Trusted and used around the world, wherever valuable record libraries are found. A Keith Monks Record Cleaning Machine is an investment. It is supported by our fast, competent Parts and Service Department.

**KEITH MONKS AUDIO (USA) INC**

P.O. Box 1069 • Palatine, IL 60078

CALL TOLL FREE  
1-800-562-5872

TELEX  
280 502

In: IL, AK, HI, CAN.  
Call: 312-359-9240



Also Available: Studio Mark II • Lifetime Duty

Circle (88) on Reply Card



Ask for our  
**44 PAGE CATALOG**  
 of  
**PROFESSIONAL  
 SOUND RECORDING  
 & DUPLICATING SUPPLIES**

Recording Supply Div. of Polyline Corp  
 1233 Rand Road, Des Plaines IL 60016  
 (312) 298 - 5300

35

Circle (89) on Reply Card

**MAP 3550**

**EQUALIZER**  
 (5 1/4" x 1 1/2")

**EUPHONIOUS "MAP a good sound future"**

**MODULAR AUDIO PRODUCTS**  
 A UNIT OF MODULAR DEVICES, INC.  
 50 Orville Drive ■ Airport International Plaza ■ Bohemia, New York 11716 ■ 516-587-9620

Circle (90) on Reply Card



## INNOVATIONS FROM ABROAD

# Sequential PA

By Bebe F. McClain, president,  
 B.F. McClain Productions, Asheville, NC

PAG Power Ltd. has solved many of the problems associated with battery recharging and dc power supplies facing the users of ENG and EFP equipment. At the InterBee-'83 Exhibition in Japan, the company showed its Speedcharge 6000 and, for the first time, the new Sequencer 6000. The two together constitute PAG's micro-computer-controlled fast charger and battery management system.\* This new development in the battery-charging field, incorporating a micro-computer, will effectively and safely fast charge a variety of batteries in sequential order.

Eight different-type batteries can be connected at one time and can be charged, one after another. Using automatic switching, eight batteries can be fully charged in eight hours or less. Batteries not needing a charge will be skipped.

modate eight separate batteries.

The Speedcharge 6000 system was developed in response to demands from professional video users for a battery charger with the following capabilities:

- The unit should be capable of charging a wide range of nicad, lead-acid and silver-cell batteries from major manufacturers.
- The unit should be capable of fast charging batteries safely, without the need for special sensors in the battery pack. Such sensors usually are used when batteries are to be fast charged. Various incompatible arrangements have been used by different manufacturers, and not all batteries are so equipped. The new system ignores conventional sensors, using a unique and proprietary charge termination method.
- The charger automatically should

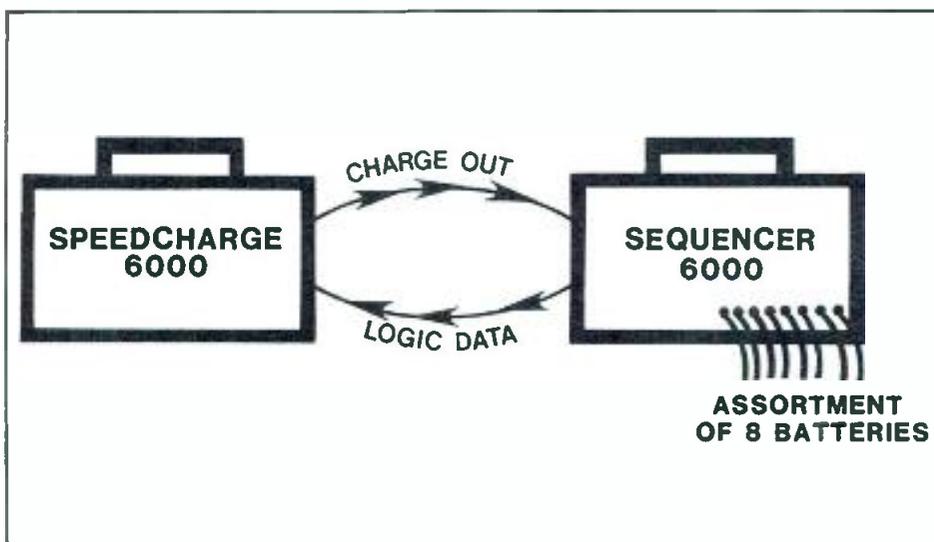


Figure 1. Functional arrangement of the PAG Power sequential recharging system.

The heart of the system, the Speedcharge 6000, already is widely used by broadcast stations and rental companies in England. It also is offered by some camera and VTR manufacturers as a recharger/power supply in standard ENG/EFP packages. The Sequencer 6000 is a new addition that plugs into the Speedcharge to accom-

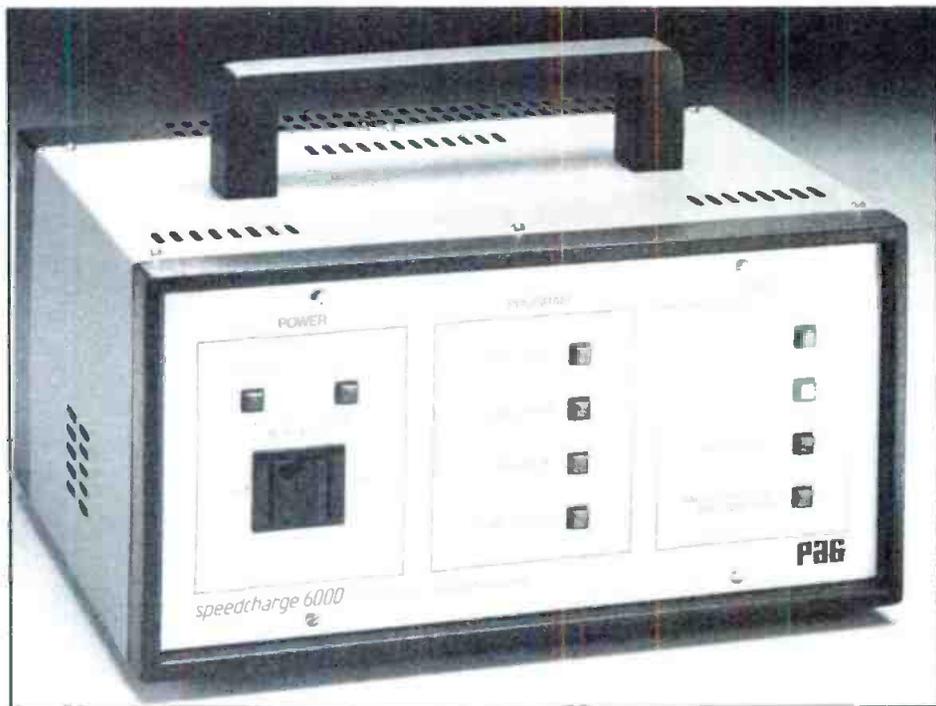
adjust itself to the battery type and size and should require no manual adjustments.

- The charger should be compatible with, and automatically adjust to, virtually any ac supply worldwide.
- The charger should incorporate an ac adapter or smooth dc power supply suitable for running ENG/EFP equipment where ac supplies are available.

In the Speedcharge 6000 system,

\*A guide to other types of battery charging systems can be found in the BE September 1983 Buyers' Guide.

# Charging: Power's 6000 system



The Speedcharge 6000 microcomputer-controlled charger from PAG Power.

electronic measurements are taken during the fast charge, effectively using the battery cells as their own sensors. The rate at which these measurements are taken is a critical factor in determining the cutoff point for fast charging an individual battery. The data is accumulated and continuously analyzed. The control system rapidly becomes complex, and a microcomputer is essential to handle it. The on-board computer, programmed by PAG and using unique and proprietary analysis techniques, is the heart of the 6000 system.

Extra features have been added to the fast charger's software, offering extra capability for little increase in cost. Included are a controlled slow-charge facility; a "revitalize" system to restore "bad" batteries; cell-balancing, trickle charge and power supply programs; battery backup during ac power failure; and self-test and diagnostic routines.

#### Fast charge

A 4A current is delivered until the Speedcharge detects that the battery is charged fully. The software to detect this cutoff point is the most complex

part of the microcomputer design. Undercharging gives poor performance and overcharging can permanently damage batteries. Also, the wide range of battery types and capacities, variations of battery characteristics between manufacturers, the temperature, age and history of the batteries, imbalances between cells and the possibility of damaged cells created a challenge to software designers.

To ensure that the fast charge is consistently and precisely stopped at the right time, and to detect faulty batteries, 10 algorithms are used in combination. Upon completion of the fast charge, the unit switches to a safe balancing charge, if the data from the subject battery indicates that cells are out of balance. The intensity and duration of charge depends on factors determined during the main fast-charge program.

Once balanced, the Speedcharge will indicate that the battery is ready for use. The battery can be safely left connected to the charger, which will continue to monitor the state of charge, applying, when necessary, a precise trickle current to compensate

## Video Amplifier



**SERIES 1500** 1 in, 4 out Video Distribution Amplifiers provide high quality performance in color and high resolution monochrome systems.

Precision hybrid video operational amplifiers provide  $\pm 0.5$  dB frequency response to 10 MHz, +1, -2 dB at 30 MHz, and 0.25%/0.25° differential phase/gain.

- ★ High thermal stability
- ★ Front panel adjustment and test points
- ★ Self-contained with internal power supply

### DYNAIR

5275 Market St., San Diego, CA 92114  
Phone 619/263-7711  
TWX 910/335-2040

Circle (91) on Reply Card

## Pulse Amplifier



**SERIES 1500** 1 in, 4 out Pulse Distribution Amplifier provides premium performance in a compact package. Low power consumption makes it ideal for remote, mobile van and ENG applications.

- ★ High impedance differential input, -2 to -4 V p-p
- ★ Edge-triggered, regenerative input amplifier
- ★ Linear output with pulse shaping filter
- ★ Output level adjustable from -2 to -4 V p-p
- ★ Self-contained with internal power supply

### DYNAIR

5275 Market St., San Diego, CA 92114  
Phone 619/263-7711  
TWX 910/335-2040

Circle (92) on Reply Card

# **BUICK IS ROLLING WITH MOTOROLA C-QUAM AM STEREO!**

GM's Buick division is the first domestic automaker to offer AM Stereo radios.

Delco single-system radios, using the Motorola C-Quam® decoder integrated circuit, will be introduced in selected 1984 models.

But one of the most enthusiastic responses to this news came from a man who isn't even a Buick dealer. He's Tom Cassetty, General Manager of WSM, Nashville. "I heard the Delco playing C-Quam AM Stereo at the National Radio Broadcasters meeting in New Orleans, and I was really impressed. The sound was terrific! If they'd been playing WSM, I never would've gotten out of the car!"

If your station had the choice, wouldn't you really rather be heard in the new Buicks? You can be. Just call Dick Harasek at (312) 576-2879, or Chris Payne (202) 862-1549.

**MOTOROLA AM STEREO. THE WINNING SYSTEM.**



Circle (85) on Reply Card



# CHINA

## An Exclusive Invitation

**Broadcast Engineering invites you to join this high level delegation.**

You and a limited number of other select international broadcast executives and equipment manufacturers will have a rare opportunity to meet with China's top broadcast station and equipment manufacturing officials and specialists. You will participate in one of the most complete technical tours of the Chinese broadcast industry ever organized. And the first such tour ever offered to the entire broadcast industry.

Sponsored by BROADCAST ENGINEERING in cooperation with The Ministry of Broadcasting and Television, this exclusive technical tour delegation is open to international broadcast station executives, consultants, equipment manufacturers and prominent educators.

**Itinerary:**

Organized with your needs and interests in mind, the itinerary includes visits to key technical facilities in each Chinese city visited. Delegates will have the opportunity to talk frankly with Chinese broadcast facility and plant operators at the plant and facility sites.



**China Broadcast Tour Cities:**

- Beijing
- Shanghai
- Guangzhou
- Hong Kong

**Some China Broadcast Tour Highlights:**

- Radio Peking
- Broadcast Technical Institute
- Central Broadcasting Station
- R&D Foreign Language Dept.
- Shanghai Radio and Television
- Guangzhou Radio and Television
- Broadcast equipment factories
- And more

**Mail to:**

**China Broadcast Tour**

Roman Specialty Tours  
P.O. Box 1607  
Lafayette, CA 94549 USA

Please send me without obligation information about the  
**CHINA BROADCAST TECHNICAL TOUR:**

Name \_\_\_\_\_ Title \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State or Province \_\_\_\_\_

Country \_\_\_\_\_ Postal Code \_\_\_\_\_

Telex \_\_\_\_\_ Telephone \_\_\_\_\_

Ask  
About the  
Early Registration  
Discount!

Sponsored by **BROADCAST**  
engineering

**NEW Date:**

14 day tour departs  
May 28, 1984

**Tour Leader:**

Cameron Bishop, Publisher, Broadcast Engineering, Intertec Publishing Corp.

**Contact:**

George H. Roman, Roman Specialty Tours, P.O. Box 1607, Lafayette, CA, 94549 USA (415) 284-9180

**Special Note:**

The number of tour delegates will be strictly limited. Persons interested in participating should inquire early.



**CREATE  
WITH Q8**

# from the keyboard:

- roll it** - instant readout for roll timing - "elastic" roll pages - insert/delete with auto ripple
- shade it** - 4-quadrant shadow or fine and bold border edging - any color
- crawl it** - continuous compose with horizontal scroll - instant insert/delete with no retyping
- fade it** - built-in downstream fade in and out at selectable rates
- key it** - keyboard selectable upstream/downstream operation
- change it** - no retyping to redefine font characteristics - tuck characters horizontally - tuck rows vertically
- call it** - rapid sequence recall - any list of pages - page selectable dwell time
- stamp it** - rapid duplication of any row - "cut and paste"
- step it** - assign a series of keystrokes to a single key for effects and animation
- store it** - dual 8" floppy double-density discs - up to 400 pages per disc
- underscore it** - emphasize with variable weight and underline
- color it** - 16 million interactively mixed colors - background, edge, characters
- size it** - instant keyboard sizing from 16 to 64 scanlines - instant condense/extend
- italicize it** - instant italics left and right

**The QUANTAFONT® Q8 Face-Loadable  
Teleproduction Graphic Titling System . . .  
26 nsec. Base Resolution . . . priced from  
\$32,500.00.**

a decade of commitment

**QUANTA®**

QUANTA CORPORATION, 2440 SOUTH PROGRESS DRIVE, SALT LAKE CITY, UTAH 84119

## Fiber-optics kit

Link II from Advanced Fiberoptics Corporation is designed for those desiring to learn about fiber-optics. The kit, with transmitter/receiver module, 5 meters of optical cable and informative literature, sells for \$75.

Circle (275) on Reply Card

## Headset design change

Enhanced field servicing of Setcom Corporation series 5 dual- and single-speaker headset systems results from structural design changes. New products and retrofit parts for existing systems are available.

Circle (276) on Reply Card

## Frequency counter

For measurements to 1GHz with FCC accuracy, the FC71 from Sencore finds applications in avionics, broadcasting, 2-way communications and general electronic servicing. A 9-hour battery capability in the instrument and microprocessor-controlled time base aid in portable uses.

Circle (277) on Reply Card

## Video text editing

Mycro-Tek's Mycro-Vision Supra-Edit terminal interfaces to Supra or SupraTwo character generators for text editing and manipulation through a horizontally split-screen scheme. Applications include CATV or other text display systems.

Circle (278) on Reply Card

## Monitor mount



Bretford Manufacturing specs the TVM-1 universal ceiling mounting bracket as capable of handling loads up to 200 pounds. Adjustable members allow displays with 17- to 26-inch screen sizes to be mounted.

Circle (281) on Reply Card

## Lavalier mic

An electronically created dip at 730Hz and acoustically generated boost above 3kHz allows the Shure SM83-CN lavalier microphone to produce natural sound without boominess or excessive brightness.

Circle (279) on Reply Card

## Satellite receiver

High performance and commercial quality are claimed by ICM Video for its model SR-4600P. Dual conversion in the downconverter section, extended threshold and a drift-free quadrature detector are featured.

Circle (280) on Reply Card

## Stereo buffer

Balanced inputs on professional equipment interface to unbalanced audio products with the Sescom SB-1 MKII. The unit also offers gain adjustment from 0-30dB and a -101dB noise level below rated output.

Circle (282) on Reply Card

## Graphic overlay

Animation and text for video programming are possible with an Apple II computer and a Synetix VideoSprite graphics card. Up to 32 levels of sprites may occupy a screen simultaneously through the Texas Instrument TMS 9918A video display processor-based plug-in card.

Circle (283) on Reply Card

## Voltage regulators

The Powermark Division of Topaz series 77000 ac voltage regulators for single- and 3-phase circuits handle 1-100kVA, 47-63Hz power loads. A voltage as much as 27% below nominal is corrected to within 7% of nominal, usually within one cycle of line frequency.

Circle (284) on Reply Card

## Multipair wire

A 100% Beldfoil aluminum-polyester shield in Belden's 9990 (3-pair) and 9991 (6-pair) cable protects against interference. The wire includes stranded, tinned, polypropylene insulated conductors with a drain wire, all 24AWG.

Circle (285) on Reply Card

## Work station lighting

Two flexibly mounted high intensity lamps and a 21-square-inch rectangular lens on the Pace POL-15 optical lighting system ease work on circuit board repair and reduce eye strain.

Circle (286) on Reply Card

## Field mixer

The Shure FP31 portable mic mixer includes three lock-type input connectors for mic or line-level signals. VU metering, quiet switching from external dc to internal batteries and switchable low-cut filters are features.

Circle (289) on Reply Card

## Talkshow equipment

"Caller Control" on the SPH-4 telephone hybrid from Gentner Engineering determines caller/talent balance from full 2-way conversation to full gain reduction of caller. The system includes an internal beep-tone generator to let the caller know he is on the air.

Circle (290) on Reply Card

## Improved insertion system

Panasonic Industrial Company introduced an updated version of the MVP-100 multifunction player system at the SMPTE conference in November 1983. First shown at NAB-'83, the MVP-100 computer-controlled, multi-VCR automation system uses M Format Y/I/Q component transport decks for post-production or automated on-air applications. Up to 24 decks and threading mechanisms all are easily removable in case of individual failures, but the large number of playback units also provides a flexible multisource library function in production editing. Editing control permits playback/record, audio/video cueing and on-line start sequences on any transport, in any combination.

With standard NV-T120 M Format cassettes, up to 20 1-minute spots may be recorded on each cassette, preceded by a menu index. The computer control, through an RS-422-compatible serial data interface, allows individual addresses to be sought for and spot cued via time code. For longer segments, the NV-T180 cassette will contain 30-minute programs. Depending on the choice of cassettes and the program schedule, one MVP-100 system will play 12 hours of material before reloading is necessary.

Switching flexibility allows built-in, backup rolls for 100% redundancy in spot playback by using time code synchronization. Should a primary machine fail, the alternate backup automatically is switched on-line. Also, monitoring and playback may involve 24 video, stereo audio and time code sources to A and B outputs.

Circle (294) on Reply Card



## Customer Orientation

Subject: Design Concept—  
Auto Suggestion

# 200 SERIES

An editing system should anticipate its operator the way a great car seems to anticipate its driver. When Convergence decided to build the 200 Series, the goal was to put the Editor in the driver's seat with an extra margin of control at his fingertips. Not just for those once-in-a-while problem situations but for the day-to-day editing tasks.

One designer said it should handle like a sports car—fast on the straight-away and quick in the turns.

Another imagined a fine touring car—built for going long distances in comfort.

A third visualized a four-by-four—able to cover rough terrain with power in reserve.

When the 200 Series was complete, we could see that each of them had made his mark. From the glow of the amber status display to the feel of the new joystick, this is an editing system made to be driven. The 200 Series...built for speed, cruising and the rough uphill climb.

Test drive one today.

 **CONVERGENCE  
CORPORATION**

REV

FWD

SOURCE

1641 McGaw, Irvine, CA 92714, (714) 549-3146 • 250 W. 57th Street, Fisk Building, Suite 815, New York City, NY 10019, (212) 765-1333  
3575 Cahuenga Boulevard, West Los Angeles, CA 90068, (213) 506-POST

Circle (109) on Reply Card

**IF YOU  
WANT  
THE BEST  
ASK  
FOR IT.**



©1983

**BEST SERVICE.  
BEST QUALITY.  
BEST DESIGNS.  
CALL IT BY NAME.**

**THE GREAT AMERICAN  
PATTERN.**

826 N. COLE AVENUE, HOLLYWOOD, CA 90038  
TELEPHONE 213 461-0200 • TWX 910 494 1233

Circle (98) on Reply Card

**Scope options**

Improvements to the Tektronix 2400 series portable oscilloscopes now are available as options that may be requested at the time of purchase.

Option 05, the TV option, with improved triggering, provides an enhanced display that rivals waveform monitor performance. New trigger modes allow viewing of a selected line of Field 1 or Field 2, alternate viewing of a selected line from Field 1 or Field 2 and viewing of all lines. A microprocessor assists in trigger selection of a given line in a given field.

Option 10, for IEEE-488 GPIB programmability, introduces the 2400 series to semiautomated test systems and other computer-

based operations. All front-panel controls of the oscilloscope—except intensity, focus and CRT adjustments—are under standard GPIB bus control as talker and listener functions. The option makes the Tektronix instruments the first portable units to offer complete IEEE-488 bus capability.

The options list at \$550 for TV Option 05 and \$400 for the GPIB Option 10. An additional interface module, at \$400, is required for one or any combination of the options. Tektronix may offer more modular options in the future. Current owners of 2400, 2445 and 2465 instruments should be aware that retrofit for the new options is not possible.

Circle (295) on Reply Card

**Miniature receiver**

Coupled with Nady Systems' 49 LT lavalier or 49 HT hand-held wireless mic, the company's 49 VR attaches easily to video or film cameras for hands-off, 49MHz, 2-way communications.

Circle (287) on Reply Card

**Portable lighting**

Arriflex's 650W, 1kW and 2kW tungsten Arrilites are constructed of fiber glass-reinforced, injection-molded

thermoplastic, combined with an aluminum inner shell for lightweight durability.

Circle (288) on Reply Card

**Head stacks**

Replacement heads for MCI recorders include 16- and 24-track formats. Record, erase and reproduce heads, manufactured by Applied Magnetics Belgium, are available through Sprague Magnetics.

Circle (292) on Reply Card

**TEAM COME TRUE.**

*Elite Fleet & JVC*

For a real dream come true in mobile video production, consider the team of ROSCOR's Elite Fleet of television remote trucks and quality JVC video equipment.

All of the trucks in ROSCOR's Elite Fleet represent the industry standard for quality, durability and beauty.

Whether a 12' remote vehicle, a 19' ENG van or a 44' broadcast remote truck, each unit is meticulously designed and tested to provide

the ultimate in remote production facilities. JVC's line of extraordinary video equipment also represent the industry standard for excellence.

The exceptional quality in cameras like the KY-310, JVC's full series of color monitors and the KM-2000U

special effects generator are

ideal for EFP and remote productions.

ROSCOR's Elite Fleet

and JVC:

a dream come true in mobile video production.



**ROSCOR**

VIDEO SYSTEMS ENGINEERING

ROSCOR CORP. • 6160 W. OAKTON ST. • MORTON GROVE, IL • 312/539-7700

Circle (99) on Reply Card



# Ikegami ITC-730 expands your ENG coverage, tightens your budget.

When Ikegami designed the ITC-730 ENG camera, we set out to create the world's finest modestly-priced, hand-held TV camera. And we succeeded.

Look at what the ITC-730 ENG gives you for under \$10,000\* (less lens). A lightweight, 3-tube prism optics camera featuring advanced Saticon II\*\* tubes, a 2H detail corrector, noise-free contrast compression circuitry, and a character generator in the viewfinder that indicates filter selection, gain selection, auto-white balance, VTR start/stop, gen-lock, and battery test.

The f/1.4 RGB prism beam-splitter delivers low-light performance (a standard sensitivity of 2000 lux at f/4), and a consistent 54 dB S/N ratio from the preamp.

And when you're out there shoot-

ing, you get even more. You can go farther and last longer because the ITC-730's unique circuitry makes it a miser on power consumption. Shoot up to three hours on one fully charged Nicad battery.

The ITC-730 is easy to handle. It has an excellent weight/balance ratio for smooth shooting from the shoulder. And its low profile makes it as easy to see over as it is to handle. A rugged magnesium alloy, die-cast housing takes the inevitable bumps in stride.

Equipped for EFP, the ITC-730 expands the limits of field production. It can be remotely operated up to 1000 feet from the CCU on AC; up to 300 feet on battery power from the camera.

ENG or EFP, you'll never have to accept anything less than an Ikegami again. Contact us for details.



## Ikegami ITC-730

Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, NJ 07607

Northeast: (201) 368-9171 □ Midwest: (219) 277-8240 □ West Coast: (213) 534-0050 □ Southwest: (713) 445-0100 □ Southeast: (813) 884-2046

\*Manufacturer's suggested list price \*\*TM of Hitachi Ltd.

Circle (100) on Reply Card  
www.americanradiohistory.com

# Texscan's Spectrum Analyzer can make you a popular person with the right people.

Some of the best decisions are made by people who don't always get the credit. But every so often someone discovers something so good it simply can't be ignored. Like the Texscan AL-51C. It's got so many outstanding features that we couldn't possibly list them all here. That's why we'd like you to ask for our specs. Get a live demonstration. And then make a decision you can feel good about.

- 0.5 to 1,000 MHz Frequency Range
- 60 dB Dynamic Range
- Battery Operated Portability
- Phase Lock Stability
- Crystal Derived Harmonic Markers
- LIN/LOG Display
- Built-in Audio Recovery AM/NBFM
- Narrow Band Frequency Modulation
- Optional Digital Storage \$995
- Cost \$6,295

The Texscan AL-51C Spectrum Analyzer. It can't promise you instant fame. Or even a promotion. But it can make your job a whole lot easier. And help you impress the right people, too!

**Texscan**  
CORPORATION

**Texscan Corporation has offices worldwide to serve you.**

Texscan Instruments  
3169 N. Shadeland Ave.  
Indianapolis, IN 46226  
(317) 545-4196

## FCC update

Continued from page 6

separate open filing windows for TV translators. Pursuant to this proposal, there would be alternate filing windows for translators and LPTV applications. Another alternative is to wait and see how the overall window approach described previously changes the situation. Priorities may not have to be assigned at all if the new approach, which would not invite conflicting proposals as current procedures do, substantially diminishes the number of competing applications for unserved or underserved areas.

### Call sign assignment procedures revised

The FCC has made sweeping revisions to its rules and policies governing the assignment of call letters to broadcast stations. The new rules, which became effective on Jan. 20, make the following provisions:

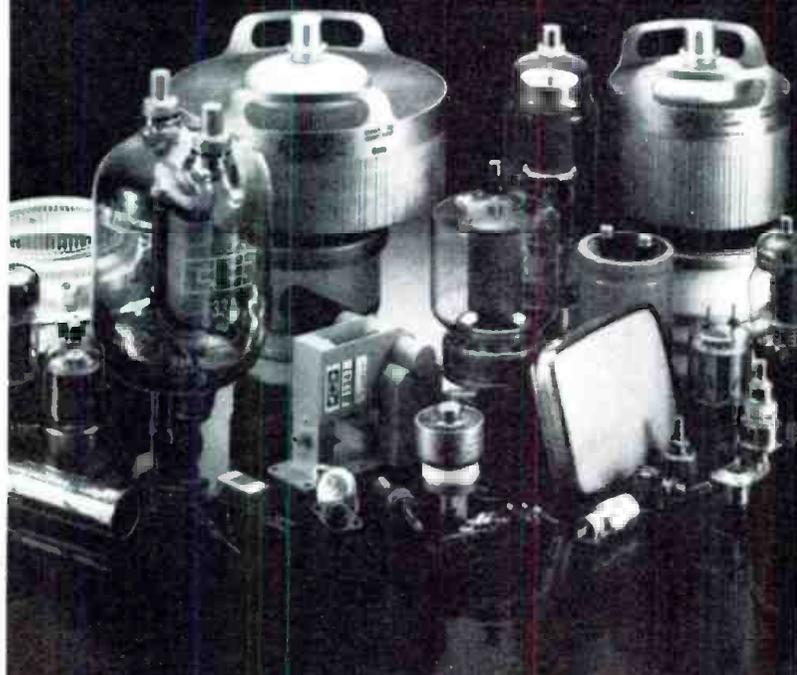
- Requests for new or modified call letters will continue to be made by letter to the secretary of the commission. Notification to all broadcast stations within 35 miles no longer will be required.
- A request for a call sign for a new station will not be accepted until a construction permit has been granted.
- A call sign may be requested by a proposed assignee or transferee of an existing station when the assignment or transfer application is filed, or any time thereafter.
- The commission no longer will arbitrate the question of whether a call sign is in good taste, because such standards traditionally have been set and enforced by local communities.
- The rule proscribing the assignment of call letters using the initials of the president, a living former president, the United States of America or any of its agencies or departments unless "suitable clearance" is obtained has been eliminated. If a station attempts to use such call letters in a manner intended to suggest a relationship with a president or federal agency, there are adequate remedies outside the context of call letter processing.
- Objections to the assignment of requested call signs will not be entertained by the commission. This, however, will not hamper any party from asserting its rights in some other forum.
- Call signs will continue to be assigned on a first-come/first-serve basis. If requests for the same call sign are received on the same date, the assignment will be made to the station having the longest continuous record of broadcast operation under substantially unchanged ownership or control.
- A change in a call sign assignment will be made effective on the date specified in the telegram authorizing the change. However, the applicant now may include with its application a request for a specific effective date within 45 days of the submission of its application for a call sign.

### Station totals released

The commission has announced the following totals for broadcast stations licensed as of Nov. 30, 1983:

AM radio	4732
FM radio	3513
FM educational radio	1113
UHF commercial TV	334
VHF commercial TV	533
UHF educational TV	172
VHF educational TV	112
UHF low power	67
VHF low power	181
Total radio	9358
Total TV	1399

# ELECTRONIC TUBES



**All major brands  
at the lowest prices.**

Transmitting, receiving, camera and cathode ray tubes, sockets, chimneys, capacitors and related components in stock for immediate delivery worldwide.

**AMPEREX • CEI • EIMAC • GE • HITACHI • ITT  
JRC • MACHLETT • RCA • RAYTHEON • SYLVANIA  
TOSHIBA • VARIAN • WESTINGHOUSE**

Calvert set new standards by supplying components with factory-backed guarantees at the lowest prices. We ship within 24 hours of order acceptance.

**NEW CUSTOMERS—WE ACCEPT TELEPHONE ORDERS.**  
Inquire about our convenient Net 30 terms. We give special attention to new accounts and will expedite opening your account.

### COAST TO COAST TOLL FREE NUMBERS:

To call NJ office: **800-526-6362** (except from NJ)  
To call CA office: **800-421-7549** (except from CA)  
**800-824-6232** (from CA only)

**CALVERT**   
**ELECTRONICS, INC.**

One Branca Rd., E. Rutherford, NJ 07073  
201-460-8800 • TWX 710-989-0116  
Telex 4990274

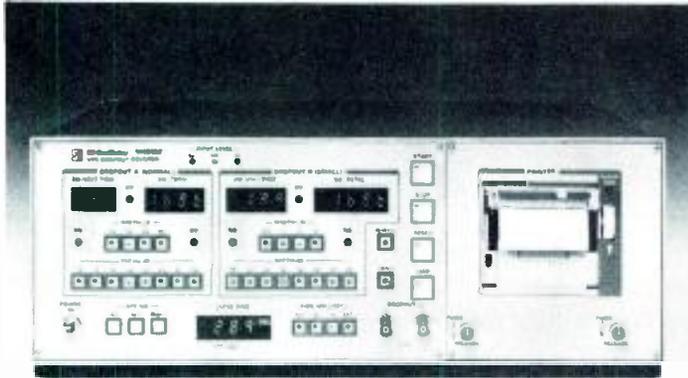
1355 Redondo Ave., Suite 6.  
Long Beach, CA 90804  
213-498-3504



284

Circle (102) on Reply Card

# THE TRUE MEASURE OF PERFORMANCE



## ASACA/SHIBASOKU VH01BZ VTR Dropout Counter

The VH01BZ VTR Dropout Counter has been designed to provide extremely high precision detection of video tape dropouts. By utilizing the RF signal from a video tape recorder, dropouts greater than the range selected are detected, accumulated, and recorded on a tape from a built in printer as well as read from a digital read out on the display panel.

This instrument is highly recommended for manufacturers of Video tape, Video tape recorders, as well as video production centers and television stations.

- Selectable dropout range of  $-10\text{dB}$  /  $-24\text{dB}$  with two dB increments.
- Two selectable measuring modes: Normal time widths which measure 10–50 micro seconds and small time widths which measure 0.5–5 micro seconds.
- Built in printer to effectively store data.
- Dropout detection level, time width, and measuring time functions may be set remotely.
- Using the optional GP-IB interface bus, the VH01BZ may be fully automated.

ASACA/SHIBASOKU  
VH01BZ VTR DROPOUT COUNTER

Measure your performance with the best.  
**ASACA/SHIBASOKU VH01BZ.** The world standard for accuracy.

For complete specifications, write:



ASACA/SHIBASOKU CORP. OF AMERICA  
12509 Beatrice Street, Los Angeles, California 90066  
Sales, Service: (800) 423-6347 • (213) 827-7144

Circle (103) on Reply Card

## Editorial

Continued from page 10

transmitter is going to solve their problems. It is not that simple.

AM improvement requires standards agreed upon by broadcasters and receiver manufacturers. Each group cannot continue to go its own way, and to blame the other for the problems that AM radio is facing.

If you ask AM station managers why they are over-processing their transmitted audio, they will tell you it is primarily because the receivers used by their listeners are, in a word, lousy. On the other hand, if you ask receiver manufacturers why they do not make better AM radios (we asked that question at the 1983 Consumer Electronics Society show), they will tell you it is because AM broadcasters transmit a signal that is, in a word, lousy. The point is obvious. We have to stop blaming each other for causing the problem, and devote our energies to its solution.

AM stereo by itself will not save the standard broadcast band from further audience slippage to FM. However, it may be the vehicle for the eventual rescue. AM stereo can sound as good as FM stereo, given careful attention to the transmission chain and a good quality receiver.\* High performance audio and RF transmission equipment is readily available. Hundreds of AM stations have updated their plants to the state-of-the-art. Thousands more should follow suit.

Receiver manufacturers that have taken the financial risk and produced high quality AM radios for the public should be congratulated and encouraged to move forward. Today's technology can deliver advanced receivers with improvements such as:

- more sensitive and selective front ends with automatic fine tuning to eliminate the problems associated with mistuning;
- noise blankers to strip off impulse energy, and thereby to clean up reception even in hostile environments;
- variable bandwidth IF strips that can be controlled by signal strength levels or day/night digital codes from each broadcast station;
- improved demodulators to replace the outdated envelope detector; and
- improved audio output amplifiers and speaker systems for true high fidelity.

With mass production and integrated circuit technology, these improvements can be made affordable to the average consumer.

The NAB subcommittee on AM improvement will look at these issues and others in its examination of the technical future of the industry. Part of this study will concern standards that could be implemented to help in converting AM radio from *low fidelity* to *high fidelity*. The issue of high frequency pre-emphasis standardization (if used at all) will need to be addressed, as will restricted bandwidth transmission questions. To reduce the problem of skywave interference, it has been suggested that AM stations restrict their high end audio frequency response, especially during nighttime operation. Other avenues the NAB will explore include digital techniques that might be used anywhere along the station-to-listener chain to improve performance.

The question reasonably can be asked as to what AM broadcasters can do in the meantime. The answer is simple. Clean up your act. Some AM stations have kept their operations well-maintained and updated to the state-of-

\*See "The AM Stereo Challenge: AM Stereo vs. FM Stereo" by Dave Obergönnner on page 84 of this issue.

the-art. Many others, perhaps the majority, have let their plants slip into various stages of technical chaos. AM systems too long have been taken for granted. Standard operating procedure at most stations, we think, has been to fix the gear if it breaks, but otherwise to ignore it. Our experience has shown that most of the new equipment and renovation dollars have gone into FM systems, rather than AM.

Any transmitting facility allowed to slip into disrepair will show it on the air, and despite what some managers might say, listeners care how a radio station sounds. The dramatic shift in audience from AM to FM proves that point.

Stations in technical trouble (this applies equally to FM stations) should spend the time, effort and money required to bring their transmission systems up to current standards of performance and reliability. We are not proposing that every station go out and buy a new transmitter and antenna. We are suggesting, however, that the present system should at least be thoroughly tested and repaired. Direction for this effort must come from the top of the station management chain. An employee will not think that AM improvement is important unless his supervisor thinks it is important.

AM radio is basically strong and resourceful. It can reverse the trend of audience flight to FM if it makes a concerted effort at standardization and cooperation. This cooperation must be not only between the broadcast and consumer electronics industries, but also among and within AM stations themselves. I:~:~))]]

## Satellite update

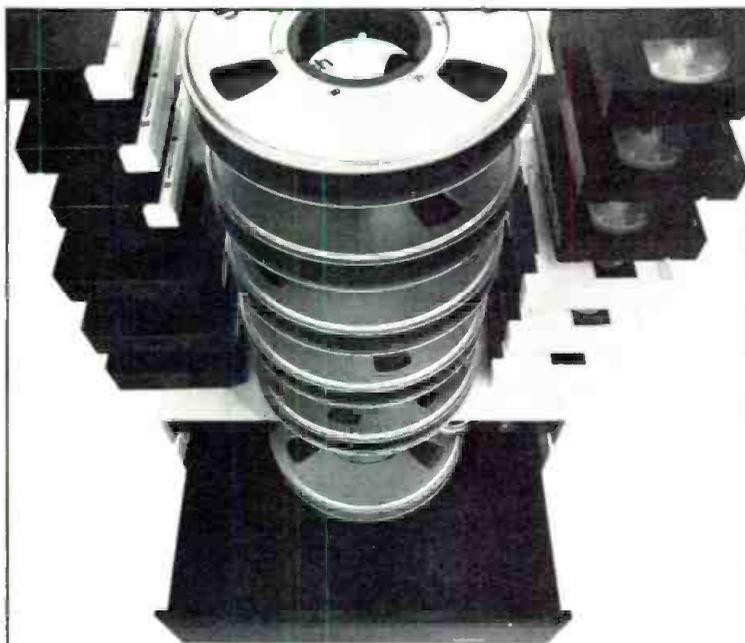
Continued from page 12

discrimination and perhaps 6dB more isolation caused by cross-polarization isolation and frequency planning, an acceptable total isolation from adjacent satellites of 15dB or more can be achieved with a 1.5m antenna.

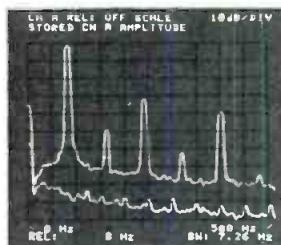
For the medium power Ku-Band satellites, a 1m antenna provides the same degree of isolation for 1° satellite spacing as does the 1.5m C-Band antenna for 2° spacing. Otherwise, the EIRP level of this class of satellites could be increased beyond the 50dBW point to allow an even smaller antenna size, because there is no practical limit on downlink EIRP as in C-Band. Also, the 50dBW level is about optimum in terms of satellite design because of the state-of-the-art in medium power Ku-Band TWT power amplifiers.

Thus, for the C-Band and medium power Ku-Band satellites, delivery technology is reaching the optimum state in terms of most cost-effective receive earth terminals and most efficient and reliable satellite designs. Also, the number of orbital positions possible (35 for C-Band and 70 for Ku-Band), makes the total number of channels that can be expected at these frequencies so large that a competitive market for available channels is almost assured, virtually guaranteeing a low cost per delivered broadcast channel.

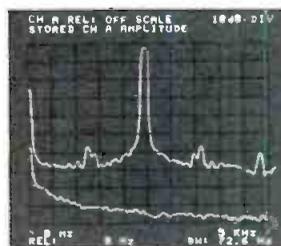
The general economics of satellite delivery is beginning to look so attractive that important signal originators and broadcasting organizations are making moves in that direction. Home Box Office (HBO) is experimenting with DBS-type delivery at C-Band and Ku-Band frequencies to increase its total penetration into homes beyond that offered by cable access alone. CBS, the last of the major US broadcasting networks to get into satellite technology, now is discussing the possible use of the first high power DBS system, the Satellite Television Corporation system planned for 1986, to expand its delivery capabilities into the home.



# VIDEOTAPE ERASURE MADE SIMPLE



To erase today's tapes . . . particularly 1-inch C-Format 3/4- and 1/2-inch cassettes . . . you need twice the erasure power to eliminate all residual signals of low-frequency recordings.



Videomax TD-800 tape demagnetizer has enough power to erase the most persistent videotape . . . even audio and time code . . . at a full 80 dB. That's 10 dB more than any 1-inch VTR.



A simple, innovative design at a very compact price.

Make the most from your investments; send for the TD-800 brochure, and see our results!

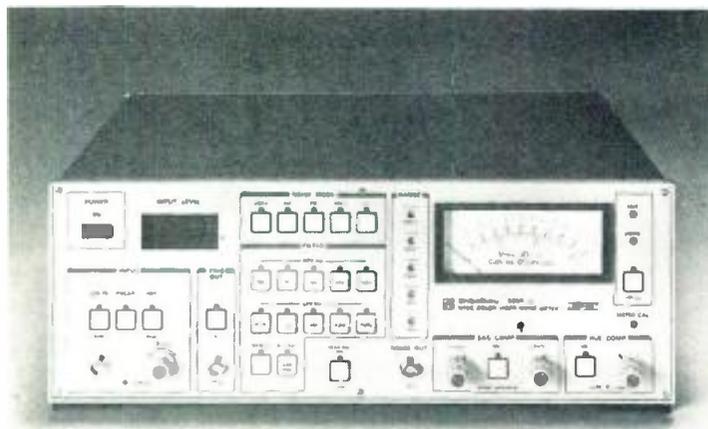
## **videomax** TD800 TAPE DEMAGNETIZER

CMC TECHNOLOGY CORPORATION  
733 North Pastoria Avenue Sunnyvale, CA 94086  
(408) 245-3342 TLX 910-3790012

Circle (104) on Reply Card

February 1984 *Broadcast Engineering* 129

# THE TRUE MEASURE OF PERFORMANCE



## ASACA/SHIBASOKU 925R Color Video Noise Meter

The versatile 925R accurately measures both luminance and chrominance noise generated from TV transmission equipment, TV cameras, VTR's, videotape and videodisks. Connected to a general purpose interface bus (IEEE-488), it gives you complete receive/transmit capabilities. You can receive measurement start, mode and filter selection commands and transmit measurement data through the bus. You can expand the 925R into a fully automated system by using a desk-top computer with the SHIBASOKU TG-7 TV Test Signal Generator, U705 Noise Test Unit and 531 Interface Unit.

- Tests equipment under actual operating conditions.
- Separates AM/PM chrominance noise and measures each.
- Features HP/LP filters and weighting network for frequency analysis.
- Provides V/H sag compensation, hue compensation, and VTR head balance.
- Logs digital data; may be used as a digital video level meter.
- Available in NTSC; PAL B, M, N; and SECAM systems.

Measure your performance with the best. **ASACA/SHIBASOKU 925R.** The world standard in color video noise measurement.

For complete specifications, write:



ASACA/SHIBASOKU CORP. OF AMERICA  
12509 Beatrice Street, Los Angeles, California 90066  
Sales, Service: (800) 423-6347 • (213) 827-7144

Circle (105) on Reply Card

An examination of the characteristics of high power DBS shown in Table I (page 12), when compared to the other two delivery technologies, reveals a much lower overall capability in terms of total channels that can be offered, and at apparently minimal gain in terms of lower earth terminal costs. The high power DBS satellites also are much higher cost satellites on a cost-per-channel basis, making the prospect of large scale economic feasibility even more doubtful.

Satellites delivering 55-60dBW in EIRP per channel cannot provide more than a few channels (3-4) per satellite, and a system using this technology must have a satellite for each time zone of the country to provide coverage. Thus, the total cost of such a system is much higher than with more conventional delivery technologies. The continued development and expansion of C-Band and medium power Ku-Band systems during the coming year will do much to determine the probable future of the planned high power DBS systems.

## Feedback

Continued from page 18

equipment are addressed by a new publication from the European Broadcasting Union (EBU). The spiral-bound book, *The Design of Handbooks for Broadcasting Equipment*, is available from the Technical Centre of the EBU, Avenue Albert Lancaster 32, B-1180 Bruxelles, Belgium. Request Document Tech. 3239-E, indicating English- or French-language editions.

The book is based on EBU Recommendation R29-1982, which, in part, suggests that proper documentation for equipment should include three separate manuals, or a single volume in three sections. The approach of the three sections should address planners and installers; operators and technical people; and repair personnel.

Further, each section should be presented in a logical manner with information applicable to the segment of the technical/engineering community at which it is aimed.

Presentation of the information, including aspects of language, cover, pagination, printing material, print and graphic materials are discussed. Pictorial graphics, schematics, wiring diagrams and indexing also are covered. Finally, 11 illustrations of material from a variety of manufacturers are included as samples of well-produced documentation.

BE staff

!:->))))

## WANT ADDITIONAL COPIES OF SPEC BOOK?

Spec Book is your basic reference source for broadcast equipment comparisons. To order your additional copies, in their easy-to-use, convenient format, send a check or money order for \$15 to:

**Spec Book**  
P.O. Box 12901  
Overland Park, KS  
66212

Spec Book — for **everyone** involved in buying and specifying products.

# people

Tektronix's Communication Division has announced the following reassignments within its Television Products Business Unit: **Larry Kaplan**, named business unit general manager for the Television Products Business Unit; **Chuck Barrows**, named strategic business and engineering development manager for the Communications Division; **Austin Basso**, named national sales manager for the Television Products Business Unit; and **Steve Kerman**, named marketing manager for the Television Products Business Unit.

**C. Robert Thompson**, manager of video recording systems programs for RCA Broadcast Systems Division, has been elected a Fellow of the Society of Motion Picture and Television Engineers.

**Peter Gloeggler** has joined Sharp Electronics as product manager for the company's Professional Products Division. Gloeggler has more than 10 years' experience in the broadcast industry.

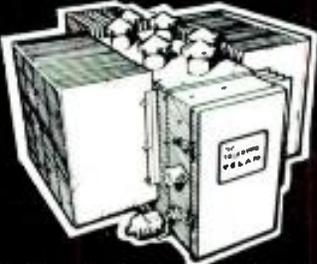
HEDCO has announced the appointment of **John Hayes** as vice president of manufacturing. Hayes has been with the company more than three years, following a career with Memorex, IBM, Vendo and Lockheed in various manufacturing management positions.

Acrodyne Industries has appointed **Richard J. Broadhead** as vice president, marketing. Broadhead had previously been business manager, UHF transmission systems, for RCA Corporation. [:-:-)]

**CHARGE UP THOSE BATTERIES**



WITH **TELAN** thermoelectric generators



**SINGLE UNITS  
10 TO 90 WATTS  
COMBINE UNITS  
FOR HIGHER  
POWER RATINGS**

- Long term unattended operation
- Safe
- Automatic operation

**APPLICATIONS**

- Telecontrols
- VHF and UHF repeaters
- Microwave relays
- Cathodic protection
- Data stations

**TELEDYNE ENERGY SYSTEMS**  
110 W. Timonium Rd., Timonium, MD 21093-3163  
Phone: (301) 252-8220 Telex: 8-7780 (Tdyener Timol)  
DDD: (301) 252-7926 (Tdyener Timol) Cable: TELISES

Circle (106) on Reply Card

# Perfect Timing

## PROGRAMMABLE CLOCKS

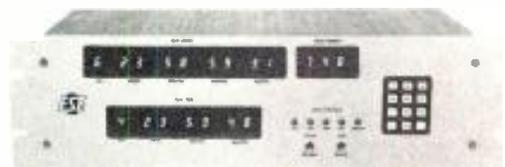
CONTROL TIME THE EASY,  
ECONOMICAL WAY



**750 L SERIES**  
One or Two Events,  
Thumbwheel Programming  
**\$330-410**



**780 SERIES**  
Up to 96 Events Stored  
in Random Access Memory  
**\$1250-1725**



**ES 790**  
1000 Events, Microprocessor-  
Based, 32 Output Channels  
**\$2190**

Many More Units Available  
Contact Us or Our Dealers  
We'll Be Happy to Help!



(213) 322-2136  
142 Sierra St., El Segundo, CA 90245

Circle (107) on Reply Card

## UNIVERSAL SURGE PROTECTOR FOR ALL LINE VOLTAGES!

Never obsolete! Unique re-settable strapping protects on all power systems—even 3-phase—if you should change line voltage. "On" all the time, to protect constantly. Immediate shipment. Quantity discounts. Money back guarantee. Order today.



CALL BILL JOHNSON  
215/544-8879

**EAGLE HILL ELECTRONICS, INC.**  
41 Linden Avenue Rutledge, PA 19070

Circle (113) on Reply Card

FREE 32pg Catalog & 50 Audio/Video Applic.  
PWR SUPP. EQ. PHONO, MIC, TRANS, ACM, TAPE, VIDEO, LINE, OSC

Stereo/Mono Pre Ampl. Video & Audio Dist Amplis. TV Audio & Recd Prod Consoles

OPAMP LABS INC (213) 934-3566  
1033 N Sycamore Av LOS ANGELES CA. 90038

Circle (114) on Reply Card

## PRIME SOURCE PRECISION MAGNETIC TEST TAPES

Standard Tape Laboratory, Inc.  
26120 Eden Landing Road #5, Hayward, CA 94545  
(415) 786-3546

Circle (115) on Reply Card

**Camralite™**  
Variable intensity obvie light

- Light Weight
- Mounts on any Camera
- Keeps Constant Color Temp

**THE GREAT AMERICAN MARKET**  
826 N COLE AVE HOLLYWOOD CA 90038 213-461-0200

Circle (116) on Reply Card

## HEAD RE-LAPPING AND NEW HEADS FOR AMPEX

Worn Cartridge and reel to reel heads re-contoured and re-lapped for original performance. Send for free brochure.

R.K. Morrison Co.  
819 Coventry Road • Kensington, CA 94707  
(415) 525-9409

Circle (117) on Reply Card

## AUDIO PATCH BAYS

- PREWIRED
  - MULTIPIN GOLD CONNECTORS
  - BROADCAST QUALITY
  - DEALER PROGRAM
  - CUSTOM WORK
- BITTREE 1337 GREENBRIAR ROAD  
GLENDALE CA 91207 213-507-0418

Circle (118) on Reply Card

## SATMASTER PROGRAMMER



- Satellite Audio Input
- Random Select Cartridge Control
- 1000 Events

**MEI MICROPROBE** Call Dave Collins, (312) 440-3111  
ELECTRONICS INC 875 N. Michigan Ave., #1532A  
Chicago, Illinois 60611

Circle (119) on Reply Card

# ad index

ADM Technology, Inc. ....	IFC	Lenco, Inc. ....	33
A.F. Associates ....	99	Lerro Electrical Corp. ....	17
Abekas Video Systems ....	49	Logitek Electronic Systems, Inc. ....	112
Acrodyne Industries ....	27	MCI/Quantel ....	45
ADDA Corp. ....	64-65	MCI/Sony ....	110-111
Allen Avionics ....	100	3M Magnetic Tape ....	40-41
Amek of America ....	74	McCurdy Radio Industries ....	IBC
Ampex Corp. ....	5,31	Micro Controls, Inc. ....	58
Apert Herzog ....	80	Microdyne Corp. ....	75
Asaca/Shibasoku Corp. of America. ....	94,128,130	Microprobe Electronics Inc. ....	132
Aspen Audio Recording Institute ....	119	Midwest Corp. ....	1
Audio-Technica U.S., Inc. ....	101	Modular Audio ....	114
Audio-Video Engineering ....	74	Keith Monks Audio USA Inc. ....	113
Belar Electronic Labs ....	100	R.K. Morrison ....	132
Bittree ....	132	Motorola ....	116
Broadcast Electronics Inc. ....	13	NEC America Inc. ....	85
Broadcast Video Systems ....	96	NTI America Inc. ....	86
CMC Technology ....	129	Nova Systems, Inc. ....	91
Calaway Engineering ....	102	Opamp Labs ....	132
Calvert Electronics, Inc. ....	127	Orban Associates Inc. ....	73,87
C.O.A.R.C. ....	108	Otari Corp. ....	59
Celwave ....	81	Pacific Recording and Engineering ....	67
Cetec Antennas ....	60	Polyline Corp. ....	114
Circuit Research Labs, Inc. ....	82	Potomac Instruments ....	46
Comark ....	55	Power Pak Systems ....	108
Continental Electronics Mfg. Co. ....	106	Q.E.I. ....	78
Convergence Corp. ....	123	Quad Eight/Westrex ....	71
Crosspoint Latch Corp. ....	136	Quanta Corp. ....	120-121
Datum, Inc. ....	44	Quantum Audio ....	80
Digivision, Inc. ....	97	RCA Camera Tube Marketing ...	63
Dubner Computer Systems, Inc. ...	35	Radio Systems ....	39
Dynair Electronics Inc. ....	113,115,117,119	Ramko Research ....	79
EECO Inc. ....	61	Research Technology International ...	18
ESE ....	131	Rohde & Schwarz ....	32
Eagle Hill Electronics, Inc. ....	132	Roscor Corp. ....	124
Electrex Co. ....	96	Schneider Corp. of America ...	62
Electro-Voice, Inc. ....	93	L.J. Scully Mfg. Co. ....	70,106
Evertz Microsystems ....	11	SGL Weber ....	92
Feldmar Watch and Clock Center ....	92	Sencore ....	15
Fidelipac Corp. ....	109	Shintron Co., Inc. ....	26
General Electric Video ....	95	Shure Brothers ....	103
Garnier Industries ....	16	Sitcom ....	132
Grass Valley Group Inc. ....	7	Sony Corp. ....	56-57, 104-105
Great American Market ...	124,132	Standard Tape Lab ....	132
Harris Corp. ....	83	Studer ReVox America Inc. ....	51
Hitachi Denshi America, Ltd. ....	24-25	Tascam div. TEAC Corp. ....	23
Howe Audio Productions ....	19	Tektronix, Inc. ....	8-9
ITC/3M ....	29	TeleCine Corp. ....	62
Ikegami Electronics Corp. ....	3,37,125	Teledyne Energy Systems ...	131
Inovonics ....	119	Texscan Corp. ....	126
JBL, Inc. ....	20	Thomson-CSF Broadcast, Inc. ...	77
JVC Company of America ....	69	Townsend Associates, Inc. ....	53
Jensen Transformers ....	30	Utah Scientific ....	47
Leitch Video Ltd. ....	43	VSC Corp. ....	98
		Videotek, Inc. ....	107
		Ward-Beck Ltd. ....	BC
		Waters Mfg. ....	100
		Winsted Corp. ....	102

Broadcast Engineering's "Help Wanted" ads are well-read. Call today to place your low-cost ad.

# professional services

**VIR JAMES P.C.**  
CONSULTING ENGINEERS  
Applications and Field Engineering  
Computerized Frequency Surveys  
3137 W. Kentucky Ave.—80219  
(303) 937-1900  
**DENVER, COLORADO**  
Member AFCCE & NAB

**STEIGER, HURRAY & ASSOCIATES INC.**  
Broadcast Technical Consultants  
ANTENNA SYSTEM SPECIALISTS  
6816 Westview Drive  
Cleveland, OH 44141  
(216) 526-7187

**EVANS ASSOCIATES**  
CONSULTING TELECOMMUNICATIONS ENGINEERS  
AM-FM-TV-CATV-ITFS-LPTV SATELLITE  
216 N. Green Bay Road  
Thiensville, Wisconsin 53092  
Phone: (414) 242-6000 Member AFCCE

**ATLANTIC RESEARCH CORPORATION**  
Jansky & Bailey  
Telecommunications Consulting  
Member AFCCE  
5390 Cherokee Avenue  
Alexandria, Virginia 22314  
(703) 642-4000

FCC DATA BASE  
**dataworld™**  
AM • FM • TV • LPTV • MDS  
• Tower Location/Height  
• Allocation Studies  
1302 18th St., N.W. Suite 502  
Washington, D.C. 20036  
(202) 296-4790 800-368-5754

**R. L. HOOVER**  
Consulting Telecommunications Engineer  
11704 Seven Locks Road  
Potomac, Maryland 20854  
301-983-0054  
Member AFCCE

**D. L. MARKLEY & Associates, Inc.**  
CONSULTING ENGINEERS  
206 North Bergan  
Peoria, Illinois 61604  
(309) 673-7511  
Member AFCCE

**WR E** **WARD RESEARCH AND ENGINEERING**  
AM-FM UHF-VHF TV  
COMPLETE MAINTENANCE AND REFURBISHING LAB  
EMERGENCY FIELD MAINTENANCE  
CUSTOM STUDIO AND RF SYSTEMS  
DESIGN AND MODIFICATIONS  
RD 1 BOX 133-F BRIDGEVILLE, DE 19933  
302-337-8094

**Radiotechniques**  
RADIO CONSULTING ENGINEERS  
STATION DESIGN AND SERVICE  
ELECTRONIC PRODUCT DESIGN  
Edward A. Schober, P.E.  
402 Tenth Avenue, Haddon Heights, NJ 08035  
(609) 546-1841

**RE** **RADIO ENGINEERING CO. CONSULTANTS**  
NORWOOD J. PATTERSON  
BOX 420  
SANTA YNEZ CA 93460  
(805) 688-2333  
Serving Broadcasters over 35 years

**ME** **MIDWEST ENGINEERING ASSOCIATES**  
Consulting Engineers  
150 Wesley Rd.  
Creve Coeur, Illinois 61611  
Phone (309) 698-3160  
F. W. Hannel, P.E.  
Member AFCCE

SINCE 1952 **MSI** Tel. 201-627-7400  
**MICROWAVE SERVICES INTERNATIONAL, INC.**  
SATELLITE AND TERRESTRIAL SYSTEMS  
CONSULTANTS • ENGINEERS • CONSTRUCTORS  
FREQUENCY COORDINATORS  
VICTOR J. NEXON, PE 288 W. MAIN ST.  
PRESIDENT DENVILLE, NJ 07834  
MEMBER AFCEE

**BROADCAST ENGINEERING SERVICE COMPANY**  
TV-FM-AM Field Engineering—  
Emergency Maintenance—Turnkey Installation—  
System Design—Survey and Critique—  
Interim Maintenance or Chief Engineer  
**B E S COMPANY**  
100 Star Trail, New Port Richey, Fla 33553, 813-868-2989

**SMITH and POWSTENKO**  
Broadcasting and Telecommunications Consultants  
2000 N Street, N.W.  
Washington, D. C. 20036  
(202) 293-7742

**McCLANATHAN & ASSOCIATES, INC.**  
Consulting Engineers  
APPLICATIONS & FIELD ENGINEERING  
TURNKEY INSTALLATIONS—RADIO & TV  
DIRECTIONAL ANTENNA DESIGN  
P.O. Box 750  
PORTLAND, OREGON 97207  
Phone: 503/246-8080 Member AFCCE  
TWX 910-464-6112/Front!

**Dr. Jeremy K. Raines, P.E.**  
Consulting Electromagnetic Engineer  
Antennas, arrays, parasitics, top loading,  
guy wires, and reradiating obstacles  
analyzed using the method of moments.  
13420 Cleveland Drive  
Potomac, Maryland 20850 (301) 279-2972  
Member AFCCE

**T & G OPTICS, INC.**  
71-01 INGRAM STREET  
FOREST HILLS, NY 11375  
COMPLETE REPAIR SERVICE FOR COLOR TELEVISION  
CAMERA BEAMSPLITTER OPTICS, LENSES, COATINGS,  
MULTIPLEXER MIRRORS, FILTERS AND PROJECTORS—  
WRITE OR CALL GERALD PINCUS (212) 544-8156 twen-  
ty four hour service with pleasure.

**John Aalto, P.E.**  
Consulting Engineer  
TELEVISION PRODUCTION  
AND POST PRODUCTION SYSTEMS  
(213) 664-9790 1755 North Dillon Street  
Los Angeles, CA 90026

**Why not run your business card here?**  
**Only \$50.00 per insertion.**  
Frequency discounts available.  
Call 913/888-4664

Reconfirm your involvement in the broadcast industry!  
**Renew your subscription today.**

For additional advertiser information, use the Reader Service Card in the back of the magazine.

# classified

Advertising rates in Classified Section are 75 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, \$10.00.

For ads on which replies are sent to us for forwarding (blind ads), there is an additional charge of \$10.00 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 distributor.

## TRAINING

**ELECTRONICS DEGREE** by correspondence. Earn A.S.E.T., then B.S.E.T. Free catalog. Grantham College of Engineering, 2500 La Cienega, Los Angeles, California 90034. 7-82-1fn

**FCC GENERAL RADIOTELEPHONE** operators license through cassette recorded lessons at home plus one week seminar in Boston, Washington, Detroit or Philadelphia. Our twentieth year teaching FCC license courses. Bob Johnson Radio License Preparation, 1201 Ninth, Manhattan Beach, Calif. 90266, Telephone (213) 379-4461. 8-81-1fn

**GET YOUR DEGREE IN VIDEO TECHNOLOGY** after only 14 months of "hands-on" training. VTI, 1806 Royal Lane, Dallas, Texas 75229. Call Bill 214/263-2613. 2-84-3t

**ASPEN AUDIO RECORDING INSTITUTE** accepting applicants for summer 1984. Three 3-week sessions June-August. Intensive hands-on experience in live recording techniques. Noted faculty. Write for brochure: Aspen Audio Recording Institute, Aspen Music Festival, 1860 Broadway, Suite 401, New York, NY 10023. 2-84-3t

## SERVICES

**ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS.** Bottom line oriented. F.T.C. Brewer Company, P.O. Box 8057, Pensacola, Florida 32506. 7-71-1fn

**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. 1-73-1fn

**TRANSMITTER TUBES REPROCESSED**—Save 40 to 50%. 3CX2500, 4CX5000, 4CX15000 and many others. Write for details. FREELAND PRODUCTS CO., Rt. 7, Box 628, Covington, LA 70433. (504) 893-1243. 6-79-1fn

**HEAD RE-LAPPING SERVICE.** We expertly refinish all professional non-glass heads. Compare our new low prices over buying new. Two day turnaround. Tucker Enterprises, P.O. Box 10120, Alexandria, Virginia 22310-0120, 703/971-2321. 8-83-1fn

## EQUIPMENT FOR SALE

**BROADCAST CRYSTALS** for AM, FM and TV transmitters, hundreds in stock. Vacuum types and special crystals available. Crystal and oven service. Eidson Electronic Co., Box 3751, Temple, Tx. 76501. (817) 773-3901. 12-83-eom

**THE RECORDING BOOK THAT'S ROCKING THE MUSIC INDUSTRY AND TAX DEDUCTIBLE!** "Practical Techniques for the Recording Engineer" by Sherman Keene, is endorsed by the Recording Institute of America, Colleges, Studio/Schools, Musicians, and our Correspondence Students around the world. Recommended by reviewers of: the MIX, Re/P, Guitar Player, and other top publications. Hard cover, 380 pages, 29.75 (\$1.69 in Calif.) + \$2.50 UPS (or surface) shipping (overseas air mail \$16). **CORRESPONDENCE COURSE:** The ONLY complete course designed for engineers, students, and musicians, who have access to pro or semi-pro recording equipment, and want to achieve excellence in the studio. Two textbooks, unlimited dialog with the author via cassette. Installation plan. **NOTE:** Course and books **TAX DEDUCTIBLE** to those employed in related fields. **FOR INFORMATION OR TO ORDER** contact: S.K.P., 1626 N. Wilcox, No. GM-677, Hollywood, CA 90028, USA. Order by phone using Visa or Mastercharge by calling (805) 969-6639. 1-84-3t

## EQUIPMENT FOR SALE (CONT.)

**2-SK-90 CAMERAS** with digital commands, lenses, with Conrac RHB21 color monitors \$15,000.00 ea. (213) 823-7064. 1-84-3t

**TR-60 QUAD—EXCELLENT CONDITION**—spare head—editing module—\$6,500. H.S. Productions, 714-241-0248. 2-84-1t

**SATELLITE AUTOMATION SYSTEM—SONOMAG:** ESP 1—19 Sources, 1 8000 Event Programmer, 1 Remote Control Console for Live Assist, 6 Carousels, 4 Drawer Cart Players, 1 Net Delay Recorder, 1 Data Cassette Storage Unit, 1 Extel Printer, 1 Seven Day Superclock with flags, 2 Black and White Video Monitors. \$30,000 for all, F.O.B. Bullhead City, AZ. We will carry terms on approved credit. Contact: Steven Buck, KBAS Radio, 2332 Highway 95, Suite A, Riviera, AZ 86442, (602) 758-1139. 2-84-1t

**OPTIMOD 8100A**—Excellent Condition, \$3000. Contact Gary Hartman, 614-224-1271. 2-84-1t

**CETEC GAUSS SERIES 1200 HIGH** speed tape duplicator. 1/4" 2 track stereo format. Ferrite heads. Low time master and two slaves in excellent condition. Contact John Buffalo, 619-291-9191. 2-84-2t

**HITACHI HR-100 1"** portable VTR with Anvil case, batteries, charger, AC pwr. supply, low hours, excellent condition, \$21,500. Contact Mark Munroe, Image Producers, 3119 Market St., Youngstown, OH 44507. (216) 783-0572. 2-84-2t

**NEW Lenco 300 SERIES EQUIPMENT** Racks with power supplies, system delays, sync generator, sub-carrier DAs, multiburst, stairstep and window generators. 50K value sell 20K obo. All or part. For more info call Rex Olson at (213) 768-7141. 2-84-1t

## WANTED TO BUY

**WANTED:** Pre-1923 radio equipment and tubes. August J. Link, Surcom Associates, 305 Wisconsin Ave., Oceanside, CA 92054, (619) 722-6162. 3-76-1t

**HIGHEST PRICES PAID** for 112 Phase Monitors and for clean, one kw or greater powered AM and FM Transmitters. All duty and transportation paid. Surplus Equipment Sales, 2 Thorncliffe Park Dr., Unit 28, Toronto, Canada M4H 1H2, 416-421-5631. 2-79-1fn

**WANTED: STATION LIBRARIES OF MUSIC,** 16" ET's, 12" Transcriptions, 45's, 78's, LP's. Boyd Robeson, 2425 W. Maple, Wichita, KS 67213, (316) 942-3673, 722-7765. 5-82-1fn

**HITACHI HR-1000 1"** portable VTR with Anvil case, batteries, charger, AC pwr. supply. Low hours, excellent condition, \$21,500. Contact Mark Munroe, Image Producers, 3119 Market St., Youngstown, OH 44507, (216) 783-0572. 2-84-2t

**NEW Lenco 300 SERIES EQUIPMENT.** Racks with power supplies, system delays, sync generator, sub-carrier DAs, multiburst, stairstep and window generators. 50K value sell 20K obo. All or part. For more info call Rex Olson at (213) 768-7141. 2-84-1t

**PROGRAM AUTOMATION, ATS, 1kW FM, 5 bay antenna, STL, audio board, monitoring devices for stereo FM operation.** No junk. 122 Starlane, Butte, MT 59701. 2-84-3t

**WE WILL BUY** just about anything Optical, Scientific, Electronic, Test, Production, or Components, Excess or Obsolete. Computer Parts Mart, 3200 Park Blvd., Palo Alto, CA 94306. 415-493-5930. 2-84-1t

**GOOD USED OR NEW 25 KW-6806** or 12 KW-6448 power tubes. CONTACT: WNYC, New York, (212) 594-0946, (212) 669-7706. 2-84-1t

Use

# BROADCAST

engineering

## classified ads

## RENTAL EQUIPMENT

davidgreen

RENT broadcast test gear from the largest inventory in America. Potomac field strength meters and proof of performance systems, Delta operating impedance bridges, Belar modulation monitors, Orban Optimod, Moseley remote control and STL links, Marti RPU equipment. David Green Broadcast Consultants Corporation, 703-777-8660 or 703-777-6500, Box 590, Leesburg, VA 22075. 8-83-1fn

## EMPLOYMENT SERVICES

WE PLACE

### TV and Video Engineers

Coast to Coast  
[ALL LEVELS, BUT NOT OPERATORS]  
COME TO THE SOURCE

Phone/Resume

## KEY SYSTEMS

Westminster Road  
Wilkes-Barre, PA 18702

Phone Alan Kornish at  
**(717) 655-1458**

## HELP WANTED

**CHIEF ENGINEER AND TRANSMITTER SUPERVISOR** needed for new CH33 Miami/Ft. Lauderdale market. Applicants must have worked in this position for two years or more. Salary commensurate with experience. Call or write to Ed Reid, Director of Engineering, KTXA-TV 21, 1712 East Randol Mill Road, Arlington, Texas 76011. (817) 265-2100. 2-84-1t

**REMOTE TRUCK MAINTENANCE ENGINEER**—Candidate must have 5+ years experience as a remote truck EIC. Familiar with IKE HK357 & HL79, RTS, Chyron, VPR3, BVH500, Quantel, GVG Switcher, Routing Switcher. Experience with Network Sports & Entertainment. Must be willing to travel, possess a Class I license. Send resume and salary requirement to Jennifer Kelsey, One Pass Inc., One China Basin Bldg., San Francisco, CA 94107. 2-84-1t

**TRANSMITTER MAINTENANCE ENGINEER—KRIV-TV, Metromedia Houston, Texas** has an immediate opening for a conscientious individual. Must have strong UHF background and the desire to advance to supervisory position. New facility with modern equipment. Apply to Wendell R. Wybomy V.P./C.E., KRIV-TV Metromedia, Inc., P.O. Box 22810, Houston, TX 77227, (713) 626-2610. EOE. 2-84-1t

**THIS OPENING DESERVES YOUR ATTENTION:** We're looking for an experienced engineer to take care of our AM and FM stations in western Texas. Our company offers many benefits and a salary to commensurate with your abilities. Please send resume to: Dept. 605, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 2-84-2t

**TECHNICIAN.** Maintenance Engineer. Knowledgeable with analog and digital circuitry. Experience with VPR-2, ACR-25, VR2000-1200 video switchers, E.N.G. microwave, TK-78's, and Sony 3/4 inch U-matics. General FCC license and SBE certification certificate preferred. Send resume to Dept. 604, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. An Equal Opportunity Employer. 2-84-1t

**MAINTENANCE ENGINEER FOR MAJOR MARKET** Post-Production Facility. We are seeking the right person to maintain 2 Edit suites both CMX controlled. (5) 1" machines, (2) 2" machines, Grass Valley Switchers, 300 series and 1600 series, DVE, MCI 8 track, BVU 800's, BVU 200's, CEI cameras, Hitachi FP-21, etc. Applicants should have computer knowledge along with a good understanding of the Post-Production business. Send resume to Mark Hanson, Spectrum Video Post-Productions, 688-B Alpha Drive, Cleveland, OH 44143. 2-84-1t

## HELP WANTED (CONT.)

**VIDEO TAPE ASSOCIATES AND VTA TECHNOLOGIES**—Video Tape Associates with television production facilities in Atlanta, Georgia and Hollywood, Florida and VTA Technologies a research, development, and manufacturing firm in Hollywood, Florida, are accelerating their expansion plans and therefore have the following openings: **VTA TECHNOLOGIES, HOLLYWOOD, FLORIDA—DIGITAL DESIGN ENGINEERS**, Challenging opportunity for engineers with a television engineering background and the ability to apply advanced technologies to new areas of teleproduction equipment needs. If you are not satisfied with today's methods and equipment help us develop tomorrow's. **SOFTWARE ENGINEERS**—Join the software development team responsible for real time control and manipulation of television signals and equipment. Must be familiar with 68000, 6502 assembly language. **ANALOG ENGINEERS**—Experience with operational amplifiers, linear and non-linear circuits and video signal processing. **VIDEO TAPE ASSOCIATES—ENGINEER IN CHARGE OF REMOTE OPERATIONS, HOLLYWOOD, FLORIDA**. Management position for maintenance engineer with good knowledge of all areas of teleproduction. Only moderate travel required. The position involves the management of remote engineers and teleproduction trucks. Good client relation skills necessary. **MAINTENANCE ENGINEERS, ATLANTA, GEORGIA; HOLLYWOOD, FLORIDA**. Experience and current digital skills necessary. Work with the latest equipment, from computer graphics and ADOS, to Betacam with wireless time code. **TELECINE COLORIST, HOLLYWOOD, FLORIDA**. Film knowledge and experience as well as a strong television background are needed for this position. Work with the Bosch FDL 60 and scene-by-scene computer assisted color correctors. If you are still excited about your profession, and would enjoy working for a company that rewards self-motivation, creativity and innovation contact Michael Orsburn, 2040 Sherman Street, Hollywood, Florida 33020. Phone 305-920-0800. 2-84-3t

### TELEVISION MAINTENANCE ENGINEERS

**WTBS** **CNN**  
The leading news and sports satellite communications network has career opportunities for broadcast maintenance engineers. Openings are now available in Atlanta for engineers experienced in studio and ENG equipment maintenance. Turner Broadcasting System offers an excellent benefit and compensation program. Interested maintenance engineers may call (404) 827-1638 between 9 A.M. and 5 P.M., Eastern Time, Monday—Friday, or send resume in complete confidence to:  
**TURNER BROADCASTING SYSTEM, INC.**  
1050 Techwood Drive  
Atlanta, Georgia 30318  
Attn: Jim Brown, Corporate Engineering  
TBS is an equal opportunity employer

**TELEVISION ENGINEER**: One year supervisory experience, two years experience in electronics and General Class FCC License required. Send resume and three letters of reference to Warren Gravois, Audio Visual Center, University of New Orleans, Lakefront, New Orleans, LA 70148. Closing date February 15. UNO is an EO/AA employer. 2-84-1t

**SOUTHERN CALIFORNIA**: Christian satellite and broadcast network has openings for maintenance engineers. Minimum two years experience required. Send resume to Ben Miller, Director of Engineering, Trinity Broadcasting Network, Inc., P.O. Box "A", Santa Ana, CA 92711. An Equal Opportunity Employer. 1-84-2t

**PRINCIPAL ELECTRONICS TECHNICIAN**—engineering background or minimum of 5 years in broadcasting. FCC license, experience, maintenance and operation of VPR-2, VPR-80, HL-79, TK-76, character generators, video and audio test equipment. Send resume to Dr. Arthur Higbee, Director of Telecommunications, Utah State University, UMC-85, Logan, UT 84322. 2-84-1t

**TV MASTER CONTROL OPERATOR** and technician. Must be graduate of technical school, FCC 1st Class license, at least 18 months experience in on-air operation. Should be familiar and have experience with two-inch, one-inch and three-quarter inch equipment, RCA film and Eastman projectors. Send resume to Dept. 603, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. An EOE/M-F employer. 1-84-1t

**MOPIX/TV FACILITIES MANAGER** (Technical Operations Manager): Supervises Washington, D.C. plant of 85 employees. Skills should include extensive studio maintenance of state-of-the-art television equipment, hands-on experience with studio color cameras, video tape machines (¾-Quad-1-inch), signal converters, and engineering gear. Must be proficient in the technologies of computer operations, satellite, teleconferencing communications. A strong, technically fluent leader is needed. Graduate engineering degree preferred. Salary range from \$56,945 to \$67,200. Senior Executive Service. Send resume or application before February 24, 1984 to: U.S. Information Agency, Room 524, 301 4th Street, S.W., Washington, D.C. 20547. USIA IS AN EQUAL OPPORTUNITY EMPLOYER. 2-84-1t

### POSITION WANTED

**ENGINEER, OR ASSISTANT**. 1st Class Phone. Some experience. Larry, 415-283-8540. 2-84-1t

**BROADCAST ENGINEER WITH TWO YEARS** experience, at a major television station. Experience in air control, telecine control, studio camera operation and transmitter. FCC license, willing to relocate. Please call Marc, 1-(513) 242-4943. 2-84-1t

*This magazine gives  
you good reading,  
good writing  
and good arithmetic.*

We present the information in our articles clearly, accurately and objectively. That's good writing. Which means good reading.

We present the information in our circulation statement clearly, accurately and objectively. That's good arithmetic.

BPA (Business Publications Audit of Circulation, Inc.) helps us provide precise and reliable information to both advertisers and readers.

An independent, not-for-profit organization, BPA audits our circulation list once a year to make sure it's correct and up to date. The audit verifies your name, your company, your industry and your job title.

This information enables our advertisers to determine if they are reaching the right people in the right place with the right message.

The audit also benefits you. Because the more a publication and its advertisers know about you, the better they can provide you with articles and advertisements that meet your information needs.

BPA. For readers it stands for meaningful information. For advertisers it stands for meaningful readers. Business Publications Audit of Circulation, Inc. 360 Park Ave So. New York, NY 10010

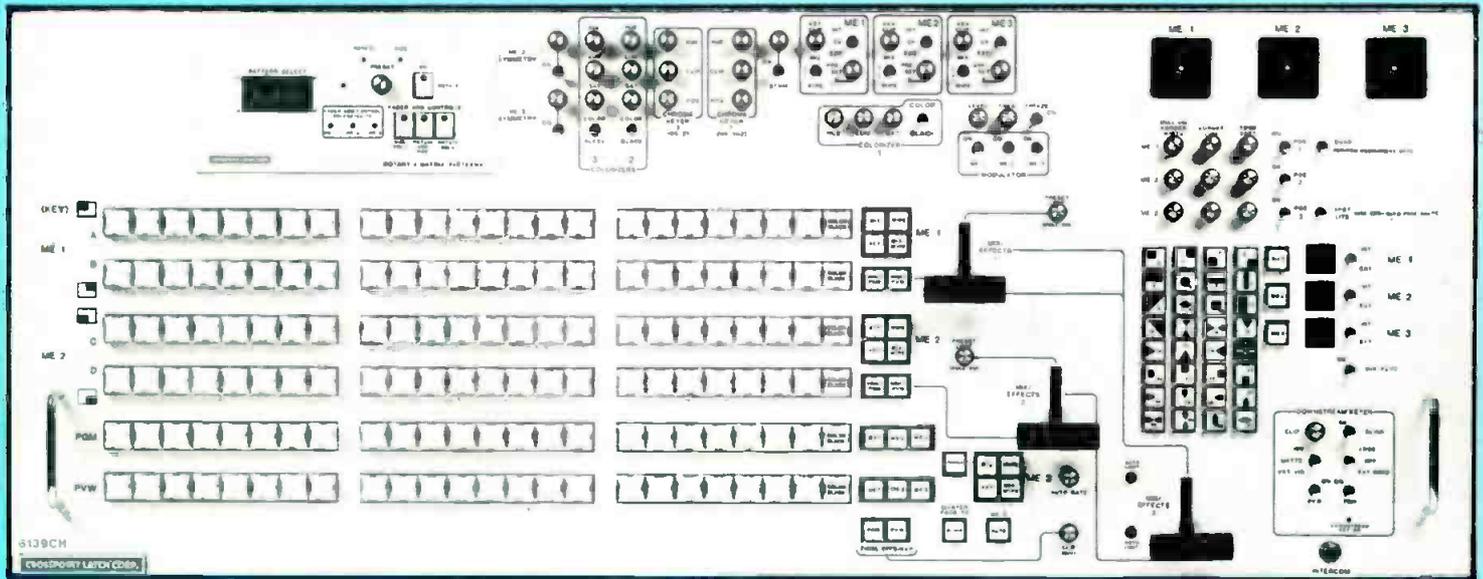


*We make sure you get what you pay for.*

# 6139

# SUPERB QUALITY

# THE PRINCIPAL FEATURE



The quality of the 6139 is superb. You could not ask for more. Imagine you had to select a switcher for one feature and one feature alone - quality. If you overlooked the tremendous production power of the 6139, overlooked its ability to be controlled from most editors, overlooked its modular state of the art design, you would still end up selecting the 6139, based on that one single feature - its high quality performance.

## 8, 16, OR 24 INPUTS      LED OR ILLUMINATED PUSHBUTTONS

### PRODUCTION

- THREE MIX EFFECTS SYSTEMS
- FIVE LEVELS OF KEYS
- QUAD SPLIT
- DOWNSTREAM KEYER, WITH EDGE, MATTE AND INSERT
- PATTERN MODULATOR WITH FREEZE
- TWO CHROMA KEYERS, RGB OR ENCODED
- THREE COLORIZERS
- MASTER FADE TO BLACK
- AUTOMATIC AND MANUAL TRANSITIONS
- MIX PATTERN MODE (DISSOLVE PATTERNS)
- TOGGLE

### THE ELECTRONICS

New state of the art design. Multiple back-porch feedback clamps provide a very high degree of stability. Modular construction, with standardized function oriented plug-in boards facilitate maintenance, and field replacement. We recognize the fact that no matter how reliable a unit is, there is always the possibility that a component can fail. The 6139 has been designed with back-up paths, to reduce the possibility of complete shut down. For instance the PREVIEW system is an exact duplicate of PROGRAM. Several boards are interchangeable, and may be swapped to at least provide essential functions in an emergency.

### POST PRODUCTION

**THE 6139 INTERFACES WITH MOST EDITORS.** It will accept commands directly from their keyboards. It will be used in conjunction with the CROSSPOINT LATCH 6403 Editor Switcher Interface, or the 7200 AUTO DRIVE. These are not mere "INTERFACES", nor are they merely "PROGRAMMABLE". They are human engineered devices SPECIFICALLY designed for use in editing. Consider just one point; they allow the operator to set the START and FINISH points of a transition precisely, (in order to obtain FRAME ACCURATE edits) while at the same time leaving the editor full control of the rest of the switcher functions; and the ability to insert and control these other functions from the edit list.

**BLANKING PROCESSOR** eliminates color shift at the end of a mix or wipe

**FIVE LEVELS OF KEYS**

**ROTARY AND MATRIX WIPE OPTION**

**HIGHLY EFFICIENT CURRENT MODE AMPLIFIERS INCREASE STABILITY AND REDUCE SIZE OF ELECTRONICS**

**INTERFACES WITH MOST EDITORS**

**AUTO DRIVE™ OPTION (COMPUTER CONTROL)**

**TWO CHROMA KEYERS (RGB OR ENCODED)**

**UNIQUE "TEST" MODE TO FACILITATE SYSTEM TIMING**

**DELIVERY  
LED VERSIONS - 2 WEEKS**

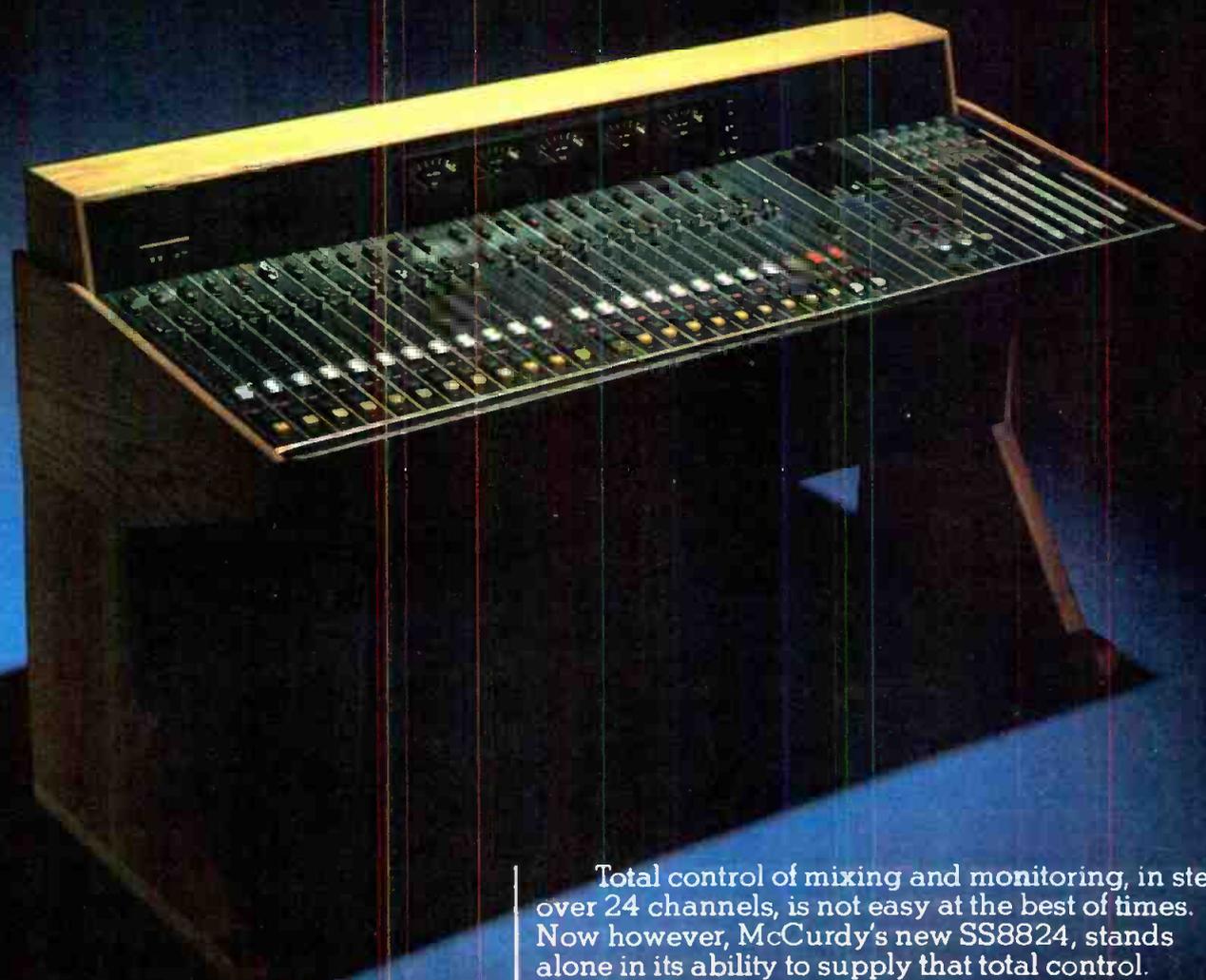
8 input LED version starts at **\$14,500**. With illuminated push buttons and options approx. **\$70,000**

95 PROGRESS ST. • UNION, N.J. 07083  
(201) 688-1510 • Telex 181160

**CROSSPOINT LATCH CORP.**

Circle (108) on Reply Card

McCurdy's new 24-channel stereo audio console stands alone in quality and performance...



Total control of mixing and monitoring, in stereo, over 24 channels, is not easy at the best of times. Now however, McCurdy's new SS8824, stands alone in its ability to supply that total control.

The SS8824 is loaded with standard features that provide ease of operation and quality of reproduction: items like two individually assignable stereo buses, plus an auxiliary stereo bus, with individual level and assignment, electronic cue switching and improved

on/off switching.

The McCurdy SS8824 also has an extensive list of prewired, plug-in options and is compatible with a wide range of McCurdy auxiliary audio equipment. All this gives

you quality audio, simplicity of use and flexibility for best possible component matching.

Let us show all the reasons why the new McCurdy SS8824 stands alone in quality audio reproduction. Call us today.

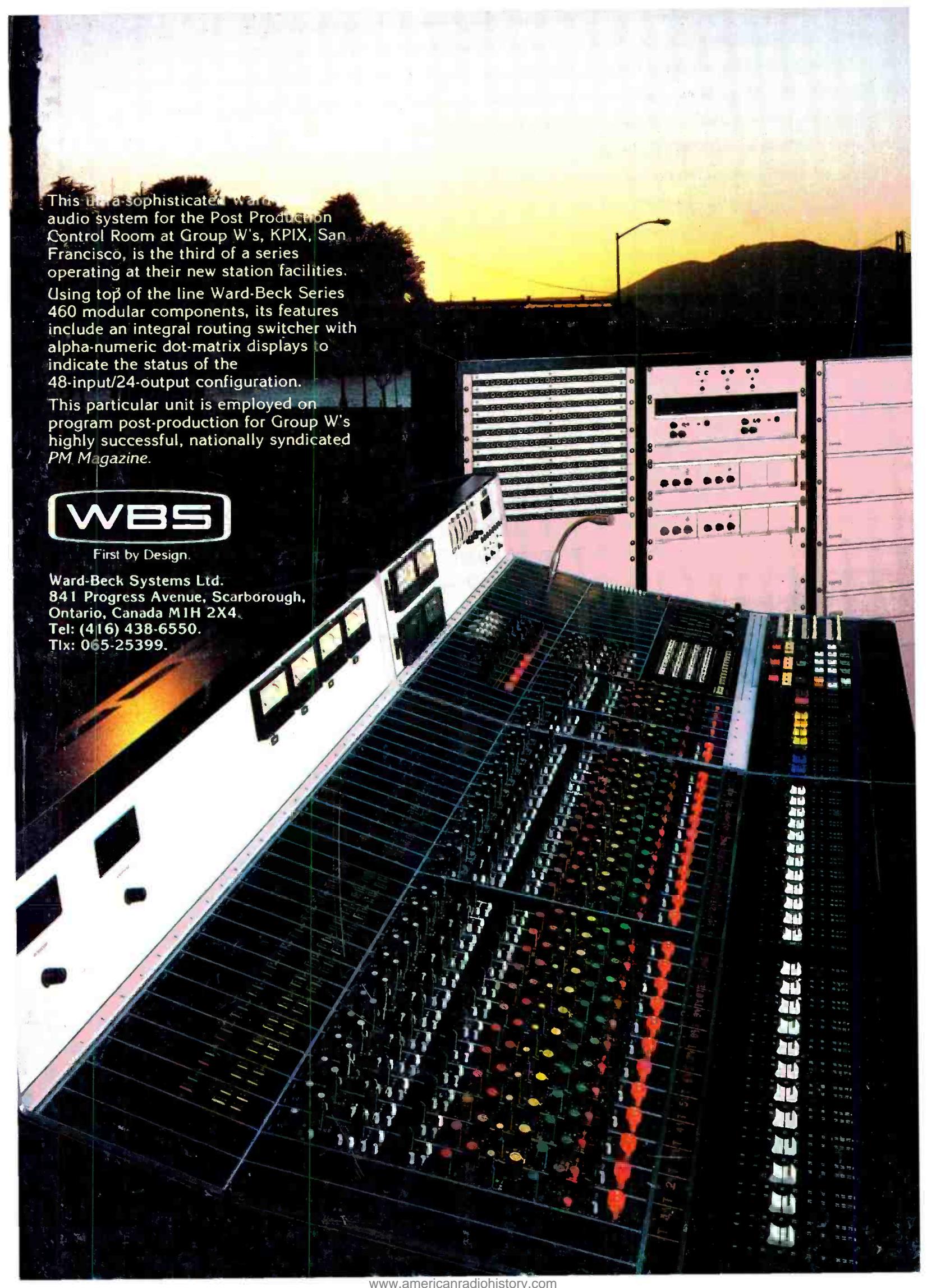
Circle (1) on Reply Card

INTRODUCING THE MODULAR

# SS8824



McCURDY RADIO  
INDUSTRIES  
Toronto (416) 751-6262  
Chicago (312) 640-7077



This ultra-sophisticated Ward-Beck audio system for the Post Production Control Room at Group W's, KPIX, San Francisco, is the third of a series operating at their new station facilities. Using top of the line Ward-Beck Series 460 modular components, its features include an integral routing switcher with alpha-numeric dot-matrix displays to indicate the status of the 48-input/24-output configuration.

This particular unit is employed on program post-production for Group W's highly successful, nationally syndicated *PM Magazine*.



First by Design.

Ward-Beck Systems Ltd.  
841 Progress Avenue, Scarborough,  
Ontario, Canada M1H 2X4.  
Tel: (416) 438-6550.  
Tlx: 065-25399.