BROADCAST engineering

December 1983/$3

Broadcast technology:

'84 forecast

- ABC
- BBC
- CBC
- CBS
- CCIR
- FCC
- IBA
- NBC
- Taft

The 9000 Sets New Standards

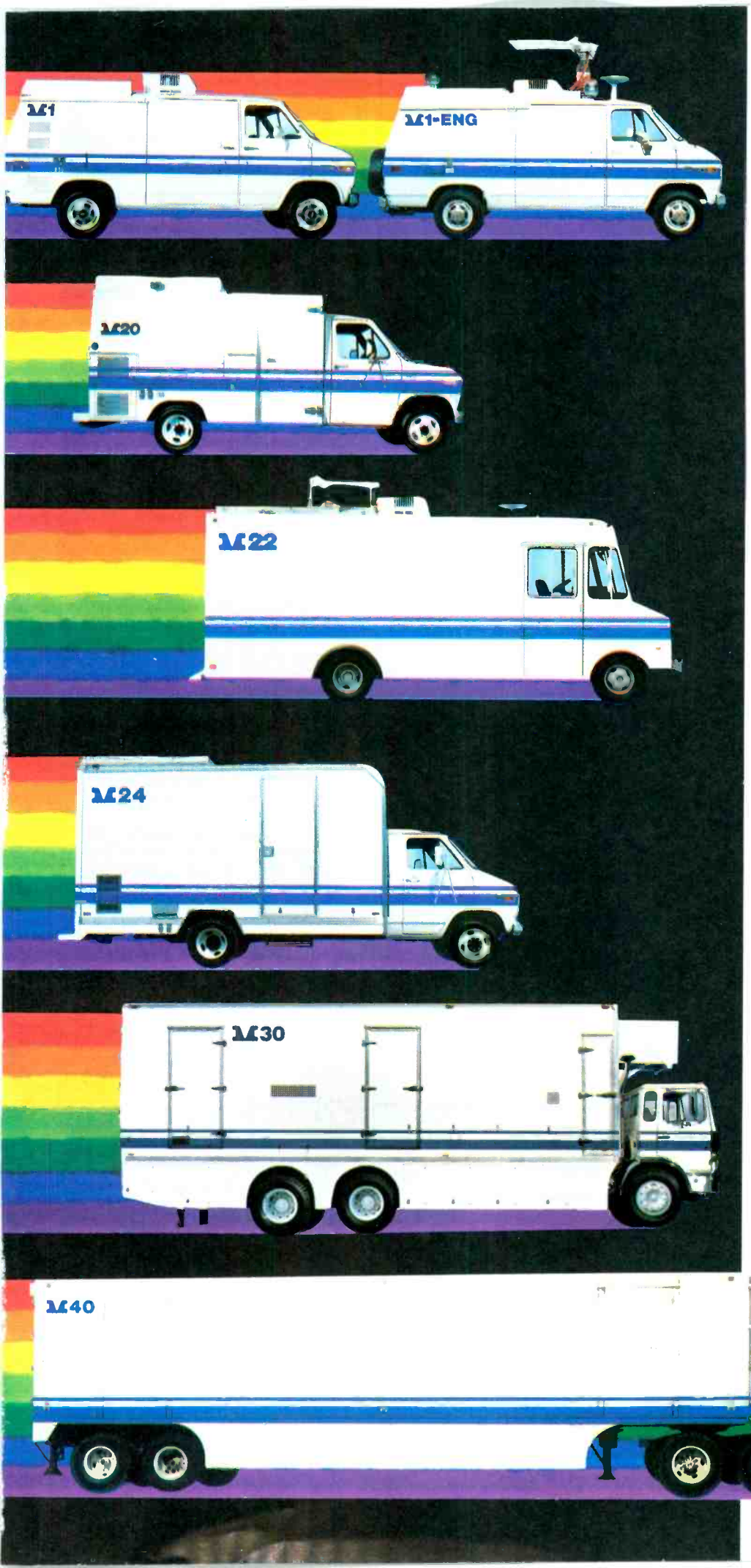
ADM Technology's 9000 Series of Tele-production consoles are the newest, most advanced audio consoles in the industry. The 9000 Series brings together in one console a quantum leap in audio processing and control as well as ADM's unsurpassed reliability. The 9000 is a true stereo console with a micro-processor-based, random access, line level input router. Together with its computer controlled output assignments, the 9000 will store in its non-volatile memory 99 input/output assignments. Designed for television production, post-production and on-air broadcast, the 9000 is compatible with SMPTE's emerging standards. Like all ADM consoles, it is backed by our exclusive 5-Year Warranty. For more information, contact ADM Technology, Inc., 1626 E. Big Beaver Road, Troy, MI 48084. Phone: (313) 524-2100. TLX 23-1114.

ADM® *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)

MIDWEST
CORPORATION

Mobile Unit Group
One Sperti Drive
Edgewood, KY 41017

Cincinnati, OH 606-331-8990	Bristol, TN 615-968-2289
Columbus, OH 614-476-2800	Nashville, TN 615-331-5791
Dayton, OH 513-298-0421	Charleston, WV 304-722-2921
Cleveland, OH 216-447-9745	Virginia Beach, VA 804-464-6256
Pittsburgh, PA 412-781-7707	Washington, DC 301-577-4903
Detroit, MI 313-689-9730	Charlotte, NC 704-399-6336
Indianapolis, IN 317-251-5750	Atlanta, GA 404-875-3753
Louisville, KY 502-491-2888	Miami, FL 305-592-5355
Lexington, KY 606-277-4994	Tampa, FL 813-885-9308

Circle (2) on Reply Card

BROADCAST engineering

The journal of broadcast technology

December 1983 • Volume 25 • No. 12

©Copyright 1983, 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 is an on-board scene from the Earth-orbiting space shuttle Challenger, releasing the Indian National Satellite (INSAT), India's first communications satellite. The deployment came during the Challenger's second day in orbit on Aug. 31, 1983. When in position, the satellite will bring improved weather forecasts to the huge subcontinent and will provide it with telephone and TV services. The view shown here, provided courtesy of NASA, is from the aft flight deck. The payload flight test article displays the US flag in the middle of the cargo bay, and the Canadian-built remote manipulator appears to be waiting for its busy agenda of activity with the barbell-shaped test device.

The cover is especially appropriate for this issue devoted to the 1984-and-beyond *Technology Forecast*. In selected articles beginning on page 21, broadcasters and agency experts look ahead to technologies reshaping the world of broadcasting, much as the satellite shown here will alter the future of communications for India.

The staff of
Broadcast Engineering
wishes you
a happy holiday season
and a prosperous
New Year.

NEXT MONTH, BE plans a dynamite issue on ENG/EJ/EFP to kick off what promises to be a super year for broadcasters. We will cover radio and TV newsgathering, with special emphasis on automating news operations. Also, we will look at tripods and camera support systems for ENG/EFP.

The Fall 1983 SMPTE Convention in Los Angeles was exciting, with several new aspects for the industry. Our January issue will feature a replay of this event and will highlight new dimensions appearing in the SMPTE shows.

"I want the world. Consistent .05% corner registration and full auto-setup of up to 96 cameras on computer command."

HITACHI HEARD YOU.

AUTO SETUP

Don't want much, do you?

Dynamic registration not just at dead center but at all four corners. Plus 2-minute auto-setup of all those cameras.

You're asking for some smart camera system, networks of the world and top-drawer video production companies.

Well, Hitachi heard you, and has created an outright *genius*—the Hitachi SK-110 Camera System.

The computer registration capabilities of this camera system produce pictures of a clarity and resolution previously unheard of.

And you get auto-setup at the push of just one button, and zero reference, too, where the computer sets the green channel and compares blue and red to it with absolute precision.

The SK-110 is not only self-correcting, but self-diagnostic as well. It gives both video screen display and hard copy printout; can be hooked into the CRT for control room monitoring.

There's a high-performance contour corrector; 5 automatic setup modes including quick check; 5 data files; so many other unique features an ad can't begin to tell you about them.

The ultimate Hitachi SK-110. Contact the broadcast video division at any of the offices listed below. Hitachi Denshi America Ltd., 175 Crossways Park West, Woodbury, NY 11797 (516) 921-7200. Offices also in Chicago (312)344-4020; Los Angeles (213) 538-4880; Atlanta (404) 451-9453; Cincinnati (513) 489-6500; Dallas (214) 233-7623; Denver (303) 344-3156; Seattle, (206) 575-1690; and Washington, D.C. (301) 459-8262.

Circle (3) on Reply Card

The Classic Look in Audio Consoles

Audio performance? Exceptional! For both 150 and 250 series: Distortion .05% IM and THD from 30 Hz to 20 kHz at +18 dBm output with ±0.5 dB frequency response. Each mixer in every model has a preamp selectable for either microphone or high level plus a full complement of line, monitor, cue and headphone amplifiers...all plug-in.

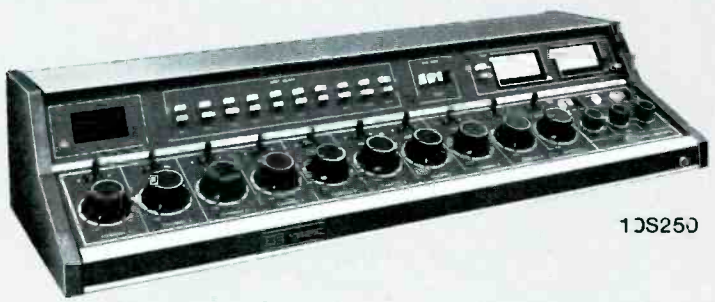
Choose from 10 different models, mono or stereo.

5M150

5S250

8M150

8S250



10S250

For more information, contact your local Broadcast Electronics distributor, or write for our new brochure.

BE BROADCAST ELECTRONICS INC.

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

Circle (4) on Reply Card

BROADCAST 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. Ericksen, *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*
Mary Birnbaum, *Production Manager*

Regional advertising sales offices listed near the Advertisers' Index.

Member, American Business Press ☆ABP

Member, Business Publications Audit of Circulation ▽BPA

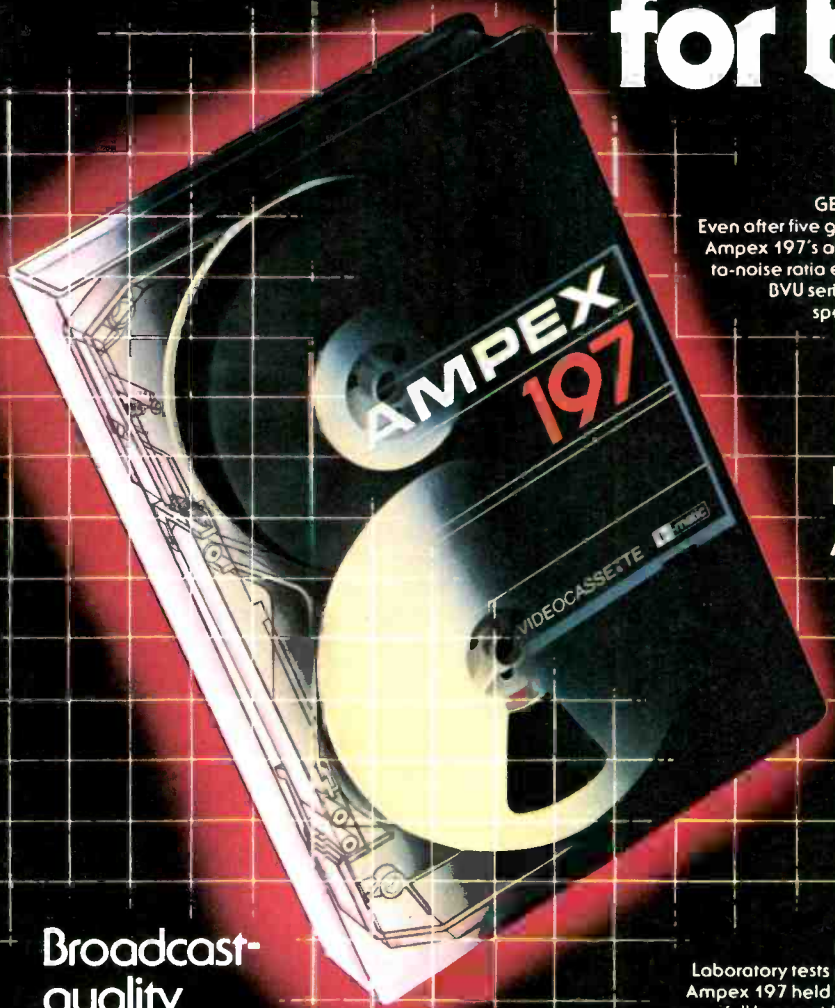
BROADCAST ENGINEERING (USPS 338-130) is published monthly by Intertec Publishing Corporation, 9221 Quivira Road, P.O. Box 12901, Overland Park, KS 66212-9981. Postmaster, return form 3579 to P.O. Box 12938 at the above address.

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.

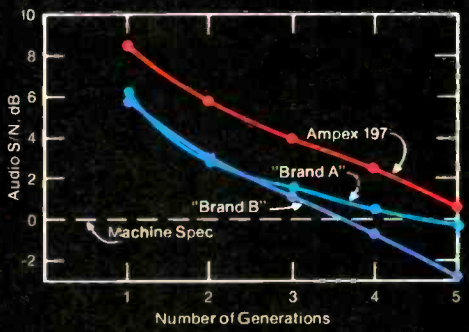
SUBSCRIPTIONS: **BROADCAST ENGINEERING** is mailed free to qualified persons in occupations described above. Non-qualified persons may subscribe at the following rates: United States, one year, $25; all other countries, one year, $30. Back issue rates, $5, except for the September Buyers' Guide issue, 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.

©1983. All rights reserved.
Intertec Publishing Corp.

Ampex 197: designed especially for broadcast.



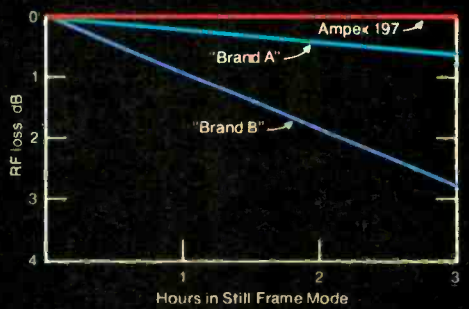
AUDIO MULTIPLE GENERATIONS
Even after five generations, Ampex 197's audio signal-to-noise ratio exceeds the BVU series machine specifications.



Broadcast-quality sound.

Ampex 197 offers superior signal-to-noise and low distortion characteristics. This means crisper, cleaner audio performance under heavy editing conditions and multiple generation dubbing. Plus excellent stereo fidelity when used for music recording.

STILL FRAME DURABILITY
Laboratory tests proved that Ampex 197 held up for three full hours with no RF loss.

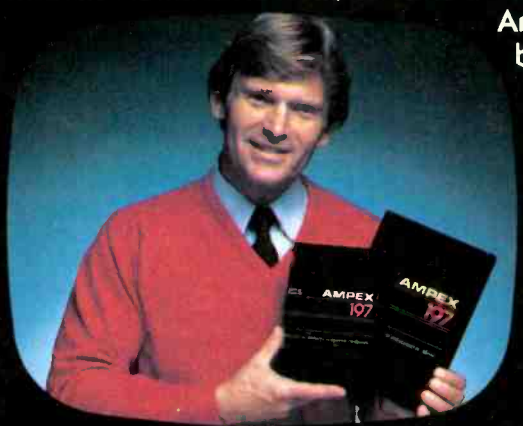


Broadcast-quality color and sharpness.

The Ampex 197 ¾" videocassette was developed with nothing less than perfection as the goal.

With superb chrominance and luminance performance it is ideal for ENG, EFP and on-line editing.

Ampex 197 has been especially formulated to optimize the performance of Sony BVU recorders.



Broadcast-quality reliability.

In blind field testing, Ampex 197 got the highest marks from broadcast professionals for picture quality, stability, and durability.

Find out more about why Ampex 197 is quality worth broadcasting. Call your Ampex Regional Office or write to: Ampex Corporation, 401 Broadway, Redwood City, CA 94063 (415) 367-3809

AMPEX

Ampex Corporation • One of The Signal Companies

Quality worth broadcasting.

Circle (10) on Reply Card

FCC update

December 1983

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

Class IV power increase proposed

The commission is proposing to permit all Class IV AM stations to increase maximum nighttime power from 250W to 1000W. Class IV stations not eligible for daytime power of 1000W because of co-channel and/or adjacent channel protection requirements still would be permitted to use the full 1000W at night.

In 1979, the Region 2 Administrative Radio Conference on AM broadcasting adopted the US proposal to permit an increase in nighttime power to 1000W for Class IV stations. However, the commission was not in a position to move forward with a proposal to change domestic regulations until a reasonable likelihood of completion of bilateral AM agreements with Canada and Mexico existed. Substantial progress has been made toward completing agreements with those countries, thus clearing the way for the commission's rulemaking.

Normally, applications by existing AM stations for power increases are treated as "major" changes under the rules and require considerable processing time. To reduce the administrative burden on licensees and the commission as a result of the across-the-board nighttime power increase now proposed, the commission contemplates classifying Class IV power increases as "minor" changes.

Multicity identification rules amended

The FCC has eliminated the requirement that a licensee provide principal-city coverage to any community with which it identifies over the air. As a result of this rule change, broadcasters now may include in their official station identifications the names of any communities they select, provided the community of license is named first. Further, licensees no longer must request authority to identify with communities other than their city of license.

This rule change is part of the commission's continuing deregulation of broadcasting. The commission found that its rule was intended to protect advertisers from misleading coverage claims and said its involvement in this aspect of the business relationship between broadcasters and their advertising clients is unnecessary and inappropriate. Because stations will be required to identify their communities of license first among the communities listed in their official station identifications, an adequate means of determining a station's location will be provided.

Lottery preferences for women proposed

The FCC is proposing to award preferences to women applicants in its process of selecting by lottery permittees for various types of stations. Under current rules, weighted preferences are given on the bases of diversification of media ownership and minority status.

In proposing the new preference for women, the commission said that, in comparative proceedings, merit is awarded to female applicants. It said adopting a lottery preference for women would be consistent with the congressional concern that the lottery preference scheme reflect the status quo in the comparative process. Further, the agency said that awarding preferences to women would advance its policy objective of promoting female ownership and participation in the media.

Because Congress did not specifically provide for the contemplated female preference when it adopted lottery legislation last year, there is a question as to whether the FCC has jurisdiction to establish such a preference for women. If the agency determines it lacks authority to implement its proposal, it will forward to Congress the record developed in its rulemaking, with appropriate recommendations.

Post-sunset notification issued

In late October, the commission began notifying daytime-only AM stations of the parameters of post-local sunset operations as a result of the commission's Report and Order in BC Docket No. 82-538, adopted Sept. 9, 1983.

Under the new rules, which depend on completion of bilateral agreements with Canada and Mexico before they can be fully implemented, daytime stations would be permitted to operate with as much as 500W power for as long as two hours after sunset.

At this juncture, an agreement with the Canadians is imminent. The agreement will permit some stations to operate until 6 p.m. local time. The notifications sent in October included, for each station, full particulars regarding the power to be used, as well as the period of post-sunset operation that will be permitted pending completion of a similar agreement with Mexico. Once the latter is completed, the 6 p.m. limit will be eliminated and it will be possible for some daytime AM stations to remain on the air until two hours after local sunset. Agreement with Mexico is expected to be completed in early 1984.

No application process will be involved. Stations need only indicate to the FCC their desire to operate post-sunset and state how any power reduction involved will be accomplished.

Notifications were issued in advance of signing the Canadian agreement to allow affected stations to take necessary steps to plan for implementing post-sunset operation once it is authorized by the FCC. As soon as the Canadian agreement is signed, the commission will issue a further public notice stating the effective date on which post-sunset operation may commence.

STV rules relaxed

The FCC has eliminated the requirement that TV licensees seeking to operate in a subscription TV (STV) mode apply in advance for authorizations. The commission also has adopted less stringent technical standards for STV transmissions.

Under previous rules, TV licensees were required to submit information specifying the method of STV operation, the type of programs proposed to be offered, a description of a type of technical equipment to be used and a showing with respect to the financial qualifications of the applicant and any STV franchise holders. The commission, in eliminating the application process for STV, found that it served no useful purpose in view of the substantial deregulation of STV already completed by the commission. It found that the authorization requirement imposed a burden on the agency and the applicant and also delayed service to the public. Under the relaxed rules, any licensee of a commercial broadcast station that desires to operate in an STV mode

Continued on page 132

AN EVOLUTIONARY MILESTONE IN TV SIGNAL DISTRIBUTION.

...Now meets RS250B 10km!

Broadband analog signals can now be reliably and cost-effectively transmitted over fiber optic cables, opening the door to levels of system performance and capability simply not possible with conventional metallic cable systems.

Developed by Grass Valley Group–the undisputed world leader in video switching and distribution equipment for television broadcasting and production–WAVELINK equipment is already in use internationally.

Present applications in the TV broadcast and production industry include interconnection between studios, transmitters, satellite earth stations, buildings, remote facilities and microwave stations.

Our extensive experience will assure you a WAVELINK system designed to fit your exact needs. Call on our worldwide sales and service network to help you discover the fiber optic advantage.

wavelink™
FIBER OPTIC COMMUNICATIONS

THE GRASS VALLEY GROUP, INC.®

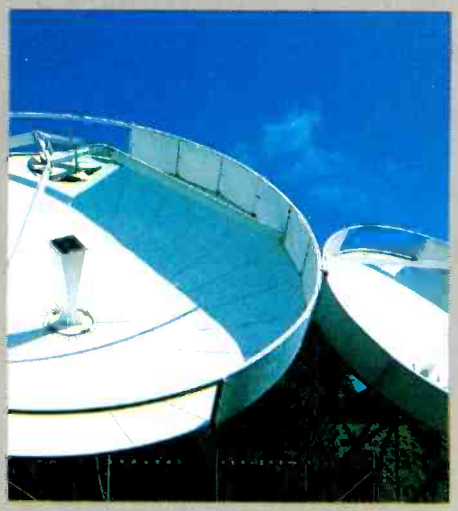
P.O. Box 1114 • Grass Valley, California 95945 USA • Tel. (916) 273-8421 • TWX 910-530-8280

A Tektronix Company

Circle (11) on Reply Card

TEK 1980 ANSWER AUTOMATIC VIDEO MEASUREMENT SET

There's just one Answer for making hundreds of video measurements automatically.



Signal verification

ANSWER is helping broadcasters, common carriers and cable operators maintain and improve signal quality in a variety of ways. The integrity of incoming feeds, off-air and off-cable signals can be checked and verified with state-of-the-art accuracy and speed. With ANSWER you know immediately if a signal is within acceptable or legal limits. Any problems that come up can be detected quickly, and with confidence, because ANSWER makes measurements with repeatability you can depend on.

Remote monitoring

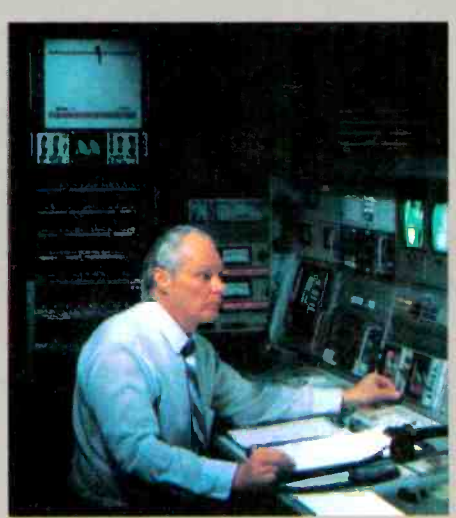
ANSWER is able to provide unattended monitoring of head ends, microwave links, satellite earth stations and distant transmitters. The need for dedicated station personnel at remote sites is minimized because ANSWER can be operated over voice-grade telephone lines. It can even be programmed to alert you automatically if measurement limits are exceeded. You save the time and expense involved in making unnecessary trips to distant stations.

Equipment testing

Equipment proofs, troubleshooting and maintenance are all ANSWER-easy. It provides quick, conclusive verification that new equipment is up to a manufacturer's specifications. And testing current equipment can be accomplished on a regular basis in much less time and with much less trouble than it takes to make the same measurements manually. Highly skilled personnel are freed for more productive activities, and the risk of interpretive errors is lessened considerably. You can have complete confidence in measurement results because of the repeatability you get with ANSWER over long periods of time.

Copyright © 1983. Tektronix, Inc. All rights reserved TVM-409.

WORKING HARD FOR
YOUR SIGNAL QUALITY



System testing and maintenance

ANSWER is the time-saving approach to systems evaluation. Major signal sources and critical points in each transmission path can be checked automatically. Testing an entire system takes much less time than it would to make the same measurements manually; personnel workloads and constraints of time need no longer be an obstacle. In addition, graphs and hard copies provide a permanent technical record that serves as an accurate basis for trend analysis and reference for future maintenance.

Manufacturing

Automated testing of production line output is a cost-effective way for video equipment manufacturers to ensure absolute product quality. ANSWER eliminates all chance of operator errors, at the same time that it increases productivity by making better use of personnel. Equally useful in research and development, ANSWER provides thoroughly accurate, repeatable test results, plus authoritative verification documentation to include with shipments.

ANSWER

Answer saves time, improves quality and lowers the cost of making video measurements by making them automatically. Attended or unattended. From a remote terminal or locally. With state-of-the-art accuracy. And comprehensive hard copy documentation. New NTSC and PAL software packages make ANSWER even more valuable. Flexible enough to meet the application demands of broadcasters, cable operators, common carriers and equipment manufacturers. Contact your nearest Tektronix Field Office for more information. Or call 1-800-547-1512 for literature. (In Oregon, 1-800-452-1877.)

Tektronix, Inc., P.O. Box 1700, Beaverton, OR 97075. Europe: Tektronix Europe B.V., European Headquarters, Postbox 827, 1180 AV Amstelveen, The Netherlands.

Tektronix®
COMMITTED TO EXCELLENCE

If you are a broadcaster circle 6.
If you are a cable operator circle 7.
If you are a common carrier circle 8.
If you are a manufacturer circle 9.

AM stereo: A call for action

A guest editorial by Norman H. Brooks, general manager, WKDW/WSGM, Staunton, VA

"What's good for General Motors is good for the nation." How many times have you heard that statement used?

Now all AM broadcasters are being told that GM and Delco picked a single-mode system of AM stereo for their cars and that they chose Motorola.

The FCC has given us an opportunity to flex our muscles and to prove that this great capitalistic society of ours still works. We have a choice of four different systems: Kahn, Harris, Motorola and Magnavox. Broadcast engineers are aware of the differences and are choosing the system that best suits the needs of their individual stations. They are picking AM stereo exciters just as they do the rest of the gear in their audio chains. Today's engineers are competent and capable of making such decisions and should be respected for them.

Some AM stereo systems are "winning" in this "marketplace war." Some exciter manufacturers are catering to the broadcaster and his needs and are hoping that receiver manufacturers will do their job in designing and making quality multimode receivers. Sansui and Sony already have chosen this positive approach. Other system manufacturers are working in the other direction. They are working directly with receiver manufacturers to force the broadcaster's hand.

Monopolies in our society never work. When there is competition and a choice, product improvement never stops.

Many of us already are broadcasting in AM stereo and are proud to be among the first to take this step forward. We have made our commitment to its future success. Now, it seems as though it is time to lift our voices again (doubly strong) and call for action.

The federal government has authorized all four systems. Let it be so! Let's not sit idly by and let decisions be made for us. Let each system manufacturer go out to tell his story and sell his product.

The one thing we all must do is to ensure the competitive market and the adoption of a standard for receiver manufacturers so that *all* "air" products can be heard by an unsuspecting public. After all, federal standards were set for all stereo system manufacturers. Let's not let the public be the sacrificial lamb.

Think of the confusion that will be cast on the public when GM introduces a single-mode radio. Think of the setback for our industry and the product it is trying to promote...AM stereo.

Write your congressman, your senators and your state representatives and propose that they encourage federal standards so that the public cannot be used in this experiment.

Let receiver manufacturers take the lead and compete to make better multimode receivers. The day of the entrepreneur is still here and there are a lot of dollars, yen and pesos to be captured through the consumer market.

Most broadcasters that have made their conversions to AM stereo can afford to lose the dollars invested in a stereo generator. But some guy who works hard, then goes out and spends his whole paycheck on a new radio or car radio that will not pick up all the on-air signals in stereo is paying for this game of push and shove. He *deserves* better treatment than that.

It's time for action from all those who are a part of this grand art of radio.

Let's get AM stereo going! It's the broadcaster's turn to influence his own destiny.

Editor's note:

The Buick Division of General Motors has announced plans to begin installing Delco single-mode AM stereo receivers in its 1984 Buick Century automobiles. The optional units will decode only the Motorola AM stereo signal. The Buick decision is based on extensive tests run by Delco more than a year ago on three of the competing AM stereo systems.


ONE OF THE FEW EFFECTS YOU CAN'T DO ON THE EXPANDED E-FLEX SYSTEM.
YET. We're working on it, though.
In the meantime, almost anything else you can think of is possible. Because we've just expanded the E-FLEX DVE® system with a new Perspective/Rotation accessory. So now, you can rotate images through all three axes. Add depth through perspective. Combine those effects with basic E-FLEX effects including split, compression, mosaic, Multi-move, and trajectory. And store it all on NEC's bubble memory cartridges.
We can't resist noting that our new capabilities make E-FLEX the virtual equivalent of systems costing far more. But more importantly, they make E-FLEX an instrument of almost limitless possibilities. One that takes only a few hours to master—and perhaps a lifetime to fully explore.
What's more, the E-FLEX system is modular. So you can buy it all at once, or start small and add later. And as we develop more capabilities, you'll be able to plug them right in.
To find out what E-FLEX can do now, call NEC at 1-800-323-6656.
By the time you call, we may have perfected the effect in the picture.
NEC
IMAGINE WHAT WE'LL DO NEXT
NEC America, Inc., Broadcast Equipment Division
130 Martin Lane, Elk Grove Village, IL 60007. In Illinois: 312-640-3792

Satellite update

By John Kinik, satellite correspondent

Planning for 1984 and beyond

As expected at the beginning of this year, 1983 has turned out to be an eventful year in satellite broadcasting. The most significant developments were: the 2° orbital spacing ruling made by the FCC, the commencement of medium power Ku-Band satellite services, the major commitment to satellite distribution by one of the broadcasting networks (NBC), the expansion of services across international borders and the RARC-'83 Conference. These developments have significance for the broadcasting industry, as satellites gradually become the dominant delivery mode for TV and radio programming. The following summarizes considerations involved in planning for 1984 and beyond.

2° spacing

The major impact of the FCC ruling is that C-Band antennas must have improved RF pattern performance in terms of lower sidelobe levels. New specifications reflecting this improved performance are mandatory for all new transmit antennas as of July 1, 1984, and apply also to receive antennas as a non-mandatory guideline. Although 2° spacing for C-Band satellites will not be phased in completely until the late 1980s, new installations *must* take the new requirements into account, because antenna service life typically exceeds 10 years. All existing antennas (installed before July 1984) must meet the new requirements by Jan. 1, 1987. The 2° spacing ruling applies to all satellites classified as non-broadcasting satellites, and includes C-Band and medium power Ku-Band satellites.

Medium power Ku-Band satellites

The first Ku-Band satellite to be used for broadcasting directly to homes in the United States is the Canadian Anik C2, which will be used temporarily by United Satellite Communications Inc. (USCI) to transmit five channels of television to its subscribers. The service was due to be on the air by December. When equivalent US satellites are available in 1985, the USCI channels will be switched over from the Canadian satellite. By using Anik C2, USCI has gotten the jump on the planned direct broadcast satellite (DBS) services due to go on the air in 1986 or later. In effect, USCI is challenging the whole concept of high power DBS satellites by introducing service via a medium power satellite at a relatively small penalty in terms of larger receive antenna size (2m diameter range vs. 1m range). Two DBS companies obviously are feeling the pressure of this unexpected early competition and have announced plans to launch their own services in 1984, two years early, also via medium power satellites. These companies, Satellite Television Corporation (STC) and Skyband, will use Satellite Business Systems (SBS) satellites in the interim, with STC planning to transfer to its own high power satellite when it is launched in 1986. The medium power Ku-Band satellite may turn out to be the optimum broadcast delivery system, serving not only private dwellings directly, but possibly also terrestrial broadcasters as well.

NBC satellite network

When NBC has all its affiliates online via a medium power Ku-Band satellite (before the end of 1984), the nature of program distribution by major US broadcasting networks will be changed forever. Technical quality of signals will improve significantly, network flexibility will increase tremendously and news coverage from all over the country will be easier to do because of the much greater number of uplink stations. There also is some industry speculation that NBC might take advantage of its new network to expand into the business communication arena by providing teleconferencing services through its affiliates' studio facilities. Thus, broadcasters that are NBC affiliates may be installing KU-Band antennas for both receive and transmit in 1984.

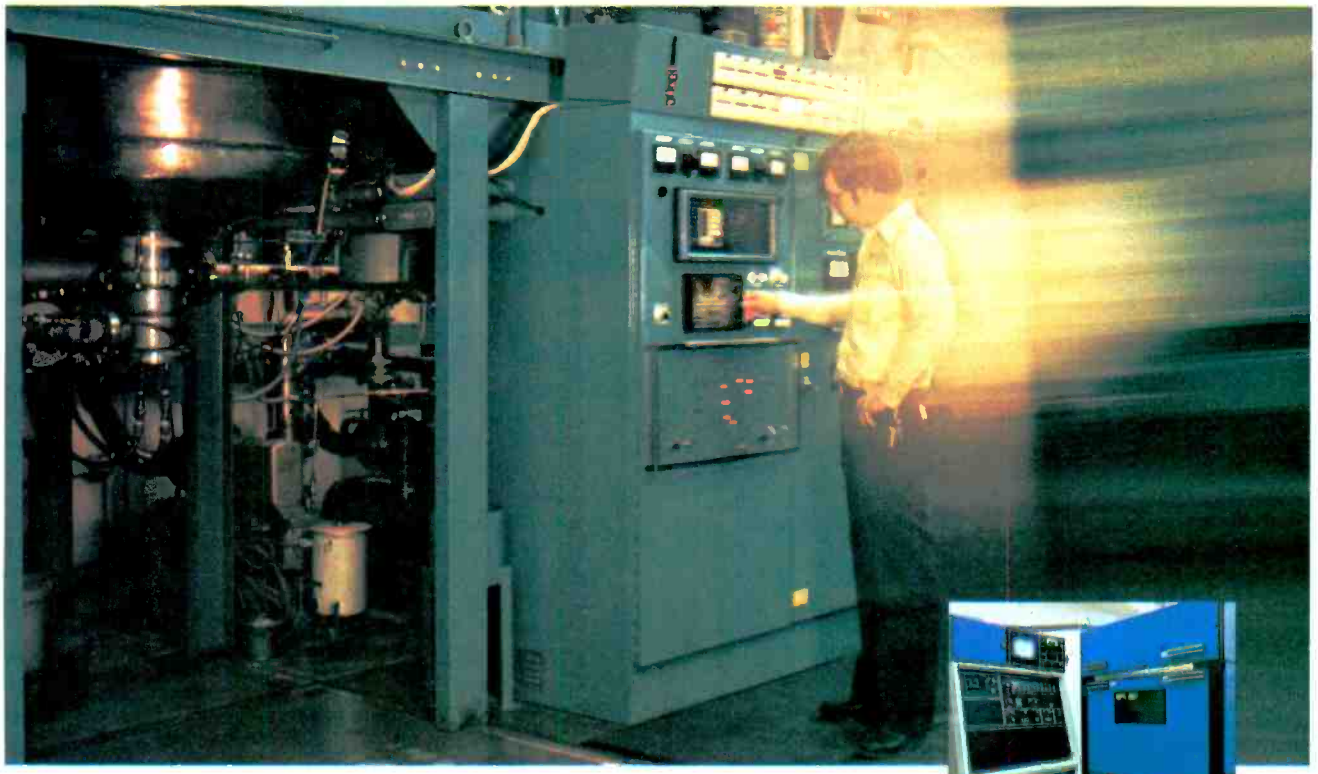
International broadcasting

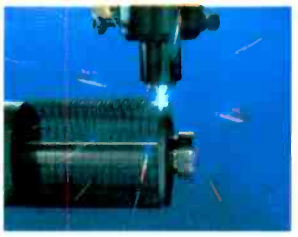
Satellite broadcasting across international borders occurred officially for the first time in 1983. Although satellite signals have been transmitted across borders for years (Canada to United States, United States to Canada, United States to Mexico and Caribbean countries) official authorization was first given this year by the FCC to US carriers wanting to sell services to Canada and to Caribbean countries. Reciprocal arrangements between Canada and the United States and between Mexico and the United States are inevitable in the future. Also highly likely is the increased exchange of programming between the United States and Europe. There are definite signs that deregulation will extend to international communication monopolies that have, up to now, handled all international communications for any given country. With a deregulated international market, broadcasting entities and program suppliers will be increasingly more free to transmit into foreign markets, resulting in a much greater selection of programming for US broadcasters.

RARC-'83

A significant conference, RARC-'83, was held last summer in Geneva to define a plan for allocating frequency spectrum and orbital positions for the new DBS satellites for the Western Hemisphere (Region 2). The plan that resulted divides the DBS band (12.2-12.7GHz) into 36 channels, with 24MHz per channel, and a channel separation of 13MHz. Orbital slots were allocated based on a non-uniform spacing plan, but with a nominal minimum spacing of 9° for any one country. The United States received eight orbital positions, Canada received six and Mexico received four positions. It remains to be seen how quickly DBS will be implemented, because, as discussed previously, there is a good possibility

Continued on page 132





EIMAC—moving toward higher frequency and performance in the 1980s.

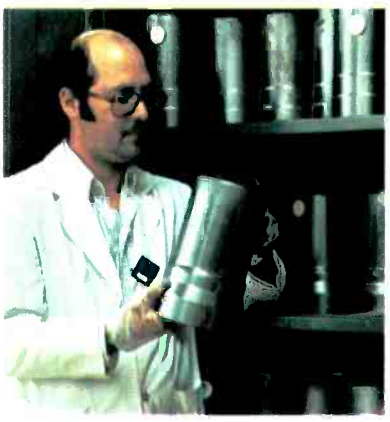
Varian EIMAC, the world's leading power grid tube manufacturer, proves its expertise with almost 50 years of know-how in state-of-the-art manufacturing techniques.

Continuing in its tradition of providing customers with maximum operating frequency and high gain, EIMAC designs and manufactures superior tubes for broadcast service.

Close tolerance control and modern manufacturing techniques provide improved life and uniform performance, tube after tube.

Consider the new EIMAC 4CX40,000G. This 40 kW tube is full-power rated to 220 MHz. The tube features laser-cut, high stability Pyrolitic graphite grids and a new internal structure combining low RF losses and high operating efficiency.

For more information on Varian EIMAC tubes and high power VHF cavity amplifiers, call or write today. Or contact the nearest Varian Electron Device Group sales office.



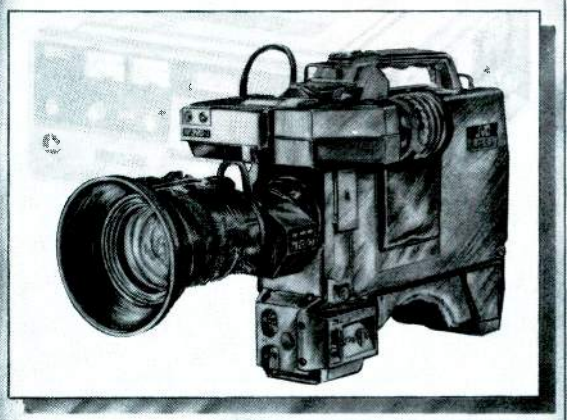
Varian EIMAC
301 Industrial Way
San Carlos, California 94070
415 • 592-1221

Varian AG
Grienbachstrasse 17
Post Fach
CH-6300 Zug, Switzerland
Tel: (042) 31 66 55
Telex: 845-78789

varian

Circle (13) on Reply Card

YOU ARE THE IMAGEMAKER
WE ARE THE MEANS



RENTALS
SALES
SERVICE

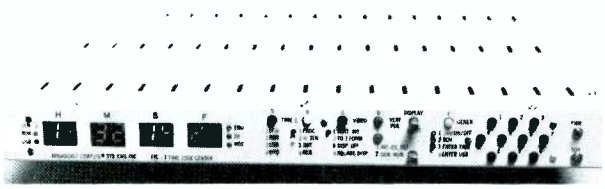
25 YEARS

FILM VIDEO AUDIO

We can make such beautiful pictures together...like with the all new KY-310U Three Tube Professional Video camera from JVC. This compact and lightweight camera has a variety of automatic functions including auto-shift registration, improved sensivity and superior signal-to-noise ratio to give you clear, sharp pictures with excellent resolution and color reproduction. At **Victor Duncan, Inc.**, we back JVC Professional Video Equipment with our excellent factory authorized service team. *So by all means, call or visit your nearest* **Victor Duncan, Inc.** *office.*

VICTOR DUNCAN, INC.
CHICAGO • 661 N. LaSalle • Chicago, IL 60610 • (312)943-7300
DALLAS • Four Dallas Communications Complex Irving, TX 75039 • (214)869-0200
DETROIT • 32380 Howard • Madison Hgts., MI 48071 • (313)589-1900

Circle (14) on Reply Card



Something Brand New In Timecode
THE BCS TCC-1 TIMECODE CENTER

– Color frame coherent. – Frame by frame jam-sync. – 7 video display modes. – Unintrusive square display. – Vertical interval display. – Stable display over fast rewinding tape (patent pending). – User bits and time displayed simultaneously on the screen. – Frames display can be turned off above ½ speed. – Capability to convert military into 12 hour time, reader or generator. – 10mV input sensitivity, reads from the BVU-110. – RS-232C interface. – 3 sources of synchronization. – Black burst output for field units. – 3 different types of time code I/O connectors. – Pull-out user instruction card and very much more.

OTHER PRODUCTS

– Time code phase corrector that fills in drop-outs. – A reader that regenerates and rephases code. – A low cost jam-sync generator color frame coherent – Studio and console clocks that translate military time into 12 hour time.

BCS
BROADCAST COMPUTER SYSTEMS INC.
57 Elm Ave., HACKENSACK, N.J. 07601
(516) 671-7278

Circle (15) on Reply Card

news

NATAS presents Emmy Awards

Nine Emmy Awards were presented by the National Academy of Television Arts and Sciences at its Sixth Annual Engineering Awards, held Sept. 12 in the Sheraton Centre Hotel in New York.

John Cannon, academy president, presented the Emmys for distinguished achievement in the science of TV engineering to the following winners:

- **Ampex Corporation.** The company was honored for the development of its ADO digital optics system.
- **RCA Broadcast Systems.** With its eighth Emmy Award, RCA was honored for the development of its Hawkeye TV camera/recorder combination.
- **3M Company and retired 3M scientist, Mel Sater.** Emmys were awarded to the company and Sater for pioneering the development of videotape.
- **Xerox Research Center and Richard G. Shoup.** These Emmys recognized the development of the first videographic system for television, SuperPaint, developed in the early '70s. Xerox's award was for its support of Shoup's research.
- **CCIR, EBU** and **SMPTE.** These organizations received Emmys recognizing their respective efforts in establishing an international standard for digital encoding of the TV signal in the studio.

The engineering industry was represented at this year's ceremony by professionals from major companies such as Panasonic, Ikegami, Hazeltine Corporation, RCA Engineering, CBS Engineering and JVC.

Ampex Corporation
Accepting the Emmy Award from Cannon (left) are Mark Sanders (center), vice president/general manager, Ampex Audio-Video Systems Division, and Roy Ekrom, Ampex president and CEO.

3M Company/Sater
Sater (left) and Edoardo Pieruzzi, vice president of 3M's Magnetic Audio/Video Products Division, hold their Emmys at the award ceremonies.

RCA Broadcast Systems
Cannon (left) presents the Emmy to Dennis J. Woywood, vice president of Broadcast Video Systems for RCA's Commercial Communications Systems Division.

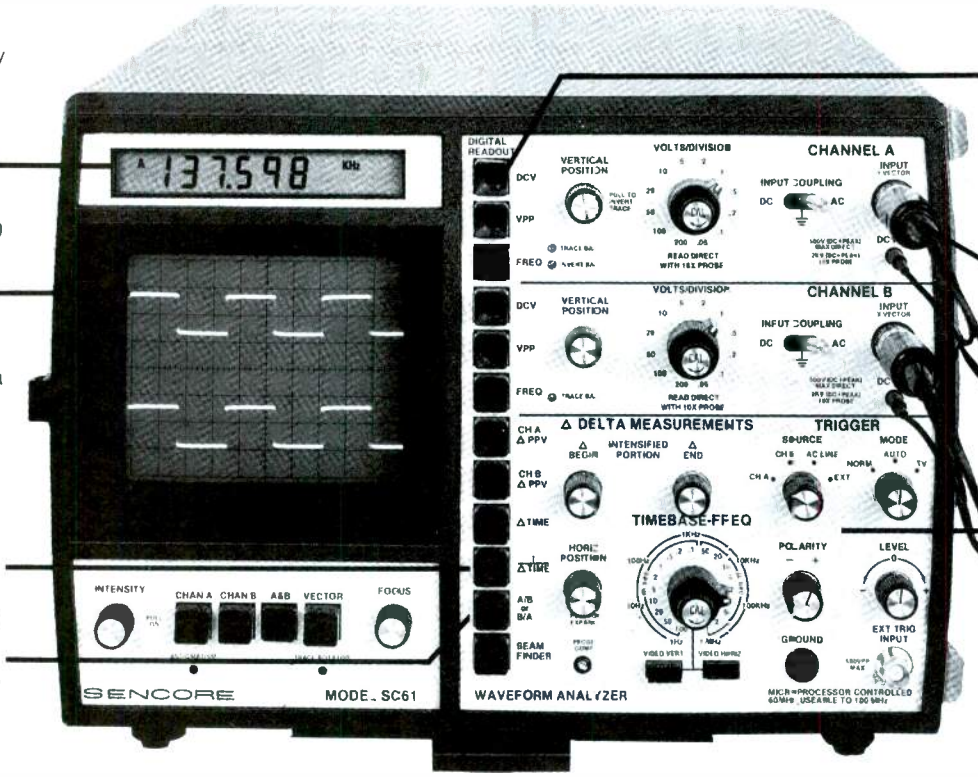
Double Your Troubleshooting and Testing Productivity . . . Or Your Money Back!

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.

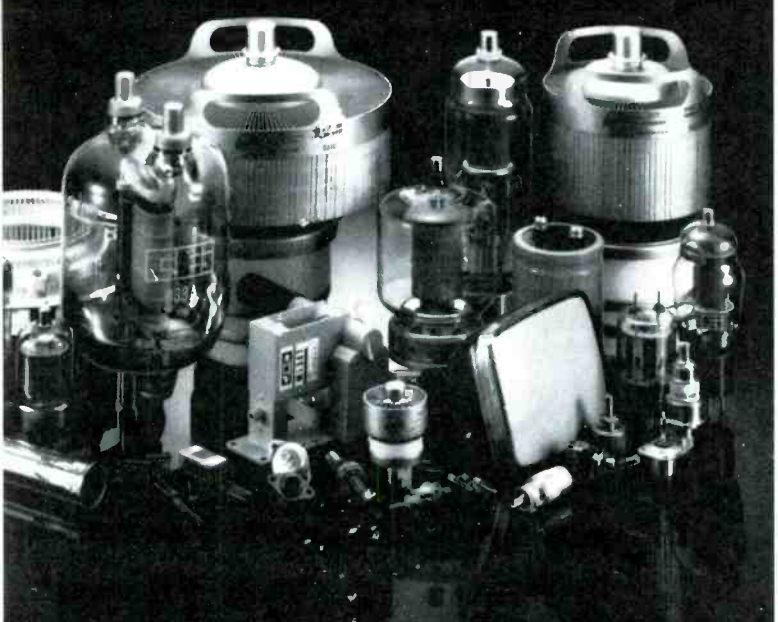
Call today. Get the entire SC61 Waveform Analyzer story. Call toll-free today, and ask for our eight page color brochure. It could be the most productive call you make this year!

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 (16) for information
Circle (17) for demonstration

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

1283

ASSOCIATE MEMBER

Circle (18) on Reply Card

Richard G. Shoup
Shoup, NATAS Emmy Award recipient, is shown with his system.

John H. Mitchell (right), ATAS president, presents the Emmy Award to Joerg D. Agin, national sales manager, Motion Picture & Audiovisual Markets Division, Eastman Kodak Company.

ATAS presents Emmy Award and Emmy Citations

The Academy of Television Arts and Sciences honored Eastman Kodak Company with an Emmy Award, and Ikegami/CBS and Ampex Corporation with Emmy Citations during its Emmy Awards Banquet ceremony on Sept. 18 at the Los Angeles Century Plaza Hotel.

Eastman Kodak's Emmy was awarded for the development of its color high speed negative film 5294/7294, which materially improves picture quality under low light levels.

Ikegami and CBS were recognized for the engineering development of the EC-35 camera, used for electronics cinematography.

Ampex was honored for the development of the ADO digital effects unit, which displays unique capabilities with improved picture quality.

SCA tests under way

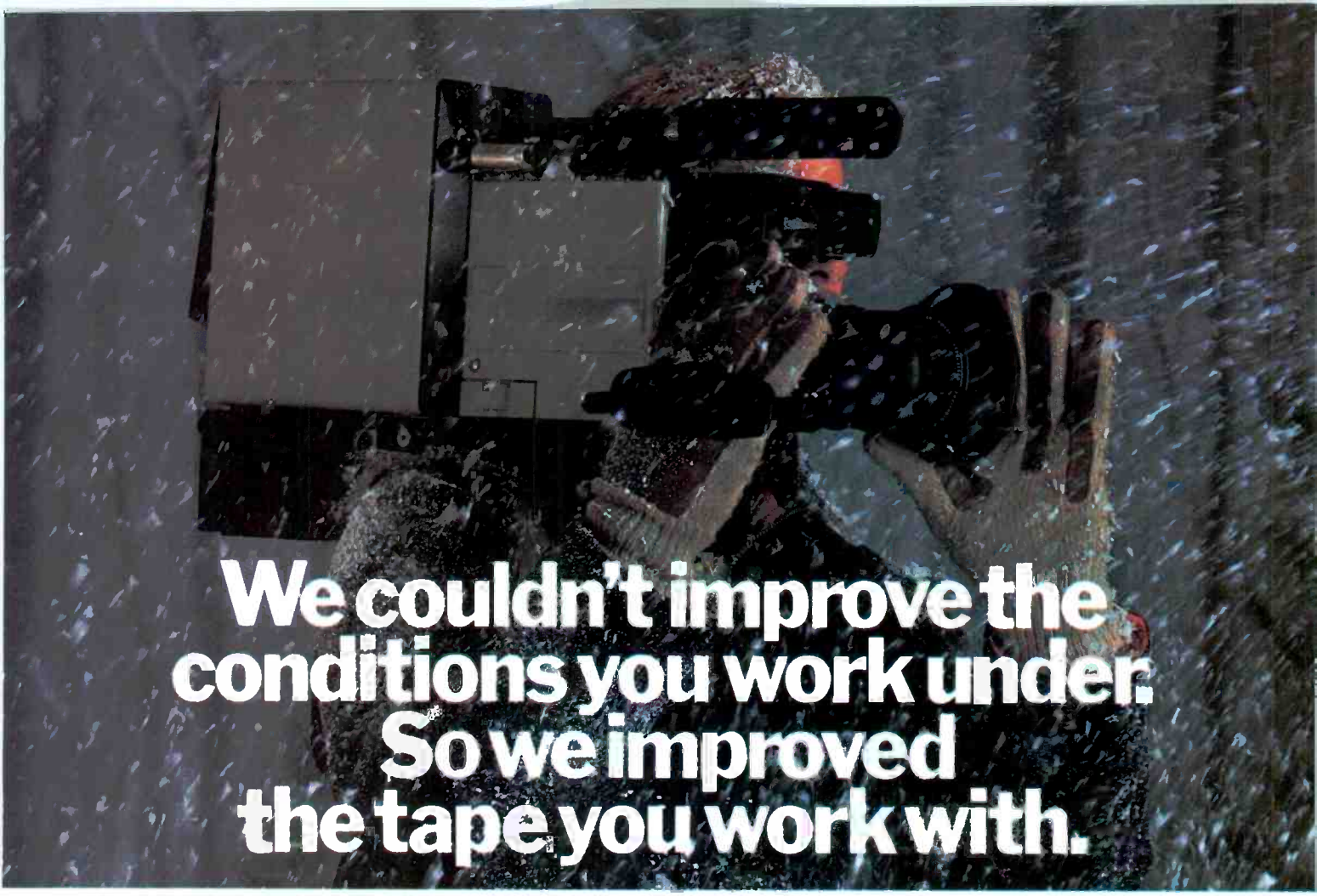
Tests over two New York City FM radio stations are establishing the feasibility of wide-area data broadcasting to inexpensive receivers.

"Data transmission error rates are at least two orders of magnitude better than the standard for telephone lines," said Eric Small, vice president of engineering for Modulation Sciences, the Brooklyn broadcast equipment company conducting the tests.

At the time of this report, test data had been broadcast for about three weeks over a subcarrier of WBAI's and WPAT-FM's signals. The technique is known as SCA (subsidiary communications authorizations). Regular FM listeners cannot hear the subcarrier or data transmission unless they have a special receiver. Transmission rates were 1200-4800 baud.

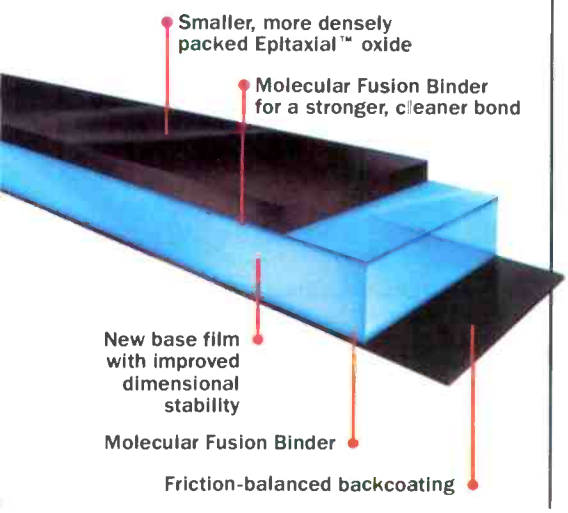
Key findings from the test include the following:

- Error rates have been better than one in 10 million (10^7) as opposed to the telephone standard of one in one hundred thousand (10^5).
- Accurate reception extends 30-40 miles from the transmission antennas, which are located atop the Empire State Building and the World Trade Center.
- Simple indoor whip antennas appear satisfactory in many instances.
- The analog S/N ratio, which is easily measured, reliably predicts digital error rate. This allows easy and accurate monitoring.
- The "gray area" between accurate and inaccurate reception is small. (The knee of the error rate curve is sharp.) In other words, the data signal tends to be highly accurate or highly inaccurate, making it easy to tell the difference.



Introducing the world's first HGX Pro ½" Videocassette.

Introducing tape performance impervious to the whims of weather and the rigors of editing. Harnessing new tape technology, Maxell brings ENG dramatic improvements you can see, hear and retain.



The Epitaxial™ contribution: higher video, brighter chroma.

A new, smaller oxide achieves unprecedented packing density. Expect enhanced signal-to-noise. Better definition. And extended replays without signal loss.

Molecular Fusion Binder: longer life bonding for truer-to-life performance.

A bond immune to time, temperature or mechanical stress. With no need of plasticizers, so none can creep to the surface. Anticipate far fewer dropouts, less clogging and extended tape and head life.

New base, binder, backcoating. Better support for the signal.

No static. No noise. No dust. The molecular-fused backcoating assures diminished mechanical and magnetic noise. And optimum running smoothness, even in high heat.

A shell made to the industry's toughest standards.

Ours. The transport is quiet, jam-proof. The housing immune to temperature extremes.

From open reel tapes to a complete line of KCS/KCA U-Matics, audio and VHS/Beta cassettes, we're getting quality down to a science. And in your hands, our science turns to art.

HGX Pro ½" Videocassettes in Beta and VHS.

maxell®

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020

Circle (19) on Reply Card

NOW ANIMATION CAN TICKLE YOUR MONEY BONE.

ANNOUNCING THE WORLD'S FIRST STILL-FRAME VIDEOTAPE RECORDER: THE SONY BVH-2500.

There's nothing funny about doing animation, animatics, computer graphics, video disc mastering, slide storage or time-lapse recording on videotape.

It's pure, unadulterated, time-consuming work.

But now Sony has created the BVH-2500, a 1" VTR that will do in minutes what used to take hours. And in so doing will have you laughing all the way to the bank.

The BVH-2500 retains all the outstanding qualities of the BVH-2000, but it also offers an invaluable array of special-purpose functions. Like still recording, step recording and slow recording.

To record still frames, for example, instead of waiting for the machine to click, reverse, whirl, click, click, go forward and then record, it simply goes click, record. There's no wasted time. No wasted effort. You'll think you're working with film.

And the profit potential is massive. Because the Sony BVH-2500 will keep your editing costs way down and your productivity way up.

Plus, like the BVH-2000, the Sony BVH-2500 does something else that will put a smile on your face. It works, right out of the box.

If you'd like to have a few good laughs at your competitor's expense, come and try the ultimate in VTR's: the BVH-2500 from Sony.

For more information (and there's a lot more to know about video recorders) in New York/New Jersey call Sony at (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; in the West (213) 841-8711.

SONY® Broadcast

© 1983 Sony Corporation of America. Sony is a registered trademark of the Sony Corporation, 9 West 57th Street, New York, New York 10019. © 1983 Warner Bros. Inc. All rights reserved.

WE JUST MADE HIGH PERFORMANCE STANDARD EQUIPMENT.

TASCAM's M-50 is the compact 12x8x8 mixing console audio production professionals have been looking for. With its multiple inputs per channel, plus assignable submixes and monitor sections, you get the flexibility to get the job done in all production modes—record, overdub and remix or assembly.

By including direct boxes to accept instrument inputs, phono pre-amps for replaying effects library or reference disks and stereo solo "in place" permitting monitoring of individual channels or whole portions of a mix, you get what you need. High performance functions as standard equipment.

The M-50 is reliable and fast, with extremely flexible signal routing. A valuable asset to the ad agency production room, the small video production/post-production company, the multi-media production facility, and in many other applications.

Because the M-50 includes Solo and PFL, multiple auxiliary mixes, plus balanced and unbalanced inputs and outputs, it is also well suited to final film assembly, small club P.A., and broadcast with clean feeds provided.

TASCAM's extensive design and manufacturing experience in professional recording equipment made it possible to create the M-50. Compact and affordable, this modular 8-track mixer is within the reach of any serious professional.

For additional information, see your TASCAM dealer, or write TASCAM Production Products, 7733 Telegraph Road, Montebello, CA 90640, (213) 726-0303.

Copyright 1983— TEAC Corporation of America

TASCAM
TEAC Production Products

DESIGNED BY POPULAR COMPLAINT.

Circle (20) on Reply Card

Broadcast technology: '84 forecast

By Bill Rhodes, editorial director

With the dawning of the 1980s, the SMPTE designated this the "Digital Decade." This year and the year approaching may go down in history as key years in the digital trend. During 1983 we saw broadcasters and manufacturers cooperating to adapt digital equipment and techniques into the broadcast environment. And, in standardization, 1983 marked one of the most active years in efforts to achieve international agreement on standards for digital audio and digital television.

Furthermore, at every major convention—the NAB, SMPTE, Montreux and AES—we saw an ever-increasing quantity of new equipment being introduced whose improved performance resulted from capabilities possible through digital technology. Also, in technical sessions at these conventions, broadcasters gave tutorials and advanced technology presentations to help colleagues shift gears from the world of analog into the bit stream of digital.

In audio, 1983 saw the use of the digital audio disc as another source for radio broadcasters, with manufacturers demonstrating this new equipment.

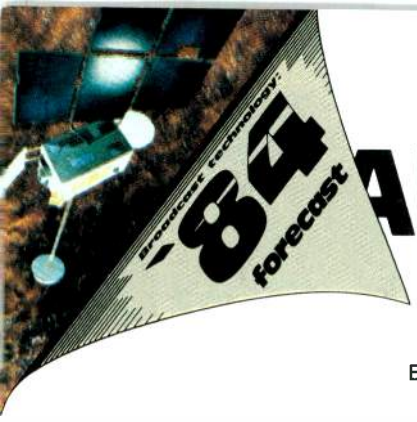
Although digital was at the forefront of the industry's attention in 1983, it was *not* the sole topic of interest. The shift to digital must, for practical reasons, be a phasing process that will occur over a span of many years. Consequently, it shared the limelight with other hot topics, such as increased satellite usage, DBS, HDTV, cable, AM stereo and stereophonic/bilingual television.

From the regulatory standpoint, 1983 marked a significant year for the FCC in its process to deregulate broadcasting. However, there is a long way to go to achieve the FCC's goal, so 1984 should be another revealing year for the industry.

Each December we ask leading authorities to express their thoughts on *What's Ahead* in broadcasting, giving special emphasis to how technologies and politics are reshaping the industry. Because of travel and other commitments, not all those invited could submit their views. But we have printed the views of those who were able to respond on the following pages. Some of these revelations may serve as a warning about things to come, and prudent broadcasters will heed the sage predictions.

This issue marks the first time that European broadcasters and agencies have joined in looking at broadcasting's future. Because broadcasting has international implications for standards, satellite distribution and problem sharing across borders, we welcome our colleagues from Europe that are joining us in this look to the future.

As history is being shaped through new technologies, 1984 and the years beyond look promising for broadcasting, with plenty of action for the strong of heart. So, we at **Broadcast Engineering** wish you happy reading and a prosperous New Year.



ABC & the Olympics

By Julius Barnathan, president, ABC Broadcast Operations and Engineering,
American Broadcasting Companies, New York, NY

To enable ABC Sports to break two Olympic records with 65 hours of coverage from the Winter Olympics at Sarajevo, Yugoslavia, and 187½ hours from the Summer Olympics in Los Angeles, ABC Broadcast Operations and Engineering (BO&E) will break its own records with its most sophisticated and complex technical facilities. But the two Olympics—ABC's third time to do both—are only part of the 1984 story for BO&E, which also must handle the ongoing needs of the Sports, Entertainment and News Divisions, plus the special news requirements of a presidential campaign year.

In many ways, the major challenge is logistical: getting the right people with the right equipment to the right place at the right time. This involves far more than moving people and equipment; it also requires matching the special skills of our staff to the technical needs of different operations. Although we are proud of the technical *firsts* generated by ABC BO&E in our 20-year Olympic history—including many innovations now routinely used by all broadcasters, such as color slow motion—our special edge in preparing for the Olympics is the people who use the machines.

Computers and people

Technically, this is the *year of the computer*, but computers are not going to make the magic; the people are.

The most visible evidence of computer power on the air will be the computer graphics, generated by new or technically improved machines. The MCI/Quantel Digital Paint Box, an optical effects device, allows the artist to draw directly on an electronic palette. The artist creates the picture or uses a still picture, and the picture is digitized. The Paint Box, which can store up to 200 different frames of video for the artist to enhance, recolor or draw in additional details, is new to the Olympics. The Paint Box palette, which has 4000 colors and makes possible the creation of a 3-D effect,

also can be used to create animation.

A more sophisticated version of the Dubner Character Background Generator (CBG) will be used during the Olympics and the election activities. The CBG reproduces pictures from photographs, TV video or hand-drawn pictures from a palette by digitizing the image. Once digitized, the image can be colored from a prepared color palette of 4096 colors. The CBG also can be used to create animation. Up to three hours of computer graphics—a slow, creative process—will have been created for the games before the first broadcast. The Chyron IV, another graphics generator, also will be used extensively in 1984.

Also new to the Olympics is the 4-channel ADO (Ampex Digital Optics), a special optical effects device that can take four different video inputs and manipulate them in a variety of ways.

In the 10 editing cubicles in the broadcast center (eight NTSC, two PAL), there will be 30 Ampex VPR 3 machines, a new version of the 1-inch, Type C tape machine designed to meet ABC's needs. These machines, driven by computer software, can fast forward or rewind tape in seconds. The new ISC control and editing system, another Olympics first, is a cross between basic remote tape editing and sophisticated computerized tape editing. One of the exciting features of this new system is that it uses the new SMPTE serial interface and, therefore, has the capability for changing the designation of the tape machines easily from record to playback. Also, up to six machines can be interconnected.

We have also used computers in other areas of our operation. Computers helped design the wiring for the broadcast center, which has 150 miles of cable, and labeled and recorded the identifications of all 16,000 individual pieces of cable. Computers also were used to inventory the equipment, which traveled in 22 freight containers by sea to Rotterdam, the Netherlands, and then across Europe by truck to Sarajevo.

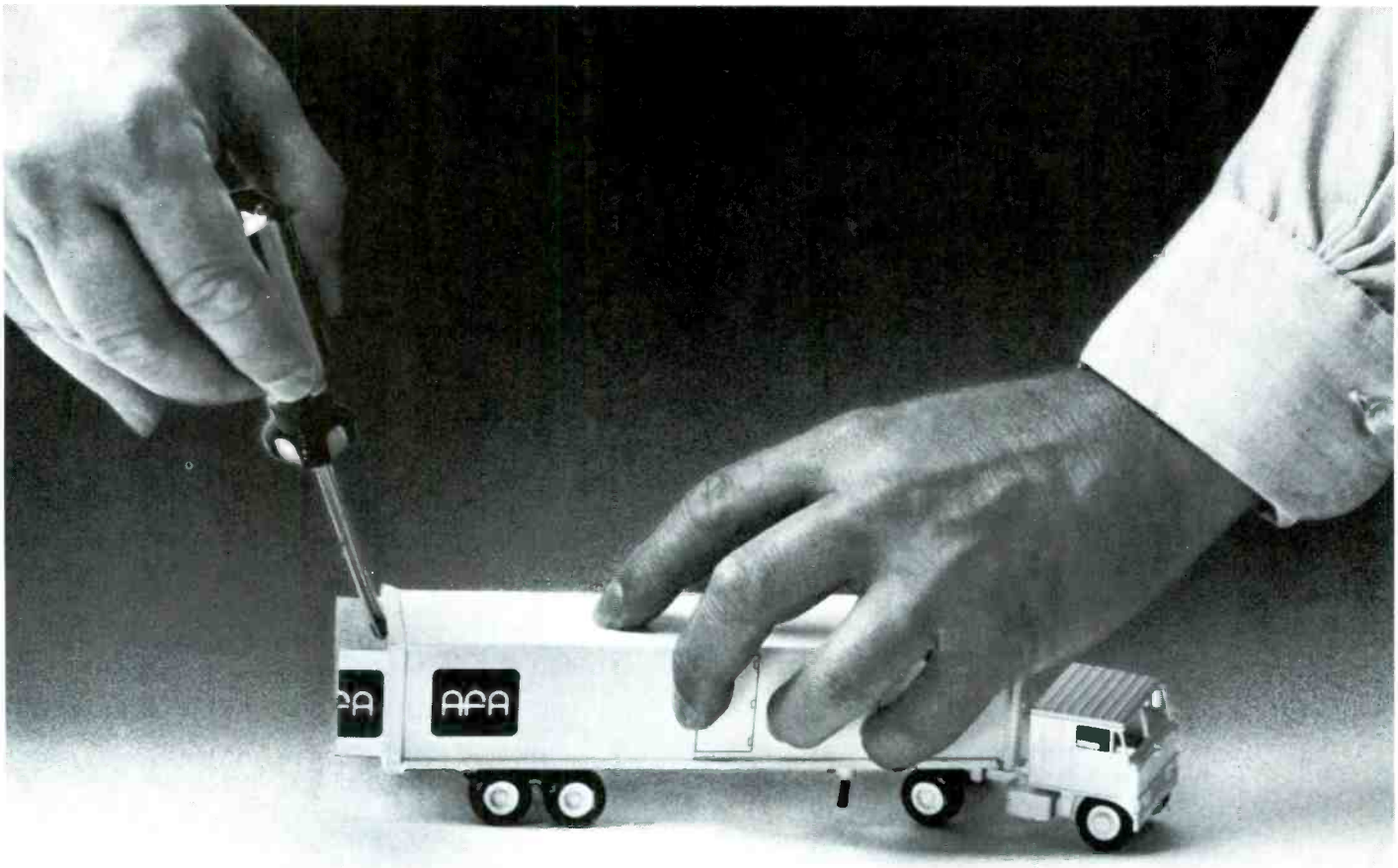
The studio set for both Olympics, which weighs five tons, was custom-designed and built in Los Angeles, and then shipped to New York. From January to July of 1983, the two control rooms, the 70-monitor wall, the 10 editing cubicles, the graphics area, the audio layover area and master control were assembled and checked out as a system in New York in a rented facility, which came to be known as the Olympic Village.

Sarajevo

ABC Sports then conducted the most extensive *war games* ever in preparation for its Olympic-breaking efforts. The center has now been reassembled in the 4-floor broadcast center in Sarajevo.

Because ABC is primarily supplementing the coverage of JRT (Yugoslavian Television) and because there are fewer events during the Winter Games, the operation is less complex.

Continued on page 26



WE MAKE 'EM IN ALL SIZES!

We've been designing and building mobile video systems since 1976 when we delivered our first—a 40' production and post-production unit for the ABC-TV Network. Since then we've built video systems in every size and configuration.

And with each one—from "mini-vans" to giant units which put entire production and post-production operations on the road—we provide the same meticulous attention to planning and execution.

We make certain that all the equipment—from VTRs to switchers—is the most effective and efficient for the job. We design for safety, comfort and durability—carefully considering the problems of human engineering, power sources, air-conditioning, weight distribution and stress on the vehicle. And we see to it that your budget and delivery date is on target!

At AFA we believe there are no such things as *small* mobile systems. Only small designers!

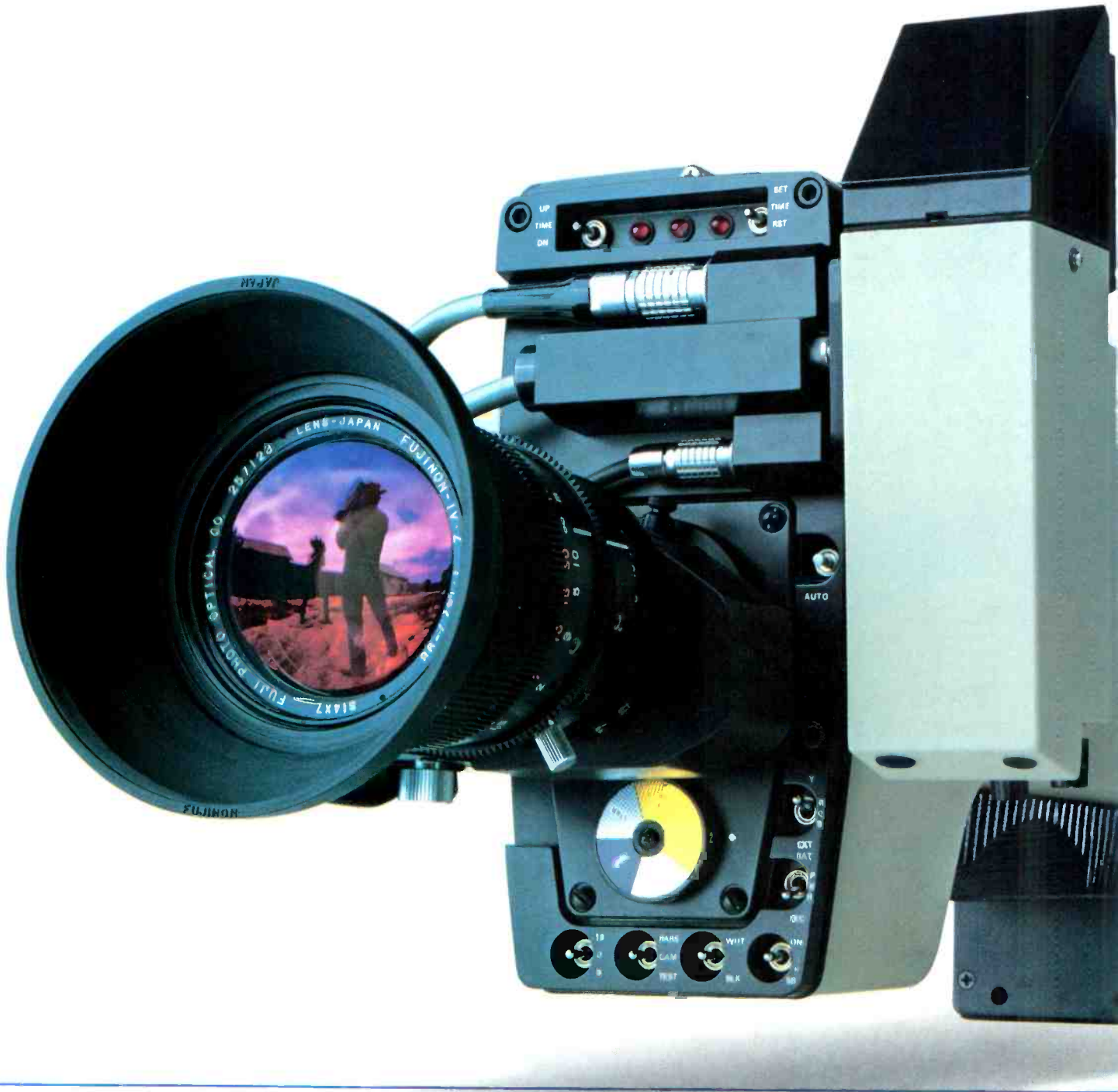
A.F.ASSOCIATES INC.

ADVANCED SYSTEMS AND PRODUCTS FOR THE VIDEO INDUSTRY

AFA SYSTEMS DIVISION/100 STONEHURST COURT, NORTHVALE NJ 07647 (201) 767-1000

Circle (21) on Reply Card

If your HL-79 beats we'll



©Harris Corporation, 1983

our TC-90S, give you the TC-90S!

Comparison. The real test. When you have to make a choice between two superb competitors, it usually comes down to a shoot-out—a side-by-side objective comparison of those features and capabilities that mean the most to you. Harris has made a substantial investment in the TC-90S—because we knew that we could design and manufacture an American camera with features that would make it the new industry standard. We wouldn't make this offer unless we were sure we had succeeded.

So look over these TC-90S features and read our offer. Then, if you want a shoot-out, let us know.

We're ready.

The Facts

1 Colorimetry

Mixed-field LOC, half-inch diode gun tubes, and an advanced new beam splitter provide winning colorimetry and better registration than larger tubes.

2 Smart Package™

Exclusive microprocessor time code generation lets you record SMPTE and VITC time code *as you shoot*, so editing hassles disappear. Automatic encoder balance, auto registration, diagnostics and camera status (in English) keep your camera out of the shop and in the field where it belongs.

3 Automatics

Auto registration
Auto beam control
Auto encoder balance
Auto iris
Auto white balance
Auto black balance
Auto scan failure protection

4 Gain Tracking

The TC-90S maintains black level under all conditions to eliminate color shift, even with changes in gain.

5 Noise

Minimal apparent noise at +18 dB gain for superb low light level performance.

6 Weight

The TC-90S, with standard lens and battery, and including the viewfinder, weighs less than the HL-79, similarly equipped. No more "sagging shoulder" feeling, and your pictures will show it.

7 Profile

You can see to the right! Even when you're shooting, you have an unobstructed view to the right over the top of the camera.

8 Price

The TC-90S, with microprocessor, tubes, batteries and a 15:1 zoom lens—a top-of-the-line camera—is list priced under $30,000!

9 24 Hour Service

Call us. 24-hours-a-day, 7 days a week. Our telephones are constantly manned by service engineers, and we're ready when you need help.

The Challenge

The details of the shoot-out are simple: We must have on file the coupon below filled out by the camera person at your facility, and a letter signed by your chief engineer or general manager on your organization's letterhead, requesting the shoot-out and stating that you are in the market for a new ENG camera. Then, if your current model Ikegami HL-79 (or an HL-79 you secure for the shoot-out) meets all, and exceeds one or more, of the TC-90S features given above, we'll leave without our camera—it's all yours.

There's More

To those of you who believe that time is the true test of a product, we'll make another offer: Forget about filling out coupons and writing letters—call us today and order a TC-90S. Then use it in the field for 30 days. If it doesn't live up to our specifications, we'll refund your money.

Either way, the TC-90S is a winner. In a shoot-out, or on your shoulder.

OK Harris, prove it!

Mail to: Mark Gray, Director of Marketing, Harris Corporation, Studio Division, P.O. Box 4290 Quincy, IL 62305, (217) 222-8200 TLX 404347

CAMERAPERSON

STATION OR COMPANY

ADDRESS

CITY STATE ZIP

TELEPHONE

Hurry, our incredible offer expires January 31, 1984. And good luck. Your HL-79's going to need it.

HARRIS

Circle (22) on Reply Card

MAKE YOUR MOBILE 1 NUMBER ONE IN MOBILITY.

HANNAY REELS GET YOU IN AND OUT FAST.

Save precious seconds in set-up, tear-down time. Just pick up the durable, lightweight Hannay Portable Cable Reel, and go. When the story's in the can, direct rewind makes pick-up easy. And the Portable Cable Reel is compact to take up minimal storage space.

It's the newest addition to our complete line of cable reels, for an even bigger selection of unlimited sizes, shapes and capacities to choose from.

When it comes to getting in and out fast, no other reel is "remotely" as efficient as a Hannay Reel!

Send Today
For A Free Catalog.

HANNAY REELS

CLIFFORD B. HANNAY & SON, INC., WESTERLO, NEW YORK 12193
TELEPHONE: (518) 797-3791

Circle (23) on Reply Card

Continued from page 22

The weather, two different mountains alternating for Alpine events, unilateral coverage of ice hockey and all figure skating, and the challenges of mixing PAL and NTSC signals into a single telecast and getting that signal back to the United States means that the Winter Olympics will provide its own set of unique challenges.

The editing cubicles at the 1984 Winter and Summer Olympics will feature Ampex VPR 3s, new versions of the 1-inch tape machine. Julius Barnathan is shown in front of the tape machines and behind the new ISC editing system, describing the ABC preparations to a gathering of editors.

Program: 1984 Winter and Summer Olympics
On air: Sarajevo, Feb. 6-19
Los Angeles, July 27-Aug. 13

Redundancy is a major characteristic in our entire approach to planning. There are three ways of getting the signal out of Sarajevo, and within the broadcast center there are different backups provided, including power. For example, Control Room A (*Air*), with the largest monitor wall ever, has a technical twin in Control Room B (*Preset*). Each has a communications system for the executive producer, with an override position allowing instantaneous communications with any and all venues. Also in both control rooms, the coordinating producer has the same override communications capability. Providing the communications among all the people was much more complicated than the audio and video systems.

Los Angeles

After 14,000 miles of travel, Control Room A, which will handle more Olympic programming in 1984 than the last five televised Olympics together, will arrive back in Los Angeles for the most technically complex operations anyone has attempted. There will be 71 tape machines in the LA Center, compared to 36 in the Sarajevo broadcast center, and 12 librarians will work in the videotape library, which has the capacity to store 20,000 reels of 1-inch tape.

ABC will be host broadcaster for the Summer Games, which means that in addition to the US coverage—most of which will be live—ABC will be responsible for providing full coverage of more than 1300 hours of competition from all 22 Olympic venues in and around Los Angeles.

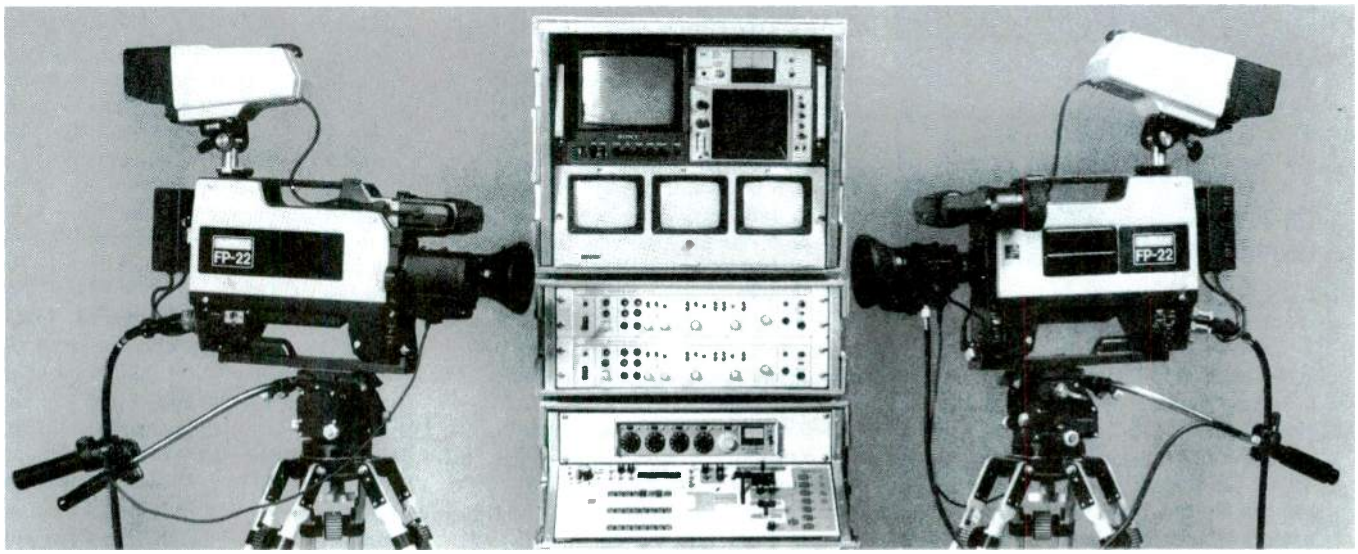
In Los Angeles, two separate broadcast centers are planned. One, the operation described, will provide the domestic signal for ABC. More than 2000 foreign broadcasters will pick up ABC's world feed at the International Broadcast Center. With that amount of coverage and some venues as much as 200 miles apart, it is easy to understand why 2500 ABC people will be required for the Summer Olympics. In Los Angeles, our cameras will travel by air, sea and land to cover all these events. For rowing, cameras will be mounted on boats to avoid the problems of shooting into the sun from the land. The boats are designed so that they do not create waves. To cover the events, we will use 144 studio-type cameras, 64 hand-held cameras, 27 Chyrons, four Dubners, 95 VTRs, 80 VCRs, 14 ENG units, five flash units and 32 mobile units. We also will use three houseboats, five helicopters and two custom electric cars for the men's and women's marathons.

ABC first broadcast the Winter Olympics in Innsbruck, Austria, in 1964. At every step along the road in the past 20 years, each technical achievement loses its magic to be replaced by yet another marvelous improvement. One year's marvel is next year's everyday technical tool. But in the eight Olympics with which I have been associated as head of ABC BO&E, I have never failed to be impressed by the people—the marvelous athletes in front of the camera and the talented people behind the scenes.

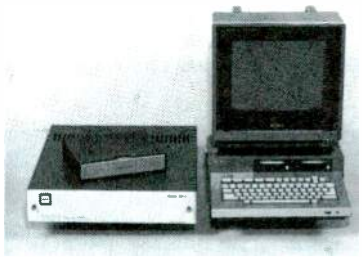
1984 promises to be an exhilerating experience for ABC Broadcast Operations and Engineering. I have been saying for years that our job is to provide the palette for the production people. Now that palette is an array of technical wonders, but those machines are only as good as the people that use them. And it is because of our people that, despite the logistical tangle of 1984, we are ready for the games to begin.

Mobile Color TV System
$79,900

Includes Econoline Van, camera, editing, and character generator systems.



- **2 FP-22** 3 Tube Saticon cameras, 10:1 zoom lens and all equipment for studio and ENG use
- **2 Christie** Reflex 20 batteries and one charger
- **2 O'Connor** fluid heads, wooden tripods, dollies and spreaders
- **2 Camera shipping cases**
- **2 50′ camera cables**
- **1 set Anvil cases**
- **Tektronix** 528A Waveform monitor
- **Sony PVM 8200** 8″ color monitor
- **WV 5203** triple 5″ black and white monitor
- **Sony SEG 2000** Production Switcher
- **McMartin** amplifier and speaker
- **M67 Shure** mixer
- **TRIAX ADAPTORS AVAILABLE**



COMPUTERIZED CHARACTER GENERATOR SYSTEM

Chyron VP-1 Generator and
Sony SMC 70 Micro Computer
CP/M Operating software
Word Processing software

CONVERGENCE ECS 90 EDITING SYSTEM WITH

2 Sony ¾″ VTRs 5850/5800
2 Sony PVM 8200 color monitor
1 Sony CPD 120 green screen monitor
Custom design desk

Van includes air conditioning, insulated walls, custom support equipment and carpeting throughout.

For details, call John Neri
(215) 223-8200

LERRO
ELECTRICAL CORPORATION
COMMUNICATIONS SYSTEM DIVISION
3125 N Broad Street, Philadelphia Pa 19132

System is removable for use in a studio.

Barnathan

About the author:

Julius Barnathan *was promoted to president of ABC Broadcast Operations and Engineering in December 1976. Barnathan had been vice president in charge of Broadcast Operations and Engineering for ABC since April 1965.*

As executive in charge of ABC's engineering activities, Barnathan's responsibilities include the direction of all technical operations for the ABC TV Network, including news and sports, and the planning, designing and acquiring of equipment and facilities for all broadcast areas of the TV Network, Radio Network, Owned TV Stations and Owned Radio Stations.

Before being named vice president in charge of Broadcast Operations and Engineering, Barnathan had been vice president and general manager of the ABC TV Network, since March 1962. Earlier, he had served as president of the ABC Owned TV Stations, since January 1962.

Barnathan joined ABC in 1954 as supervisor of ratings. Two years later, he was named manager of TV Research and in 1957 was appointed director of Research. He became vice president in charge of TV Research in March 1959, and in July of that year, was named vice president for Affiliated TV Stations, holding this position until being appointed president of ABC's Owned TV Stations.

Before joining ABC, Barnathan was director of media research and statistical analysis from 1952-1954 for Kenyon and Eckhardt Advertising.

Barnathan and others at ABC were instrumental in developing the technology for closed captioning for the hearing impaired. In 1972, he was named chairman of an NAB subcommittee to develop standards for such a system, which has been in operation since March 1980. In 1982, Barnathan was awarded an honorary Doctorate of Science degree from Gallaudet College in Washington, DC, for his contributions to the closed-captioned system.

In recognition of his outstanding contributions to broadcasting, Barnathan received the NAB's 1982 Engineering Award.

Barnathan has been involved in six Olympics (three Winter and three Summer). He is currently involved in the planning for the 1984 Winter Olympics in Sarajevo, Yugoslavia, and the 1984 Summer Olympics in Los Angeles.

Barnathan is a former member of the board of governors of the New York Chapter of the National Academy of Television Arts and Sciences and a member of the Royal Television Society. He is a member and former chairman of the technical committee of the North American National Broadcasting Association (NANBA) and a member of the technical committee of the European Broadcast Union (EBU).

He received an Emmy Award for the 1976 Summer Olympics, an Emmy Award for the 1980 Winter Olympics and a citation for outstanding service to the Society of Motion Picture and Television Engineers (SMPTE).

Stereoize your audio for $399!

Whether you're an AM station going stereo or an FM needing to create a full stereo format, we have the $399 solution to your problems. The new Orban 245F Stereo Synthesizer creates a seductive sense of stereo space from any mono source material.

You can convert mono records ("oldies"), agency spots, promos, remotes, and even DJ mikes to pseudo-stereo in a dramatic, pleasing way. You'll also be delighted at the 245F's full mono compatibility with FM or *any* AM stereo system: No phasing on mono radios!

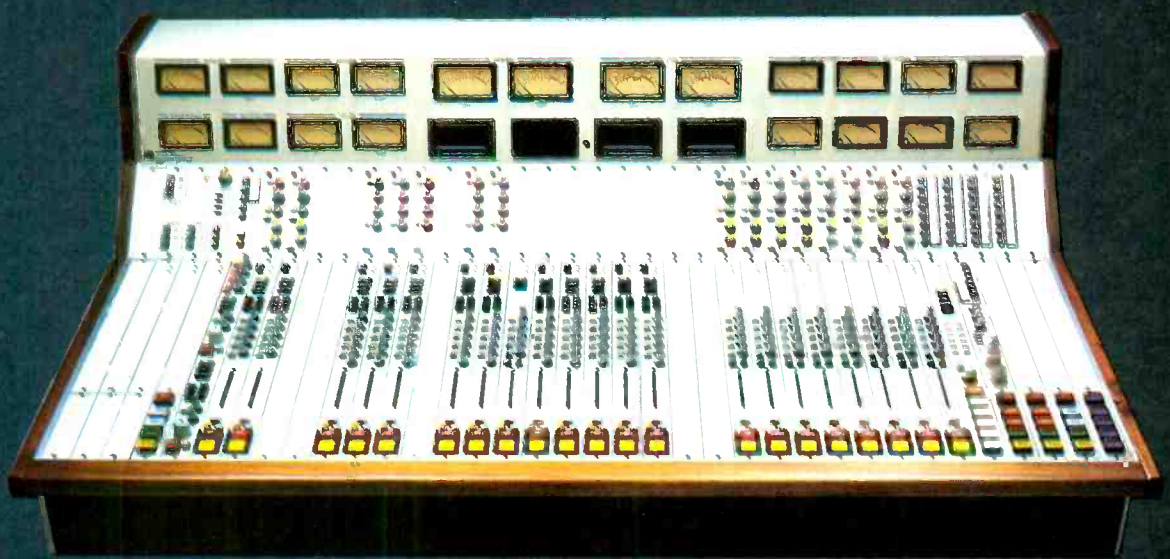
To "stereoize" your complete format instantly, use the Orban 245F Stereo Synthesizer. Call or write for further details.

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

Circle (24) on Reply Card

A NEW WORLD CLASS BROADCAST OPERATIONS BOARD

ABX



Announcing the only world class BROADCAST OPERATIONS CONSOLE ... the ABX. The famous quality of the BMX air console is now available in this unique air/production masterpiece. ABX features modular design implemented with aerospace technology. Mainframes of 18, 26 and 34 inputs provide microphone and stereo line inputs, 4 or 8 tracks and 2-mix, slate and talkback, multiple telephone inputs with mix-minus, stereo cue, solo-in-place and complete A/B logic for remote machine control. All inputs may have stereo equalization or mono equalization and filtering. Four sends and returns add echo and processing to the recording chain as desired.

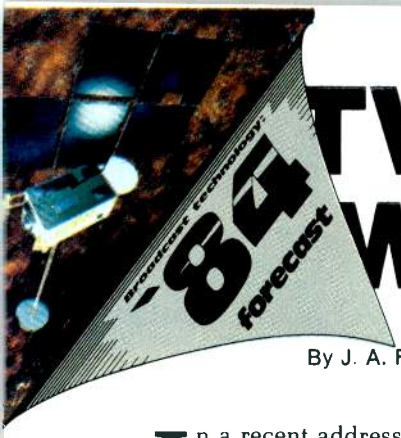
The ABX is truly a new world class console designed to be equally at home with all music formats, talk radio and broadcast production needs. And the best news is its sound. No compromise in performance, features or construction were allowed. Write or phone toll-free for your brochure.

PACIFIC RECORDERS & ENGINEERING CORPORATION

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

Call toll-free 800-874-2172

Circle (25) on Reply Card



TV standards: Whither or whether

By J. A. Flaherty, vice president, Engineering and Development, CBS TV Network, New York, NY

In a recent address to the IEEE, I think I was expected to deliver a vitriolic broadside at the FCC for its pusillanimous failure to endorse much needed standards in such fields as AM stereo and teletext, and for its fulsome faith in marketplace determination, which together have caused confusion in the industry and retarded the marketplace development of new services.

I could not, in good conscience, do this. It is not that I doubt that many standards are absolutely essential, or that the present situation is, indeed, chaotic. Rather, it is because I believe that the FCC can do little to remedy the situation without our help and guidance.

The historical fact is that the vast majority of TV standards are voluntary standards developed by industry organizations, such as the IEEE. Only a few, albeit important ones, are the subject of FCC regulations, and many of these were proposed by industry organizations.

Thus, before we lay blame for the present confused state of technical standards, let us return to basics and propose remedies that will provide for a more orderly future, one in which technology can be more efficiently harnessed to provide new and improved services for the public we serve.

We should admit that, in an era when technology is moving so rapidly, some of our standards are crumbling from irrelevancy, and many that we would build may lack an enduring foundation. I believe, therefore, it is altogether appropriate that we ask whither standards are bound and whether, in fact, they are needed at all.

What then is that comfortable security blanket we call a *standard*? The dictionary defines a standard as that which "fulfills specific requirements as established by an authority, law, rule or custom." In short, a standard is *manmade!* It represents an agreement between two or more people to achieve a specific goal.

It is *not* a natural law of physics, and therefore it is not immutable. Not only can it change, but indeed it *must* change to reflect advancement in the subject field.

Perhaps Dr. Brown, the retired director of the RCA Princeton Research Labs, said it best in his NAB-'83 address:

"When we were trying to convince the FCC that the time had arrived to set standards using the NTSC principles, I wrote a statement which reflected my philosophy on the matter of standards.

'It is important that any set of specifications adopted as standards be neither circumscribed by the present-day equipment limitations, nor unnecessarily restrictive; so that the fruits of research and invention may result in more stable performance...

'That is to say, the ceiling performance of the system must be sufficiently high to ensure continued equipment improvement without a collision with restrictive standards.'"

We are today colliding with restrictive and obsolete standards, and we need a wholesale review of our standards and a re-evaluation of their methods of preparation and promulgation.

Types of standards

TV standards can be divided into two areas—*professional* standards and those standards involving the general public, which we may call *mass communications* standards.

Professional standards, that is, those affecting program producers, distributors, broadcasters, cable operators and equipment manufacturers, serve a relatively small and highly sophisticated market. Such standards have been and, in my opinion, *should* continue to be voluntary standards, promulgated by industry organizations. Government regulation in this marketplace would do little but delay the standardization process.

This is not to say, however, that there is no need for significant improvement in the method of generating and maintaining professional standards. I see, at least, these pressing needs:

- **First, we must minimize the number of standards.** Considering the sophistication of the professional marketplace, only those standards absolutely essential should be established and maintained.
- **Second, we must streamline the procedures.** Recognizing the speed with which technology is moving, standards must be developed and implemented quickly to avoid almost instant obsolescence.
- **Third, we should consider sunset provisions.** The rapid evolution of equipment renders standards irrelevant in an ever shorter space of time. This fact can directly hinder agreement on a standard unless it is seen to have a limited life.

We turn next to mass communications standards—that is, those that involve, directly or indirectly, the general public.

Because this market is so large and is less sophisticated than the professional market, and because the investment in equipment on the part of the public is so huge, these standards require broad application and stability. Thus, in this area, government regulation may be required; therefore, there is need for continued cooperative effort between industry standards organizations and the FCC.

Traditionally, there have been four purposes served by the FCC technical regulations:

- spectrum allocation and assignment;
- interference protection;
- compatibility; and
- minimum quality.

The first two of these must, for the present, continue to be subject to FCC regulation. Spectrum allocation and assignment has always been centrally controlled in the United States, and the radio frequency spectrum is subject to many international agreements through the International Telecommunications Union. Thus, to fulfill its international obligations, the government must somehow stay involved.

In the case of interference protection, the rapid increase in the number of transmitters and the proliferation of home devices using the RF spectrum makes this an increasingly important area for regulatory standards. Here again the FCC must stay involved.

In the last two areas of compatibility

Editor's note:
Portions of this paper were presented in an address to the IEEE Broadcast Technology Symposium on Sept. 23 in Washington, DC.

Introducing our new klystrons for UHF TV

Utilizing New Compact Magnetics

Type	Power Output
K3270BCD	5 to 15 kW
K3271BCD	15 to 30 kW
K3272BCD	40 to 55 kW

Each tube covers all UHF TV channels in the USA

- Beam Control Device for greater energy savings
- Efficiency 42% min-45% max
- No Beryllium Oxide Ceramics
- Water or Vapor Cooled

Another innovative, cost-effective product from EEV, the Company that has continuously advanced high power tube technology for over 40 years.

EEV

Achievement in electron tube technology

EEV, INC.
7 Westchester Plaza, Elmsford, N.Y. 10523.
Tel: 914 592 6050. Telex: 6818096

In Canada EEV Canada Ltd., 67 Westmore Drive, Rexdale, Ontario M9V 3Y6 Tel 416 745 9494 Telex 06 989363 In Europe EEV Chelmsford, Essex CM1 2QU, England Tel 0245 61777 Telex 851 99103

Circle (26) on Reply Card

EEV4b

and minimum quality standards, there are today a number of FCC regulations, but many lack specificity, are redundant and sometimes obsolete. It is in recognition of these facts that the FCC now proposes to withdraw completely from these fields, in the belief that consumer market forces will eliminate the need for such standards.

Although this may be true, some of us have the intuitive feeling that at least some standards must be retained. The question is to determine which standards should be retained, and which subset of these require government regulations. Let me suggest that making the critical choices on these standards is certainly not the unique responsibility of the FCC. Rather, the responsibility should be shared with the industry standards organizations.

Unhappily, our record in this area is not unblemished!

Shared blame

The FCC is roundly criticized for its failure to choose a single AM stereo standard and a single teletext standard. Yet, it was an industry committee that failed to recommend a single AM stereo standard, instead proposing no fewer than five different standards to the FCC. Further, it was the inability of another industry committee to act on a single teletext standard that left the FCC with no recommendation at all!

Today, many will wager that the industry committee now agonizing over a TV stereo standard will fail to produce one. Should this occur, the FCC once again will have no recommendation upon which to act.

Thus, before we complain too bitterly about the failures of the FCC, we should look to our own record and admit that for many complicated technical, political and legal reasons, we have failed to generate these critical standards. Although I am sure that the reasons were real and formidable, the bleak fact is that we failed.

Progress in standards

Lest you despair, the situation is not without hope. Just three months ago, we embarked on an industry-wide standardization effort, unprecedented in scope since the days of the NTSC.

The Advanced Television Systems Committee (ATSC) committee, under the chairmanship of Bill Henry, was chartered by the JCIC (Joint Committee for Inter-Society Coordination) to explore the need for, and where appropriate, to coordinate development of voluntary national technical standards for advanced TV systems in improved NTSC, enhanced 525-line systems and high definition television.

The ATSC may be this nation's last chance to self-determine its future TV systems and to retain the technical leadership it has so long enjoyed!

To this spark of hope I should add a flame of achievement. Last year saw the establishment of the first worldwide TV standard—the world compatible standard for digital coding of TV signals.

This forward-looking agreement, forged by the CCIR as Resolution 601, was actively supported by the United States through the Department of State and the FCC. In a public statement released on Sept. 9, the State Department said:

"The agreement is thus an important achievement, and will serve as a valuable source of encouragement for future technical agreements. The State Department fully supports the goals of the CCIR and urges US industry to take cognizance of its technical recommendations."

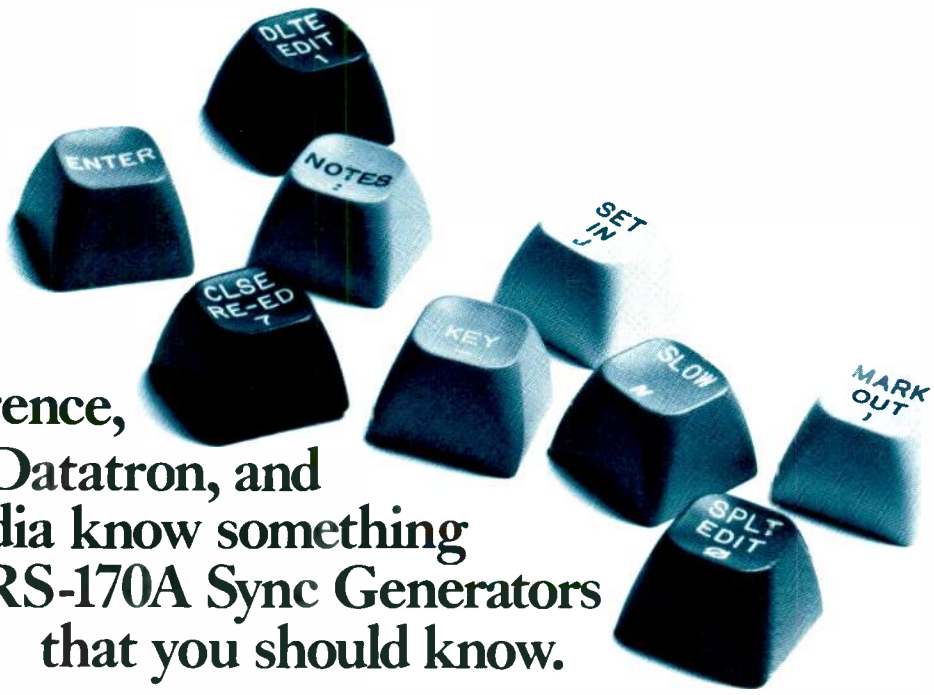
Whither then are standards going in this age of racing technology? And what can we do about it?

I would like to propose for your consideration a specific set of actions.

I propose that the industry standards organizations—the EIA, the IEEE, the NAB, the NCTA and the SMPTE—should, working through their JCIC organization, immediately

Circle (27) on Reply Card

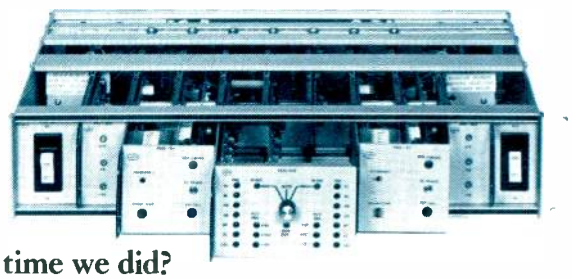
Who's Pulsing the Editors?



Convergence, CMX, Datatron, and Videomedia know something about RS-170A Sync Generators that you should know.

These and other leading manufacturers are committed to producing the ultimate in quality videotape editing equipment. How? By using the PMG-312 Master Sync Generator system to test and pulse their editing systems.

The complete dual sync system consists of a dual power supply frame, two RS-170A Generators, and an Automatic Changeover. The Automatic Changeover meters each generator pulse and DC voltage for fault indication. The PMG-312 offers chrominance subcarrier with an accuracy of .35Hz stability over a one year period. Subcarrier to horizontal phase relationship is maintained in reference to line 10, RS-170A. Black burst is optional. Professional broadcast quality at very attractive prices. Two year parts and labor warranty.



These manufacturers of editing systems know who's pulsing the system and now so do you. Is Lenco pulsing your editing equipment? Don't you think it is time we did?

Lenco, Inc., Electronics Division 300 N. Maryland St. Jackson, Missouri 63755.
Telephone: (314) 243-3147

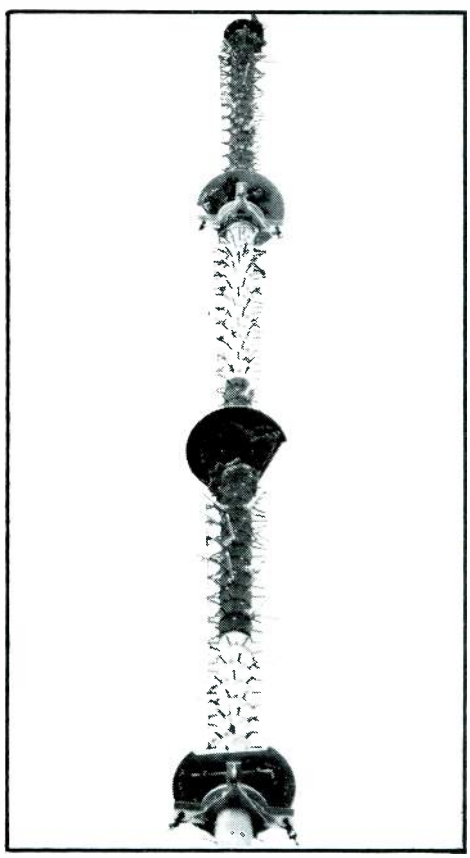
Engineered and manufactured in the United States LENCO *The Professionals' Choice*

Circle (28) on Reply Card

Cetec CP/TV

PAYS OFF WITH HANDSOME DIVIDENDS!

★ INCREASE YOUR AUDIENCE PENETRATION
★ IMPROVED MARKET SHARE
★ CETEC ADDS:
TECHNICAL EXCELLENCE
PROVEN PERFORMANCE
QUICK DELIVERY
COMPETITIVE PRICING



YOU SHOULD GET THE CETEC PICTURE

CETEC ANTENNAS, PIONEERS IN CP TV

CALL FOR TECHNICAL DETAILS AND TEST RESULTS

Circle (29) on Reply Card
Cetec Antennas
The Edge In Coverage!
6939 Power Inn Road, Sacramento, California 95828
(916) 383-1177 Telex: 377321

initiate an intensive review of all existing TV standards.

Their tasks shall be as follows:

•First, to recommend which should be retained, modified or deleted.

• Second, to propose a streamlined mechanism to develop and implement technical standards in a timely manner, consistent with the pace of technological advance.

• Third, to develop a procedure for the sunsetting of those standards that may become irrelevant, or that may constrain and thwart near-term technical innovation.

• And, lastly, to determine which standards should, in the public interest, enjoy the status of government regulation through the formal procedures of the FCC. In this latter work, the participation of government representatives will be a necessary and valuable element.

It is only in this way that we can achieve a new and effective balance between market forces and technical standards. In this enterprise, time is the enemy, and I would propose that this group be required to submit its final recommendations within 12 months.

Should we fail to take such steps as these to develop an efficient, orderly and responsive standards organization in this country, we shall surrender control of our technological future to others.

This can only result in severe losses to American industry and in American jobs, while our communications marketplace will be reduced to an international tower of technological Babel.

I know this is an enormous task, but I would suggest that:

"It is better to undertake an enormous task and get it even half done, than to undertake nothing and get it all done."

Flaherty

About the author:

Joseph A. Flaherty *received his degree in physics from the University of Rockhurst, Kansas City, MO, in 1952. He began his TV career at WDAF-TV, also in Kansas City. During 1953-1954, he served with the US Army Signal Corps, and in 1955 joined NBC-TV in New York as a TV engineer.*

In 1957, he became associated with CBS, where he was involved in designing TV network systems and plants. In 1959, he became the network's director of technical facilities planning. In 1967, he was promoted to general manager, and subsequently was appointed vice president, Engineering & Development. Flaherty is responsible for all TV engineering and development activities for the CBS Broadcast Group, including planning and coordinating the development of new equipment, and for the installation of technical facilities.

Flaherty is a Fellow of the SMPTE. He has been the SMPTE vice president for TV Affairs, treasurer, financial vice president and the executive vice president. He has published many technical articles on various aspects of TV broadcasting. The most recent of these are "Trends in Television Recording," "New TV Production Techniques," "Electronic News Gathering," "Technology Applied to TV Program Production and Broadcasting," "Beyond ENG" and "New Horizons in Program Production, Post-Production and Continuity."

Flaherty was a recipient of an Emmy Award Citation for the CBS Minicam color camera in 1969, and was the 1974 recipient of the David Sarnoff Gold Medal for progress in TV engineering. Flaherty received for CBS the 1975 Technical Emmy Award for electronic newsgathering, and in 1979 received the Montreux Achievement Gold Medal for the development of the concept and the operational implementation of electronic newsgathering. In 1983, Flaherty was the recipient of the National Association of Broadcasters Engineering Award. Flaherty is a Fellow of the Institution of Electrical Engineers (IEE), United Kingdom; a Fellow of the Royal Television Society (RTS), United Kingdom; a member of the Society Fernseh-und Kinotechnischen Gasellschaft (FKTG), Germany; and a member of the Societe des Electriciens, des Electroniciens et des Radiolectriciens (SEE), France.

Flaherty also is a member of the executive committee of the Montreux International TV Symposium, and is on the Research Board of Visitors for Memphis State University.

THE SHARP XC-900D* AND TRIAX. NOW YOU DON'T HAVE TO PAY MORE FOR AN IMAGE.

*SHARP'S NEW DIODE GUN PLUMBICON CAMERA.

Saticon is a registered trademark of NHK (Japan Broadcast Corp.) Plumbicon is a registered trademark of N.V. Philips.

If you think a top-of-the-line camera or Triax system has to carry a top-of-the-line price tag, think again.

Think of the new Sharp XC-900D, a Diode Gun Plumbicon camera with a Saticon price tag. Now you don't have to pay $35,000 to $45,000 for an image camera, when the same state of the art technology is yours for a list price under $20,000. Technology like linear matrix masking for superb color matching. And Diode Gun Plumbicon advantages like superior sensitivity and resolution and almost non-existent lag, burn in or highlight sticking.

For those of you who favor Saticon technology, Sharp still offers the best for the least, the XC-800, the first Saticon II camera that lists under $10,000.

And if shooting on the run is the name of your game, think of Sharp's XC-803TX, the first no compromise Triax System that lists under $10,000.

So if you still think performance, reliability and economy don't mix, call our bluff. Make an appointment for a shoot out between the XC-900D and any other camera of your choice. When you see the results, you'll probably become one of our best salesmen.

For more information or a shoot out, contact your local dealer, or write: Sharp Electronics Corporation, Professional Products Division, 10 Sharp Plaza, Paramus, New Jersey 07652. (201) 265-5548.

From Sharp... the people who replaced half a million transistors and diodes with one tiny chip.

SHARP

FROM SHARP MINDS COME SHARP PRODUCTS

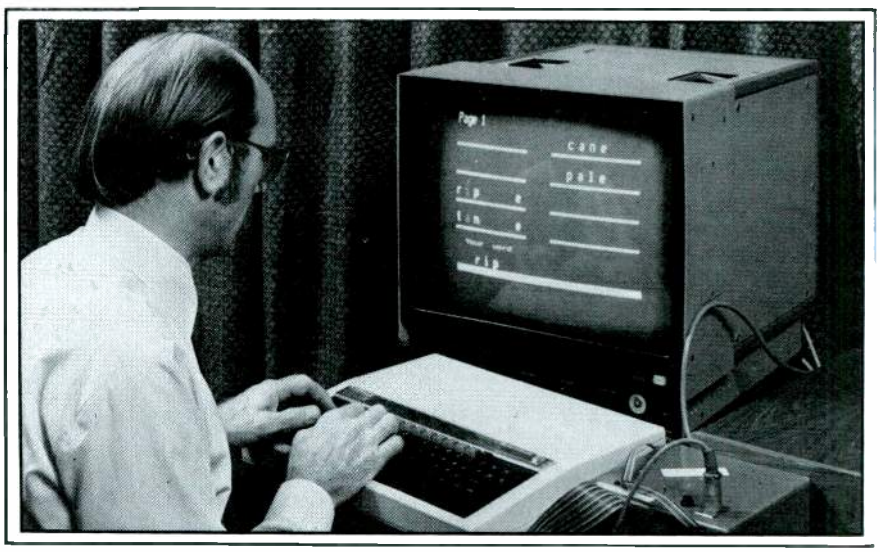
Circle (30) on Reply Card

Future developments: Push or pull?

By Charles P. Sandbank, head of the BBC research department, United Kingdom

Although it is not new for the media to have various outlets (books, newspapers, films, radio and television), we are in a period when technology is creating a rapid increase in the number and type of such outlets. At the same time, there also is a blurring of the boundaries between the different forms of the media, their technologies and their marketing.

One of the reasons for the intense speculation—both intellectual and financial—that characterizes the broadcasting industry at this time is that there are no clear answers to two questions. First, are the new broadcasting technologies responding to a market *pull*, or are they *pushing* the industry into new markets? Second, should new technologies such as DBS, wideband cable, and domestic recording be used to increase the *quantity* or *quality* of what is offered to the public? The simple answer to the second question is that we should try to do both. However, when one comes to making the finer judgments about the viability of new services, there is not much case history to assist in determining the balance of priorities.



Shown are the BBC microcomputer and a teletext adapter that permits the direct downloading of software broadcast by teletext.

Success of services

The prime factors that determine the success of a service are the acceptability of the program material and the costs of distribution. This would suggest that technical quality is less important. However, the surprising commercial success of the optical disc for distributing sound recordings suggests that, under certain circumstances, the consumer will invest in quality as well as quantity.

Another lesson to be learned from the compact disc is the danger of underestimating the technological interaction between different media markets. The broadcasting industry took little interest in the standards proposed for the digital discs developed for the domestic record market. By the time it was appreciated that the sampling frequency used for these discs would not live conveniently with the frequencies established for digital sound studios, the dice were cast.

It is important that the same situation is not repeated with HDTV. Its first application will be as a means of electronic production for the cinema that avoids some considerable short-term problems, such as finding sufficient transmission capacity and providing domestic terminals capable of doing justice to an HDTV signal. This situation may induce a lack of interest among broadcasters in HDTV standards. It would be a pity if we failed to ensure that what should become a worldwide studio standard recognizes not only the requirements of electronic cinematography, but also the future opportunities in broadcasting.

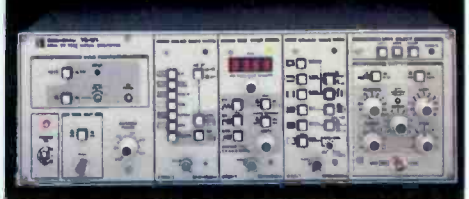
When domestic HDTV receivers become available to the consumer, judgments about quantity vs. technical quality will be put to severe test.

Digital technology

An area of broadcasting in which the influence of technology is showing fairly clear trends is in digital video and sound. The establishment of standards for the sampling structure has encouraged investment by manufacturers to produce hardware and by broadcasters to purchase the equipment. So ready has been the response that the industry has not even waited for the finalizing of the interface standards for interconnecting digital equipment before introducing more digital *islands* in the analog *sea*. Although it is unlikely that the islands will become *continents* before the availability of the digital videotape recorder, the use of digital equipment in the BBC now is sufficiently extensive to have a noticeable influence on programs. Special effects units giving geometrical picture manipulation are finding increasing use in TV productions, but the rapid extension in the use of electronic graphics is, perhaps, where the public finds the influence of digits most noticeable.

The use of digital techniques in TV graphics is one in which the BBC research department has made particular contribution. Program producers and graphic artists have been quick to use these tools to develop their art. Digital storage of the type used for main frame computers has been adapted to enable animated sequences to be assembled and replayed in real time. This bypasses the need for cine-film in the production of animation for television so that the results are immediately viewable and readily modified due to the random access to the individual frames in the store. Further, the digital signal allows precise overlays and picture processing to be done during production.

Because the output of graphics artists working in broadcasting is normally an electronic image, it makes sense to bypass the print and paper stage if this increases the artistic



TG-7 TEST SIGNAL GENERATOR

The TG-7 TEST SIGNAL GENERATOR is a unique system which contains a total of 48 different signals and functions and may also be completely automated with the optional IEEE-488 interface bus. Because of its modular design, you may select the perfect configuration for your facility and then expand at any time. Its special features are . . .

- A main frame with sync generator, color lock, gen lock with the VES or sync with color burst.
- Chroma phase may be varied 360°
- Signals may be remote controlled by using the optional IEEE-488 interface bus.
- Seven modules are available: LINEARITY, SIN², COLOR BAR (10 signals), SINE WAVE, SQUARE WAVE, NOISE TEST, and a VITS Generator.
- Complete drives system (VBS), Sync, Black Burst, Sub Carrier, Burst Flag, and Blanking - Stability of ± 5Hz.
- Output amplifier with R-Y, B-Y modulator is built into the main frame and allows variations of the Brust, Luminance, Chroma, Sync, and pedestal level, available in NTSC and PAL.

226 COLOR BAR GENERATOR

The 226 is a COLOR BAR GENERATOR designed for use as a testing and adjustment device for ENG applications. The unit contains split field color bars and a programmable prom to generate station identification as well as a 1 KHz oscillator and a odBm output signal at 600 ohms. The 226 may be operated on both AC or DC power and it is available in NTSC only.

CB53A1 COLOR BAR GENERATOR CHARACTER GENERATOR

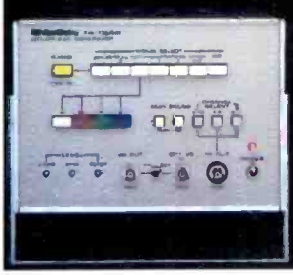
The CB5 3A1 combines a COLOR BAR GENERATOR and CHARACTER GENERATOR in one versatile instrument you can take right into the field for remotes and on-location shooting. It generates SMPTE and Y/REF color bars, plus red bar, black burst, multiburst, cross-hatch and dot signals. Standard NTSC sync signals and the gen-lock function are built in.

You can insert character information into each signal using a special keyboard with Random Access Memory that retains the signals even if your power is lost. The CB53A1 gives you a total of 31 character spaces on 2 lines.

- Black burst output.
- Selectable black or white background, four characters.
- External or internal switching for video and audio signals.
- Output range of +8 dBm ∼-50 dBm for 400 Hz and 1 kHz audio signals.
- RF signal on USA channels 3,4 and 6.
- AC-DC operation.
- Available in NTSC.

216 COLOR BAR GENERATOR

The 216 COLOR BAR GENERATOR is adaptable to all video service applications. It contains 2 color bar signals, Red, Green, Blue, & White Rasters, and 4 cross hatch & dot patterns. With this versatile instrument, you may obtain a video output as well as use the unit as a TV channel modulator with an internal or external video signal (2 VHF, 1 UHF). For audio, a one KHz signal is generated internally and modulated to form an RF signal.
The 216 is available in NTSC, PAL B, M, N, and SECAM.



ASACA ASACA ASACA ASACA ASACA ASACA

ASACA/SHIBASOKU CORP. OF AMERICA

Write for brochures or call 800 423-6347

12509 Beatrice Street Los Angeles, CA 90066 (213) 827-7144 (800) 423-6347 Telex 182089

Circle (31) on Reply Card

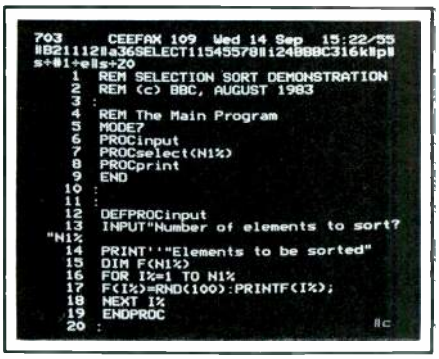
scope or reduces the tedium of some of the routines. This represents the further evolution of electronic graphics. Most of the functions of classical artwork with pencils, pens, paint and airbrushes now can be produced with the electronic palette. They can be used in combination with images from cameras and with high quality text selected from a variety of fonts available in digital form. The digital text can be filtered to blend with the other images. Microprocessor control enables functions such as *montage* to be carried out with much greater ease than the traditional *cut and paste* methods without imposing stereotyped formats that could mask the individuality of the artists.

Completing the currently available inventory of digital equipment is the electronic equivalent of the slide scanner, which enables electronic stills to be selected for transmission. Productions combining electronic graphics with camera pictures, such as popular cartoon series, have enjoyed outstanding success at peak viewing times.

The next major step in digital video production techniques probably will have to wait another two or three years for the DVTR. This will largely remove any inhibitions that we may have concerning multigeneration recording. However, an equally important aspect is that the YUV digital signal facilitates labeling methods that enable the editor to readily locate every field, every line or, indeed, every pixel if necessary. This will provide much greater artistic freedom and the opportunity for developing editing and overlay techniques much further than is possible with our present analog signals.

Labeling techniques are equally applicable to digital audio signals, and with the availability of recorders we have the opportunity to apply them in the near future. Digital labels in the audio field can include operational data such as program duration, serial number or "take," time and date of origin and cue information that can identify individual solo or even bar numbers if desired. There would be technical data such as audio word length, pre-emphasis, signal description (mono, A, B, etc.), markers for synchronization of sound and vision, data on the amount of signal compression, instantaneous level and balance settings and possibly data for the automatic or assisted equalization of transmission and playback equipment. Also, depending on the recorded material and the user's individual requirements, the labels can carry a variety of other items, such as names of performers, musical score details and editorial comments. All this information can be included at moderate

(A) The compressed program is shown as it would appear on a normal teletext receiver selecting that page. It is not intended to be read in this form.



(B) The program can also be set out in a form in which it can be keyed manually into a computer or directly downloaded.

data rates and can thus be repeated, giving distributed access and a high level of protection against errors.

When it comes to the distribution of digital signals, optical fibers are particularly suitable. Transmitting the digital vision signals in serial form requires more than 200Mbits/s, and this is demanding for coaxial cables. For point-to-point transmission, optical technology is with us now; but, if optical fibers are to be used in a studio center, switching in the optical regime is required. It may not be worth using optical cable if one has to convert to electrical for the switching matrix and back again to optical for onward transmission. Although integrated optic techniques should eventually make an optical switching matrix possible, electro-mechanical means of routing the optical signal seem the only likely solution for the next few years.

Extra signals for the receiver

The complexity of consumer equipment is increasing, and sophisticated processing can now be provided in broadcast receivers at a small incremental cost. Teletext is a good example. In the United Kingdom, we have now reached the stage in which the majority of remotely controlled receivers sold to the public incorporate a teletext decoder. The cost of the decoder is, in fact, comparable with that of the remote controller.

Teletext is also an example of another significant trend in broadcasting. It demonstrates the ability of broadcasters to add new services while coping with the requirement for compatibility with the consumer products already in people's homes. Teletext has, of course, "grown" within the present TV signal format and will continue to grow without additional demands on the radio spectrum. Although the basic teletext standard has not been changed, a series of further compatible enhancements have been developed that have extended the scope of the system to the stage in which we can transmit and display high quality still pictures. A full picture store in the receiver is required for this, so it is unlikely to be a feature of domestic teletext receivers in the near future. However, other textual and graphic enhancements require only a modest increase in memory that is easily affordable, particularly in the next generation of receivers with all-digital circuitry.

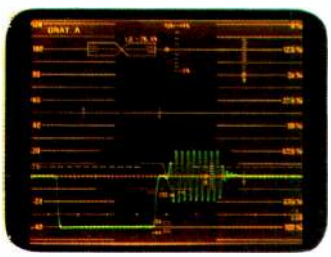
By introducing a telesoftware service transmitted on CEEFAX, the BBC's teletext service, the use of the TV channel has been extended even further. The programs can be entered directly into the computer through the use of an adapter that incorporates a TV tuner and teletext decoding circuits and is connected to the computer by a 1MHz parallel data bus.

The BBC also is proposing to broadcast digital signals added compatibly to the sound programs on VHF (FM) radio based on a 57kHz biphase coded subcarrier that can accommodate a data rate of 1200bits/s. VHF *Radio Data* will carry information such as the name of the service, the type of program (music, news, etc.) and the title of the program, all of which could be displayed on a simple LCD panel on the receiver. Depending on the complexity of the receiver, *Radio Data* can be used to partly or completely automate the selection and tuning process. A further possible extension of this technique is to use the signal to address a voice synthesizer to allow traffic information to be broadcast to cars without the need to interrupt normal programs.

There are other examples of compatible extensions under study, such as stereo sound with TV, but I would like to mention one example that illustrates the blurring of boundaries to which I previously referred. The BBC has developed an LF *Radio Data* system for use with amplitude-modulated broadcasts in the LF band, in which the data signal is phase modulated onto the carrier (200kHz).

Continued on page 42

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!

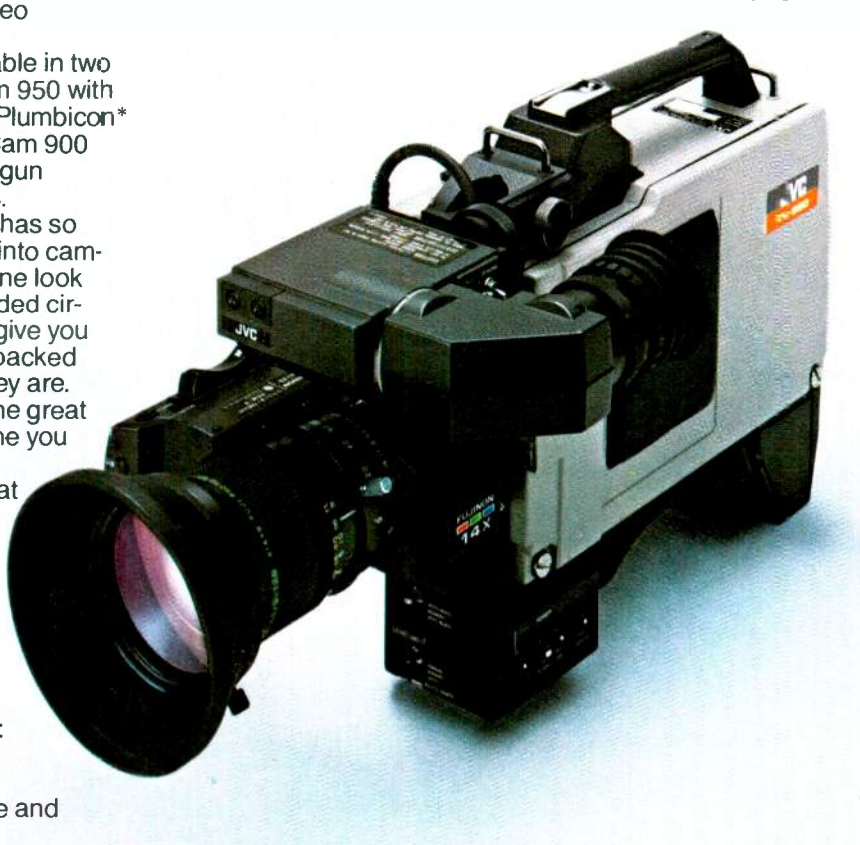
They're available in two models: ProCam 950 with LOC diode gun Plumbicon* tubes, and ProCam 900 with LOC diode gun Saticon** tubes.

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 (32) on Reply Card

Introducing a high-performance mixer with a personality all your own.

The Ramsa WR-8616.

Inside every engineer is the desire for more creative control at the board.

Now there's a post-production/recording mixer designed to make your sessions sound more like you. And less like everybody else's. The Ramsa WR-8616. And its modular design is as ambitious as your needs.

You can have 16 channels of either full stereo or mono modules. Or a combination of the two.

The WR-8616 will also save you valuable time. By letting you simultaneously monitor up to 16 channels on a multi-track machine while recording.

What's more, two discrete mixes give you full monitoring capability, which can be independent from the control room's mix.

And in the mixdown, you'll have access to all 16 inputs without having to repatch or reset the board.

You'll also find the 3-band continuously variable input EQ will give you more precise control over the highs, midrange and lows. And the six-channel remote start/stop capability lets you program materials using turntables, or tape and cart machines.

To make the WR-8616 even more compatible, we've given it a dual set of meters. Eight LED bar graphs will monitor the 16 input signals. While the six VU meters handle the Master, Group, Send, Echo outputs and Solo level.

And the balanced Mic and Line inputs and Main outputs won't let any unwanted noise come between you and your sound.

The Ramsa WR-8616. A post-production/recording mixer designed to treat you like an individual.

SPECIFICATIONS:

- Frequency Response: 20-20,000Hz; $^{+0.5}_{-2.0}$dB
- +4dBM, 600 Ohm Line Input and Output Signal Levels
- Noise: −128dB (IHF "A" WTD, 150 Ohm)
- THD: 0.05% typical at 1kHz, +20dBM
- CMRR: Greater than 80dB typical

Please send me more information about the Ramsa WR-8616.

Name _____
PLEASE PRINT

Address _____

City _____ State _____ Zip _____

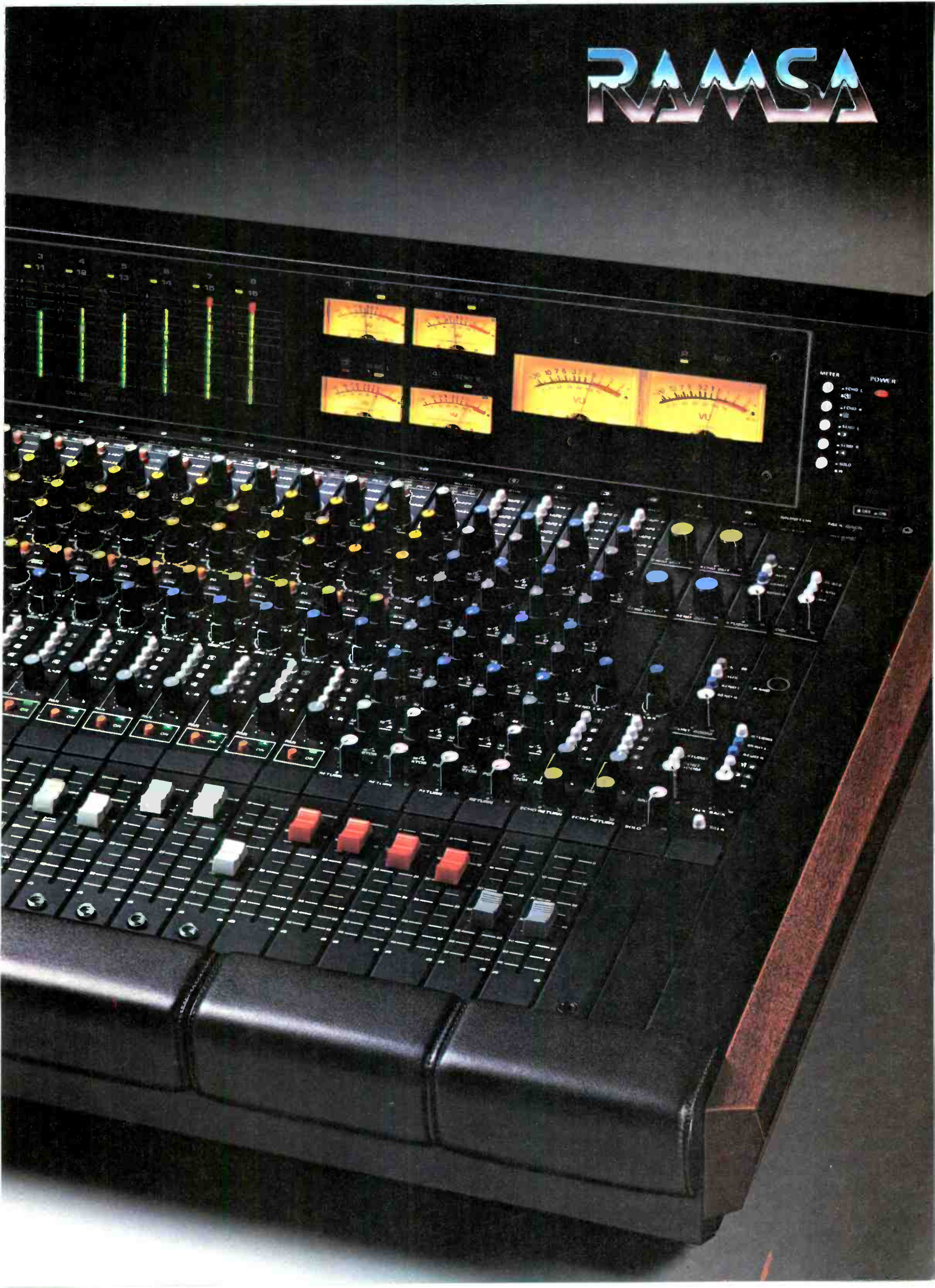
Phone ( ) _____

Return Coupon To: Panasonic Industrial Company, Professional Audio Systems, One Panasonic Way, Secaucus, N.J. 07094.

BE

Panasonic®
PROFESSIONAL AUDIO SYSTEMS

Circle (33) on Reply Card


RAMSA

Continued from page 38

The permissible data rate (25bits/s) is much lower than with VHF *Radio Data* and, for this reason, data labels for the BBC's LF and MF services will be carried by VHF *Radio Data*. However, one application, known as *teleswitching*, has been under investigation for the last four years in a cooperative venture with the UK Electricity Supply Industry. The trials have shown that microchip receivers installed in consumers' meters can, by responding to signals carried by LF *Radio Data*, be used to control the on/off switching times of *off-peak* electrical appliances (for example, water heaters). These appliances are charged at a specially low tariff and normally are controlled by electromechanical time switches. When teleswitching receivers are installed in a large number of homes, it will be possible to exercise extremely flexible control over the total load on the electricity supply network, and it would no longer be necessary, perhaps, to provide the reserve generating capacity required to meet the demand as 10 million British homes plug in their electric kettles to make a cup of tea at the end of a popular TV program!

We are in a rapidly changing environment that requires flexibility in the application of our skills and technology. It also requires good judgment to avoid seduction by volatile opportunities and care to safeguard established values in broadcasting.

Sandbank

About the author:

Charles P. Sandbank *obtained a physics degree from London University in 1953 and joined the Brimar Valve Division of Standard Telephones and Cables Ltd. (STC) as a production engineer. In 1955, he obtained a postgraduate fellowship at Imperial College, which he spent under the supervision of Professor Denis Gabor (the inventor of holography and flat CRTs). After further work on vacuum devices, Sandbank joined the Transistor Division of STC in 1959 and soon afterwards led the team that developed the first silicon chip integrated circuits in Europe.*

In 1964, he joined Standard Telecommunication Laboratories (STL), initially as head of the electron devices department and later as manager of the Communications Systems Division. Among the activities for which Sandbank had responsibility at STL were solid-state microwave generation, display technology, microwave navigational aids, integrated local area systems and fiber-optics (whose application to communication was first proposed at STL).

In 1978, Sandbank joined the BBC as head of the research department at Kingswood Warren. He was chairman of the IEE Electronics Division in 1979-1980. He is an external examiner at London University. Sandbank currently is chairman of an EBU Committee on high definition television. In 1983, he was elected to the Fellowship of Engineering and also was elected a Fellow of the Royal Television Society.

ORDER MCL

C-Band, Ku-Band High Power TWT AMPLIFIERS

Here is the ultimate in design and engineering for data and video earth satellite station use. Operating in C-Band (5.925-6.425GHz) at 50-3000 watt power level; Ku-Band (14.0-14.5GHz) at 50-2500 watt power levels.

You get everything with MCL TWT AMPLIFIERS including great performance capabilities, ability to meet or exceed demands for highest efficiency, solid state circuitry reliability, and maximum signal purity. Self-sustaining performance under practically all conditions including unattended locations. Expandable into Redundant Systems with multiple switching and interface configurations available to satisfy every need.

MCL AMPLIFIERS come complete with technical manual package, easy operating and servicing instructions, and comprehensive replacement parts reference list. As always, MCL guarantees 24 hour parts access and provides 24 hour-7 day availability of MCL personnel for assistance in installation and servicing.

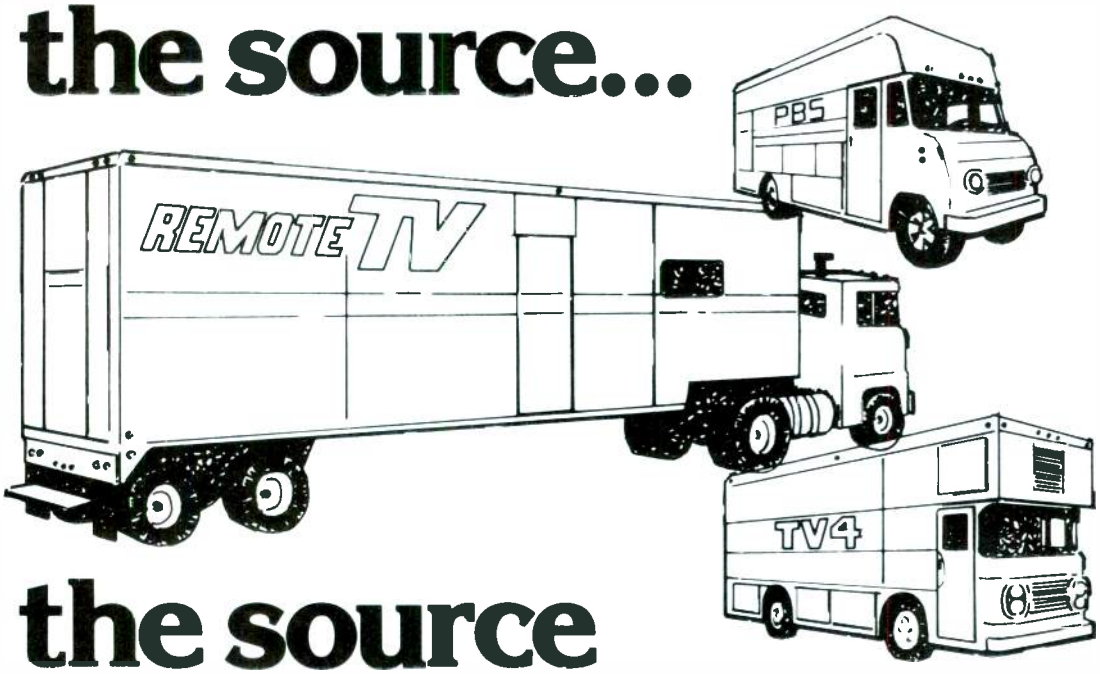
WRITE for complete, illustrated technical reference brochure today. ORDER "MCL"; you'll be glad you did.

MCL, INC. Ten North Beach, La Grange, Illinois 60525
(312) 354-4350 TWX 910-683-1899

MCL

Circle (34) on Reply Card

When you cover the action from the source...



the source for mobile studios should be Gerstenslager.

In a van or trailer, your most modern, best equipped studio could be your Gerstenslager. It all starts when you tell us what you need. The job to be done. Then we'll work with your engineers and principal equipment suppliers. Develop the plans. Detail placement of every piece of equipment, generators, wiring, climate control, consoles. Exactly as you want it. Then, build the unit from the frame up. A studio on wheels that is actually a dependable broadcasting station comparable to conventional studio systems.

How we do it with examples of work we have done for others is included in this brochure. It's yours for the asking. Write or call: (216) 262-2015.

GERSTENSLAGER

The Gerstenslager Company, Wooster, Ohio 44691

Circle (35) on Reply Card

CCIR & the future

By Richard C. Kirby, director, CCIR, Geneva, Switzerland

I was asked to review briefly the CCIR (International) Radio Consultative Committee) work in television. CCIR is the radio technical organ of the ITU (International Telecommunication Union), set up to develop the recommendations needed for radio system characteristics and the technical basis for spectrum utilization. Its results form part of the basis for international regulation and allocation of the frequency spectrum, as well as a basis for system compatibility and interconnection. Administrations and recognized private operating agencies are members, with participation also by broadcasting organizations, scientific and industrial, international and regional organizations. The technical work is carried out in study groups, and recommendations are approved at intervals of four years by the Plenary Assembly, the last held in February 1982.

Digital studio standard

Certainly, the pre-eminent TV study in the period leading up to 1982 was the development of the international standard for digital studio television, specifically the encoding parameters. Digital television is intended to facilitate studio processing and program production, to provide an improved basis for exchange of programs and to transcend the current problem of standards conversion among PAL, SECAM and NTSC systems. The major beneficiaries of the digital standard, in the short term, will be the broadcasting organizations and program producers that will be able to use more flexible production techniques. In the longer term, transmission between centers, in networks and internationally, as well as recording, will be greatly improved. The compatible digital approach allows worldwide development of equipment with many common features.

A key element was the system of coding based on color components—specifically, one luminance and two color difference signals—giving better color transmission than the composite system, greater flexibility in signal processing and greater immunity from artifacts.

Another feature was the allowance of an extensible family of coding standards to cater for different transmission needs corresponding to quality and cost requirements.

The cornerstone of the system is the 13.5MHz sampling rate adopted for the luminance signal, and the 6.75MHz rate for each of the two color difference signals. This set is the so-called ratio 4:2:2 member of the family. The sampling rates apply both to 525- and 625-line systems, and correspond to an integral multiple of samples per line in both systems.

Many organizations and outstanding individuals in broadcasting contributed and cooperated to arrive at this standard. First, the European Broadcasting Union (EBU) in 1972 began its Working Group on Digital Coding. One of the first trips I made after becoming director of CCIR in 1974 was to an EBU Working Group C meeting in which this subject was being discussed. In North America, the Society of Motion Picture and Television Engineers (SMPTE) took up the problem, and so did the Japanese broadcasting organizations. The OIRT, the international radio and TV organization of the Eastern European countries, participated later on, as did the Asian Broadcasting Union and others.

Much of the careful compromise centered on the sampling frequencies. Bounded on the lower side by the Nyquist limit of twice the bandwidth of the baseband signal, there were important differences concerning the margin needed above this, for practical filters and to facilitate picture manipulation in production. The EBU originally had proposed 12MHz, and the SMPTE strongly favored 14.3MHz. The important compromise of 13.5MHz was reached after many discussions, laboratory trials and demonstrations. The participants were convinced of the advantages of a single world standard. It has been observed that the standard, while taking good care of both 525- and 625-line systems, finally bears no trace of either. The timing was critical, as there were not yet irreversible investments in any country, a factor that prevented a world color TV standard in 1966.

The digital standard was a remarkable event in standards development and international cooperation. The US National Academy of TV Arts and Sciences has since recognized the CCIR with its engineering award for this achievement, but the credit belongs to the experts and organizations that were determined to have the standard, were capable of crafting it and succeeded in negotiating it.

The fact that the standard is not a reflection of an existing practice, but is a design for the future, carries its own set of problems for implementation and transition. The next 3-5 years will see successful implementation as a single world standard or could yet see different solutions for different parts of the world. Some active leadership, especially from broadcasting organizations, will be needed to carry the standard forward into equipment and systems.

It also now becomes important to further the compression techniques for transmission in the network. The studio level 4:2:2 implies 216Mbits/s transmission. Objectives of 140Mbits/s and 70Mbits/s have been suggested for transmission in the network.

High definition television

During the new study period of CCIR, the most active subject is high definition television (HDTV). The Montreux Symposium demonstrations of HDTV helped the world judge first hand the growing interest and potential market for this technology. In my own view, the added dimen-

Editor's note:
Portions of these remarks were included in an address presented at the opening session of the Montreux TV Symposium on May 28, 1983.

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 TEKTRONIX COMPANY

Circle (36) 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:*** 1032 Elwell Court, Ste 244, Palo Alto, CA 94303 (415) 968-6680 • ***Western Regional:*** 21243 Ventura Blvd, Ste 205, Woodland Hills, CA 91364 (213) 999-2303

sions of HDTV compare with the change from monochrome to color. I am speaking of systems of more than 1000 lines, which can give image detail comparable to 35mm film, the wider screen display valuable for sporting and outdoor events, and the cleaner, sharper picture produced by color-component encoding.

Besides high definition systems, there are some other important concepts for *enhanced* or *extended* definition, but the term high definition implies a new service, not compatible with present systems, requiring new receivers and new broadcast channels. A lot of earlier interest in HDTV focused on its potential for program production processes and closed-circuit services. But satellite broadcasting is giving new impetus to HDTV for the public. There have been experimental demonstrations in Japan, and the completed design of one of the first direct broadcasting satellites for the United States provides for some high definition television.

The laboratories continue intensive development, especially on display devices. There are high definition cathode ray tubes that make widescreen display on the order of 1000 lines practical for home, and there are video projectors for larger display. One of the most promising objectives is the flatscreen or panel-type display, including matrix scanning, for which work is continuing to improve the luminance.

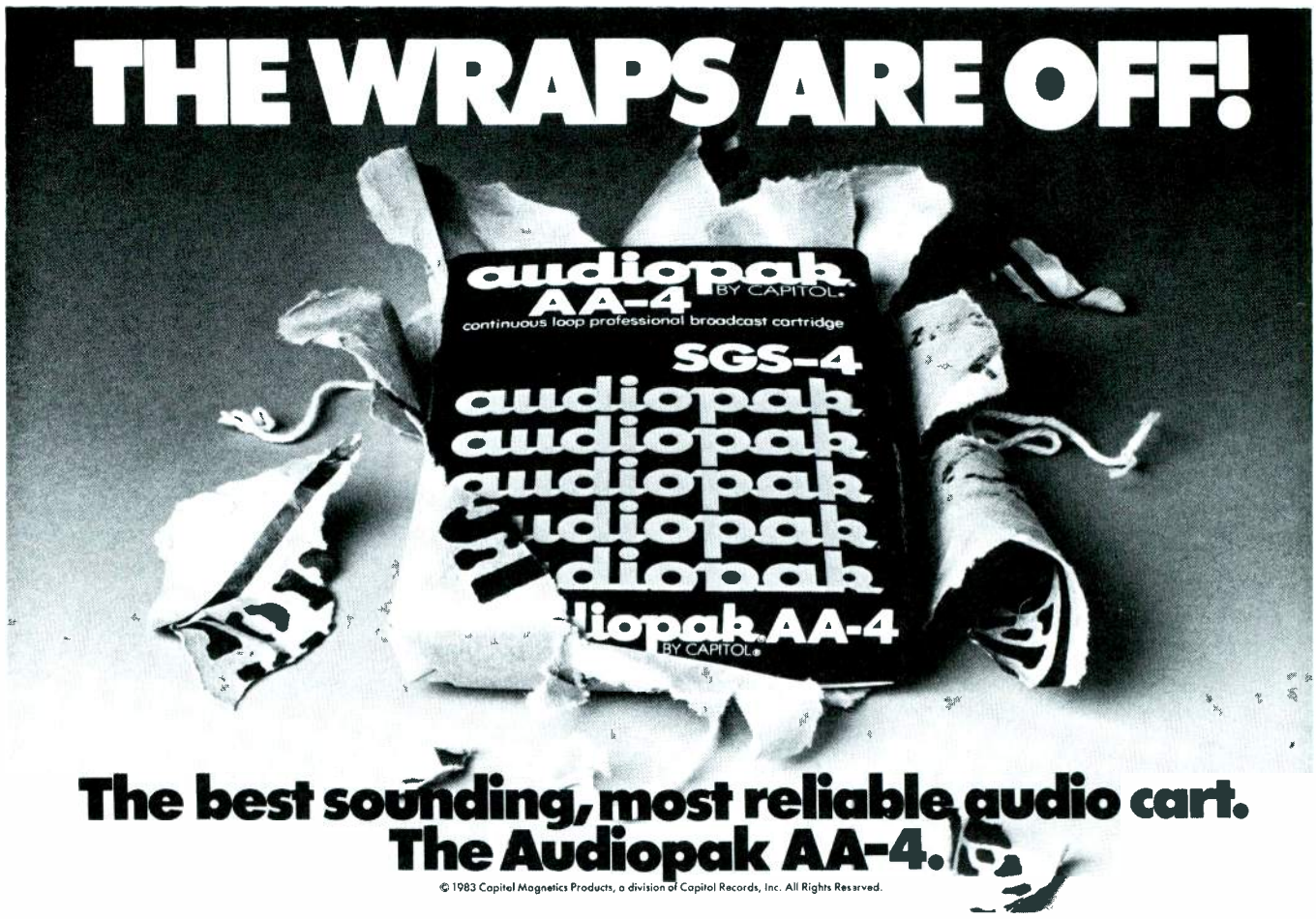
As a basis for program exchange and transmission, CCIR is studying what basic standards are needed for HDTV systems. The study is supposed to accomplish the following:

- identify the target for picture and sound quality;
- agree on scanning standards and necessary bandwidth;
- recommend a broadcast transmission system, including modulation and multiplexing for video and sound; and
- take account of production of receivers at reasonable cost, the issue of compatibility with existing systems and appropriate frequencies in the spectrum.

Proposals to the 1983 Study Group meeting already include the framework of a recommendation for a single world standard for HDTV at the studio level, to be specified in analog and digital terms. The suggestion is included that a digital version of HDTV, expected to coexist for many years with the digital 4:2:2 standard, ought to be appropriately compatible. It is proposed that the HDTV standard might be completely defined in the current study period, in other words, by late 1985, for approval of the Plenary Assembly in 1986. This timing again is critical if a single standard is to be realized in advance of major investment in several different ones.

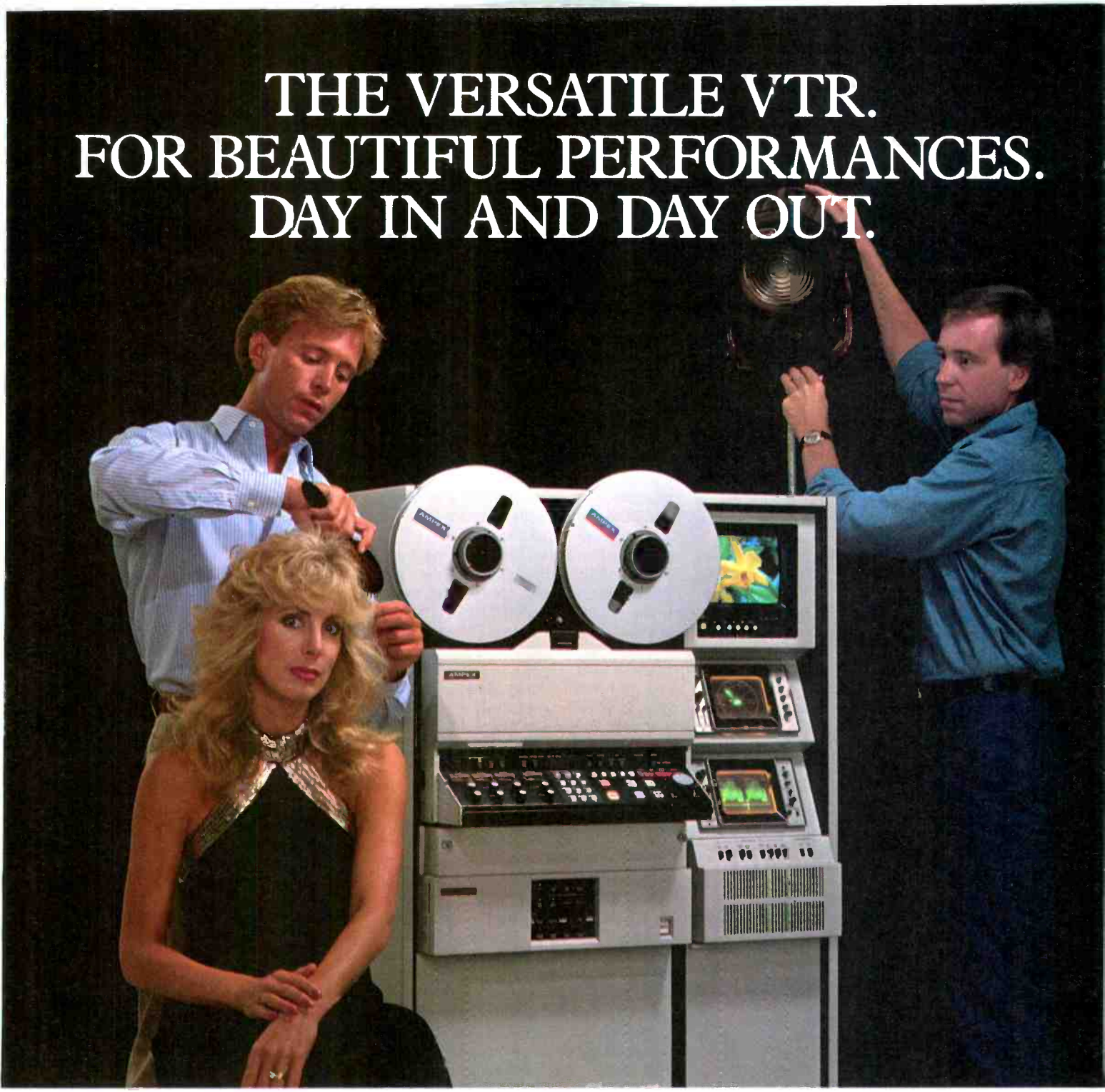
I mentioned earlier systems for enhanced or extended definition. There are several concepts for enhancing the image quality of NTSC, PAL or SECAM broadcasts by means that would permit existing receivers to continue to receive, at least without interference to present picture quality, or with an adapter, an improved picture. An extended system uses the raster of NTSC, PAL or SECAM, but extends the radiated signal characteristics to improve resolution and color quality. I will mention the MAC (Multiplexed Analog Component) system further in connection with satellite broadcasting.

The CCIR studies should take account of the full range of possibilities if a single high definition standard is to succeed.



Circle (37) on Reply Card

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.

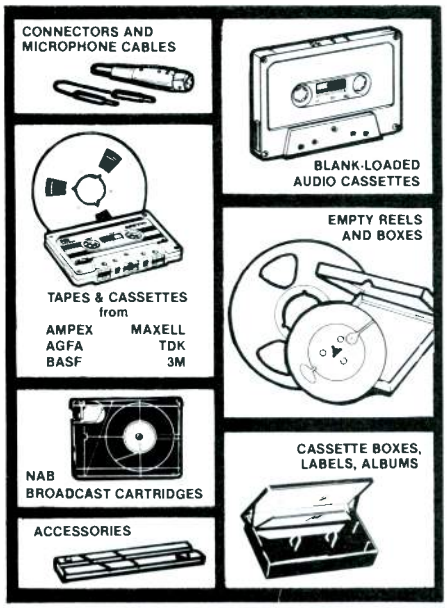
VPR-80. It's the multi-faceted beauty that fits in fashionably anywhere. From the people who started it all. For more details, contact your local Ampex AVSD sales office.

AMPEX

Ampex Corporation · One of The Signal Companies

Atlanta 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 (38) on Reply Card

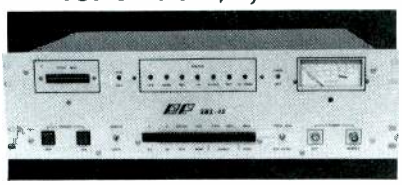


Ask for our
44 PAGE CATALOG
of
PROFESSIONAL SOUND RECORDING & DUPLICATING SUPPLIES

Recording Supply Div. of Polyline Corp
1233 Rand Road, Des Plaines IL 60016
(312) 298 - 5300
35

Circle (39) on Reply Card

The Cadillac of Exciters for under $5,000.00



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 Ratio	– 70 db below 100% mod 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 Slew Rate	12 V/usec (symmetrical)
Frequency Stability	± 300 Hz 0° to 50°C. Direct FM

Write for Sales Literature and complete Specifications

POWER PAK SYSTEMS INC.
P.O. Box 694, Cleburne, TX 76031
(817) 295-7771

Circle (40) on Reply Card

Satellite broadcasting

About one-third of CCIR broadcasting studies are devoted to satellites. The first report was issued in 1963, and now it seems that regular public services will be in operation by the next CCIR Plenary Assembly in 1986. Dr. Siocos of Canada has chaired this work, a joint area between sound and TV broadcast.

A large part of the work has been devoted to the technical bases for planning the use of the geostationary satellite orbit and the allocated frequency bands—questions of maximum yield from these resources while preserving acceptably low interference. The ITU satellite broadcasting conference in 1977 assigned channels and orbital positions for direct broadcasting satellites for Regions 1 and 3; that is, countries other than the Region of the Americas.

The plan adopted for Regions 1 and 3 provided, generally, for five programs per service area. Most countries, including Western European, are single-service areas. Channel spacing is close to 19MHz, with nominal satellite spacing of 6°. There is a procedure for modifying the plan, but the plan is already intricately interwoven. Above Europe, for example, each orbital position is shared by about 16 satellites occupying collectively all 40 channels in both polarizations.

The Region of the Americas plan, coming as it does some six years later, it is hoped by some countries, will provide flexibility to accommodate different types of transmission and some advances in technology. The CCIR Report, prepared in June 1982, stressed the need for flexibility and planning to accommodate advances in broadcasting technology. There already are 525- and 625-line systems in the region, requiring different bandwidths. There also seems to be developing in Europe, North America and Japan the objective to provide some channels of higher quality transmission by satellite. This includes the Japanese experiment with high definition as well as enhanced television, the UK MAC enhanced TV system for satellite broadcasting and the EBU activities toward enhanced and high definition television.

The MAC system referred to is the vision coding system developed by the IBA for satellite broadcasting. The color and luminance signals are transmitted sequentially, by time compression, rather than by using conventional subcarrier modulation. Keeping the luminance and chrominance information thus separate, as in digital component coding, deals better with noise impairment and removes cross-effects between color and luminance. It gives a significant improvement in picture quality.

There are many who think that the requirements for sound quality and multichannels in satellite broadcasting can only be met by digital techniques. In Europe, broadcasters already have agreed in principle on the use of digital sound. CCIR is taking account in the Study Group meetings of enhanced and high definition television for satellite broadcasting.

Before leaving satellite broadcasting, I should mention the renewed interest in ITU in sound broadcasting by satellite in the 1-2GHz band, for reception on portable or automobile receivers. This study was begun at the request of WARC-79, and is now on the agenda for the geostationary satellite orbit conference for 1985.

Conclusion

There is not enough time to review work on teletext in CCIR, although it is well-known that applications are moving ahead in several countries. Professor Cappucini's working group in Study Group 11 has been working on definitions and a possible approach to standards in this complex field—a draft recommendation in preparation endeavors to specify essential characteristics and common denominators of several systems regarding operational features, codes and interconnection.

A CCIR handbook on recording techniques, foreseen by the 15th Plenary Assembly, to be prepared in the interest of developing countries, has been drafted by Paolo Zaccarian and is being reviewed by the chairman of Study Group 11.

It may be recalled that the proposal that CCIR should study conditional access TV systems was referred to the ITU Plenipotentiary Conference in Nairobi, Kenya, for decision. The conference decided that the matter was in the competence of ITU and that CCIR should study the technical aspects of the question.

During the remainder of the 1980s, CCIR also will be committed to preparing technical bases for future radio regulatory and planning conferences. One of the most important is the World Administrative Radio Conference on the Geostationary Satellite Orbit and the planning of the services using it, the first session of which will be held in 1985.

Another conference of interest to broadcasting is the TV broadcasting planning conference for Africa, expected to be held in 1986.

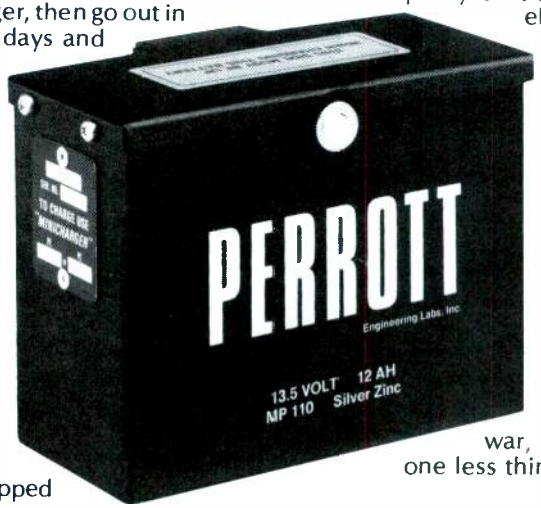
"I'm glad we had Perrott Silver 110s the last time we went to war."

—Bernie Nudelman
Video News, Inc.
Miami, Florida

Video producer Bernie Nudelman and cameraman Steve Born have spent the better part of the last four years covering the battlefields of Latin America—with a camera, a recorder and two Perrott MP-110 batteries.

"Nicaragua. El Salvador. Honduras. Guatemala. They're all routine assignments to us," explains Steve. "And when the networks hire us to cover these hot spots, they expect us to come back with the story every time. That's why we use the MP-110s. They're the most reliable batteries we've ever worked with."

"And that's why we took only two MP-110s with us to cover the war in the Faulklands," adds Bernie. "We'd charge them both up overnight on the Perrott PE-100 dual charger, then go out in the field for two days and leave the charger behind. We did this for six weeks straight—all over Chili, Argentina and Uruguay. And the MP-110s came through every time—even in 30° below temperatures off Antarctica. You can't beat that."



With that kind of record, it's no wonder Video News, Inc. has equipped all four of its camera crews with Perrott MP-110 batteries. And no wonder the Perrott MP-110 silver zinc on camera battery is the high performance choice with news teams throughout the country.

After all, the Perrott MP-110 has the highest capacity of any on camera battery—three times the running time of Nicads*. This top-of-the-line favorite fits in your hand and weighs only 4.5 pounds. And it can be used with either Kwik-Klip® or Snap-On™ mounts.

More importantly, the Perrott MP-110 is 100% quality control inspected—both electronically and manually—before it ever leaves our hands. And it's backed by the industry's only silver-zinc manufacturer's warranty.**

Which means that the next MP-110 Steve and Bernie take into the field will be as reliable as their last one. And in the middle of a war, it's nice to have one less thing to worry about.

PERROTT ENGINEERING LABS, INC.

7201 Lee Highway
Falls Church, VA 22046

FOR ORDER PLACEMENT OR FURTHER INFORMATION CALL COLLECT: (703) 532-0700.

* Based on use of 4AH Ni-cad.

** The Perrott Silver Zinc Warranty on 12AH silver zinc batteries, Perrott guarantees that for 6 months, the capacity will not fall below 10AH in standard use.

Circle (41) on Reply Card

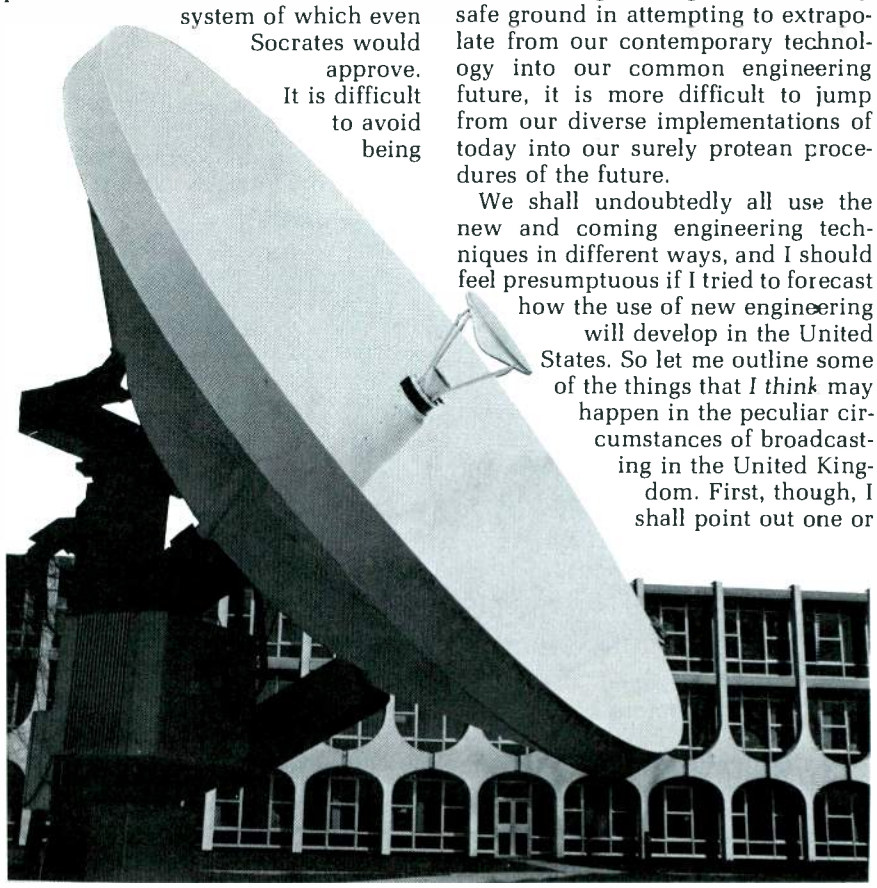
On the future of television

By Dr. George Boris Townsend, head of engineering information service, Independent Broadcasting Authority, United Kingdom

"I cannot help feeling, Phaedrus, that writing is unfortunately like painting; for the creations of the painter have the attitude of life, and yet if you ask them a question, they preserve a solemn silence..."

Socrates

In responding to this invitation to write about the future of television, I shall try not to be silent on the important issues, and I hope that I shall not appear to be too solemn. Here is a challenge to engineers to provide us with the kind of interactive system of which even Socrates would approve. It is difficult to avoid being parochial, however much one travels, however much one collaborates with colleagues in other countries, however much one admires the achievements of other broadcasters. Television has developed differently in different countries and in different societies. Its history varies from nation to nation, its successes and failures alike bearing the marks of our national cultures; yet, underlying it all are precisely similar electrons, the same Newtonian laws of optics, the same types of Hertzian waves.



development of the MAC transmission system for DBS.

Different cultures

So, although I might be on fairly safe ground in attempting to extrapolate from our contemporary technology into our common engineering future, it is more difficult to jump from our diverse implementations of today into our surely protean procedures of the future.

We shall undoubtedly all use the new and coming engineering techniques in different ways, and I should feel presumptuous if I tried to forecast how the use of new engineering will develop in the United States. So let me outline some of the things that *I think* may happen in the peculiar circumstances of broadcasting in the United Kingdom. First, though, I shall point out one or two trends that I see in the development of our UK broadcasting. Of course, as Lewis Mumford said, "Trend is not destiny."

The IBA

The Independent Broadcasting Authority operates a system of public service broadcasting—television and radio—which does not use public money. Our broadcasts reach more than 99% of our population, and we are adding 70 new transmitters a year to our existing chain of approximately 1000. In any one of our 14 regional areas, the public can receive two program services from us. One is our ITV program, provided by a local program company under contract to us, which carries a mixture of networked and locally originated programs. The other, newer service—known as Channel 4—is a national service originated in London by a wholly owned subsidiary of the IBA that purchases its programs from a variety of sources, including independent producers.

The disappearing engineer

The changes since the pioneering days when television started are immense. In the 1930s, the engineer reigned supreme in television. If he said that it was necessary for an actress to be encased in a glass box, then encased she was. Such was the esoteric difficulty of producing a usable TV signal that, once obtained, was distributed as far and wide as sible. But, gradually, engineers de- ied themselves out of the operation l actors became no more restricted n in the theater. In little more than) decades, the director became preme, and by and large the tech- ogy allowed him to do it his way. the same time, it became technical- practicable, economically viable l politically attractive to think of just one highly engineered produc- n center in the capital, but of numerous smaller centers throughout the country, linked together whenever it was expedient to do so.

Shure's new FP31 Mixer takes a big weight off your shoulders.

Introducing the most innovative field production mixer of its kind. Shure's FP31. You won't find another mixer this small with these features, dependability and ease of operation.

The FP31 measures only $6\frac{5}{16}$" x $5\frac{5}{16}$" x $1\frac{7}{8}$", and weighs just 2.2 pounds! Incredibly, it offers the same important features as much larger mixers. Plus, a few of its own.

Every channel has a mic/line level and a low-cut filter switch. And to prevent overload distortion, there's a built-in limiter with adjustable threshold.

The FP31 can be powered by two internal 9-volt batteries, or from an external 12-volt source. A green LED flashes to remind you that the mixer is on. Phantom and A-B power are also provided to operate lavalier and shotgun microphones.

A slate tone can be laid down on the tape for locating specific takes, and there's also a built-in mic for voice slating.

The mixer also has two separate mic/line outputs for 2-camera shoots and a tape output to feed a cassette. For monitoring, there are two stereo headphone jacks—one ¼-inch and one for miniplugs. The FP31's rugged nylon carrying case allows you easy access to every mixer function and lets you piggyback the mixer on your VCR or other equipment.

For ENG, EFP and film use, Shure's FP31 has everything you need to make your mix a perfect success. Coming from a mixer this small, that's quite an accomplishment.

For more information on Shure's FP31 Mixer, call or write Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, (312) 866-2553.

SHURE®

THE SOUND OF THE PROFESSIONALS®...WORLDWIDE

Circle (42) on Reply Card

As the equipment became more stable and more reliable—and to the unseeing eye, simpler—the director could operate without engineers between himself and his actors, without the confines of the studio walls and, thanks to magnetic recording and editing, without the constraints of real time operation. All these trends surely continue. Any creative person can now make his own program without too much in the way of capital equipment and with only a modicum of engineers around the action. These technical facts of life are compatible with the organization of our Channel 4 service.

Freedom for the viewer

The engineer may have gone away from the camera, but he has not gone far. Having given the TV director freedom to to his own thing, the engineer now is busily giving the viewer freedom to view what he likes, when he likes, free from the dominance of the program scheduler and the striking studio technician. The domestic videotape recorder, pirated cassette, disc player, GHz frequency bands, national and international direct broadcasting satellites and cable television together form a remarkable proliferation of the means of distribution. Perhaps the unkindest cut of all is that the engineer has now given the viewer the technical ability to make his own video program, which only he need see, and which will surely be to his taste.

Inertia

The rate of engineering invention is certainly increasing, making the engineering profession an interesting one for engineers. It is also exciting for program makers to have a continuing succession of new tools and new effects available.

But for financial directors, this presents a problem of increasing seriousness. Equipment easily can become obsolete before its capital cost has been recovered. We are now faced with a situation in which engineers are proposing that we should, more or less simultaneously, re-equip our studios with digital equipment; insert computers between the existing staff and every piece of equipment; change our ENG equipment from composite to component coding; change the satellite transmissions to a component form suitable for NTSC, PAL or SECAM, with the facility of improving the resolution for the same channel width; increase the channel width to permit a cinemascope format on

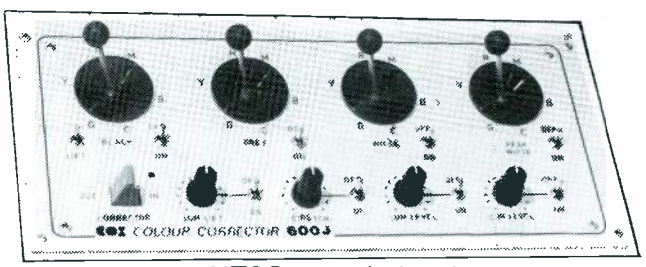
This Maintenance Automatic Test Equipment (MATE), developed by IBA engineers, replaces all the test equipment previously carried by transmitter maintenance teams.

Shown is a full set of test gear currently carried by IBA transmitter teams for use at remote stations.

COX

600J COLOR CORRECTOR

THE CURE FOR POST PRODUCTION BLUES (AND REDS & GREENS)

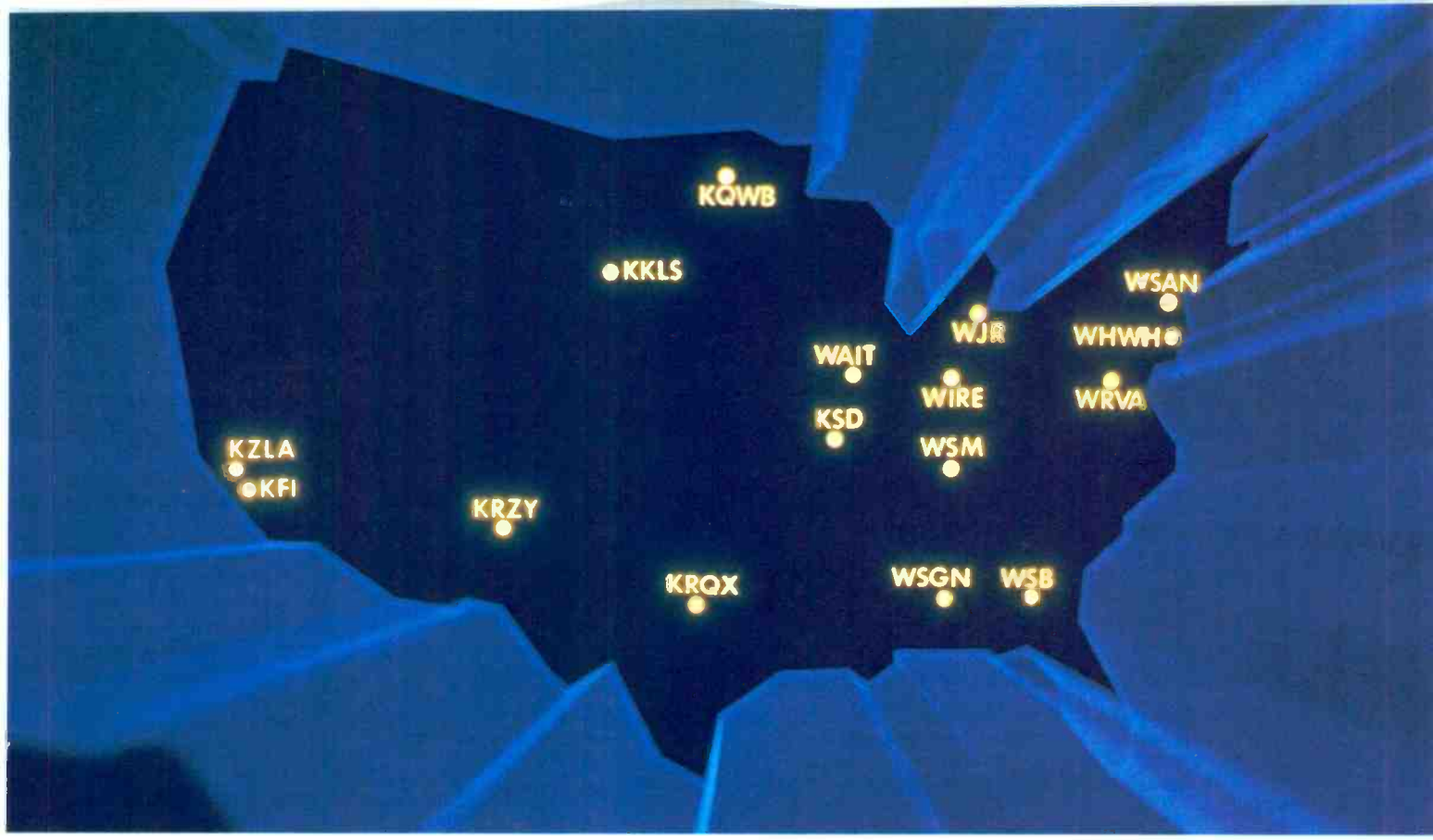


- accepts any NTSC encoded video
- full range of correction at all luminance levels
- gamma correction (black stretch or compression)
- no video degradation

broadcast video systems

1050 McNicoll Avenue, Agincourt, Ontario M1W 2L8
Telephone (416) 497-1020 Telex 065-25329

Circle (43) on Reply Card



CRL AUDIO...NOW PLAYING COAST TO COAST IN AM STEREO.

It all started last year with the Delco tests at WIRE in Indianapolis. CRL was asked to provide an AM Stereo processor. After months of research and testing and working with our customers on prototype models, CRL AUDIO is now shipping the SMP 900 AM Stereo Matrix Processor. The first production unit was installed at KFI in Los Angeles in September. The results were outstanding. Not only is the stereo sound exceptional, but the MONO signal has never been better. Other customers, like WSM in Nashville (Home of the Grand Ole Opry), WJR in Detroit, WSB in Atlanta, CFRB in Canada selected the CRL system . . . (see map for others).

We invite you to compare CRL to ANY other system on our FREE two week trial plan. Call Bob Richards at **800-535-7648** for complete information. Improve your mono signal today and be ready for stereo tomorrow.

(602) 894-0077
(800) 535-7648

CRL AUDIO

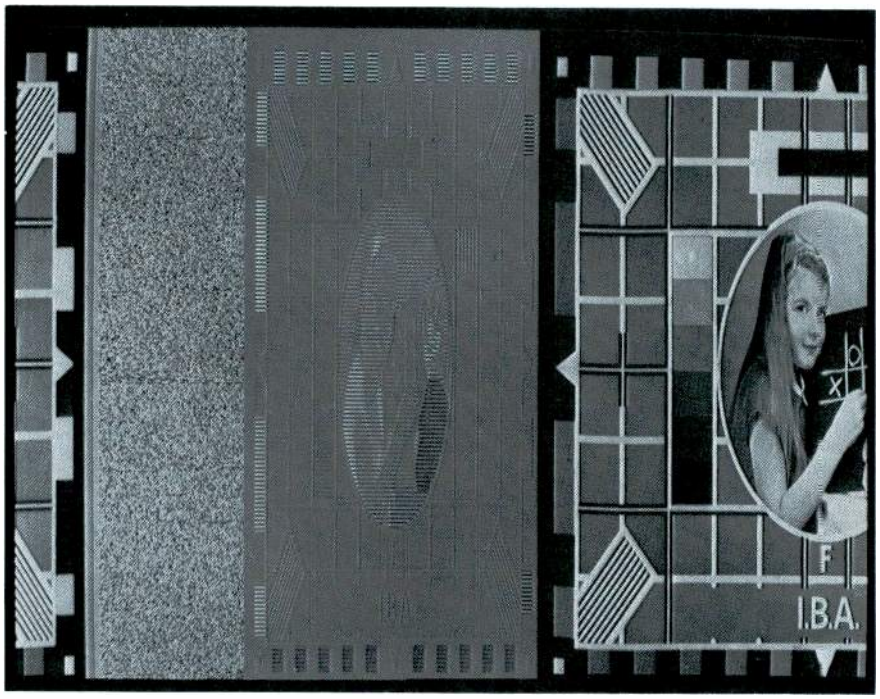
3204 S. Fair Lane
Tempe, Arizona 85282

THE PROCESSING SPECIALISTS

Season's Greetings From Your Friends At

Circuit Research Labs, Inc.

Circle (44) on Reply Card



A monochrome display of the MAC signal is slightly displaced in time horizontally to show the three separate parts of the signal: the sound and data channel, followed by the chrominance signal, followed by the luminance signal. In a normal MAC receiver, the three signals would produce a coherent color picture with eight sound or data channels.

television, and/or, while we are about it, doing the job properly and going to a high definition system that will do justice to the large-screen domestic TV displays that we do not yet have.

Certain factors inhibit such an exuberant abundance: inadequate spectrum space; a crowded geostationary orbit; and, not least, the half billion or so receivers already in the hands of the public.

What is the compromise that will be reached in this dialectical clash?

The IBA's future

I have described, briefly, the structure of our new Channel 4 service. Earlier this year, a new company began providing us with breakfast television from 6-9:15 a.m. each day, concentrating on news and information. Our enabling Act of Parliament will shortly, we trust, be modified to permit us to commence broadcasting from a Clarke-orbit satellite, perhaps using encryption on one channel.

Re-engineering of Band III

Although our color TV services are carried on frequencies in the UHF bands, our ITV programs are duplicated in monochrome on 405 lines by standards conversion of the 625-line PAL signals and radiation of the converted signal on carriers in the VHF Band III (174-223MHz). This duplication is historical and was designed to ensure a continuity of service to 405-line viewers when transmissions began on 625 lines. Band III frequencies are excellent for TV coverage and, as we now are beginning to close down our old monochrome transmitters, we naturally have been thinking of new services for this band.

It is cheaper to serve rural areas by VHF than by cable, and aerials and front ends are cheaper than for direct satellite broadcasting, while VHF is more suitable for local program variation and for portable TV receivers. However, our government has said no; our VHF band is to go to non-broadcasting services. Could the same thing happen to our UHF bands? There are other ways of delivering TV programs to people's homes.

Full-channel teletext

One of our proposals for Band III was for a national full-channel teletext service with teletext pulses on all the normal picture lines. Experience with our Oracle teletext service shows an enormous potential for such a service, with 100,000 pages easily accessible to every individual and a considerable advertisement-carrying capacity.

In collaboration with our European partners in the EBU, we are establishing standards for various enhanced levels of teletext transmission, compatible with existing receivers, but offering improved displays and graphics from new types of decoders.

New standard for satellite broadcasting

As far as direct broadcasting from satellites is concerned, using frequencies around 12GHz we have demonstrated a system that uses the existing 1977 WARC Region 1 channel widths, but which nevertheless would permit cross-frontier viewing in Europe despite our differing PAL and SECAM coding standards. We call this system MAC (Multiplexed Analog Components). It abolishes cross-color effects and permits future receivers using storage to produce pictures with enhanced resolution—a feature that broadcasters may need if they are to meet the competition from discs and cable, whose bandwidths are not limited by international agreements and whose pictures may prove attractive to a society that has more leisure time than our own.

We also are joining with our EBU colleagues in proposing eight sound channels with each satellite video signal, with the option of replacing a sound channel by several data channels. Clearly, such arrangements are helpful for international programming, for summaries of the story so far, for novel forms of advertising, and so forth.

Looking slightly further ahead, there is the interesting possibility that additional transmitted information could be used by receivers with storage and processing to change the standard 4:3 picture into a sharper, cinemascope-type format, without destroying the compatibility with contemporary receivers.

Future-proofing

All industries suffer from the stultifying effect of investment in obsolete machinery. This is particularly true of television, where the rate of obsolescence is rapid. One frustration for the broadcaster is that many technical innovations cannot be adopted without making the viewer's receiver inadequate in some respect; that is to say, the broadcaster may lose his audience if he keeps up-to-date. This handicap becomes increasingly onerous as the new technologies proliferate in the marketplace.

There are solutions to this dilemma. For example, we can refer to the concept of the smart, adaptive receiver. It is becoming practical to design the TV signal so that it regularly carries its own description in its signal, couched in terms that give specific clues as to what is being received. The smart domestic set can then construct its picture in a form appropriate to its own particular display system. Manufactured in a modular form, such a receiver could adapt itself to many types of changes in the transmission and, for other changes, could be kept up-to-date by a simple change of chip.

Given international standardization

Continued on page 58

MEK-1000
MULTI EFFECT KEYER

Make a splash on the screen
Add some flash to your titles

NTI's new Multi Effect Keyer **MEK 1000** can provide a lightning halo effect around your titles that up to now involved an expensive, difficult, and time-consuming process. The **MEK 1000** is the world's first unit that delivers this stunning effect digitally and instantly to either title character input or chroma key signals. The **MEK 1000** can also color each individual character in your titles differently. Again, digitally and instantly.

In addition, you get all the functions of a conventional Downstream Keyer. An independent edge generator lets you select any desired color. Edge, Shadow, Outline and Edge Softness and Thickness are also fully selectable. You also get such features as Auto Transition, Key Blink, Master Fade to Black, and a Selectable 10 Wipe Pattern with three scanning directions. All operations are input from a compact control panel. The **MEK 1000** is a powerful creative tool for on-air applications or in the editing suite. And just by adding an optional crosspoint module, you obtain the features of a production switcher. Call NTI America for a free demonstration. You'll be impressed. And so will your viewers.

Tools for Creators

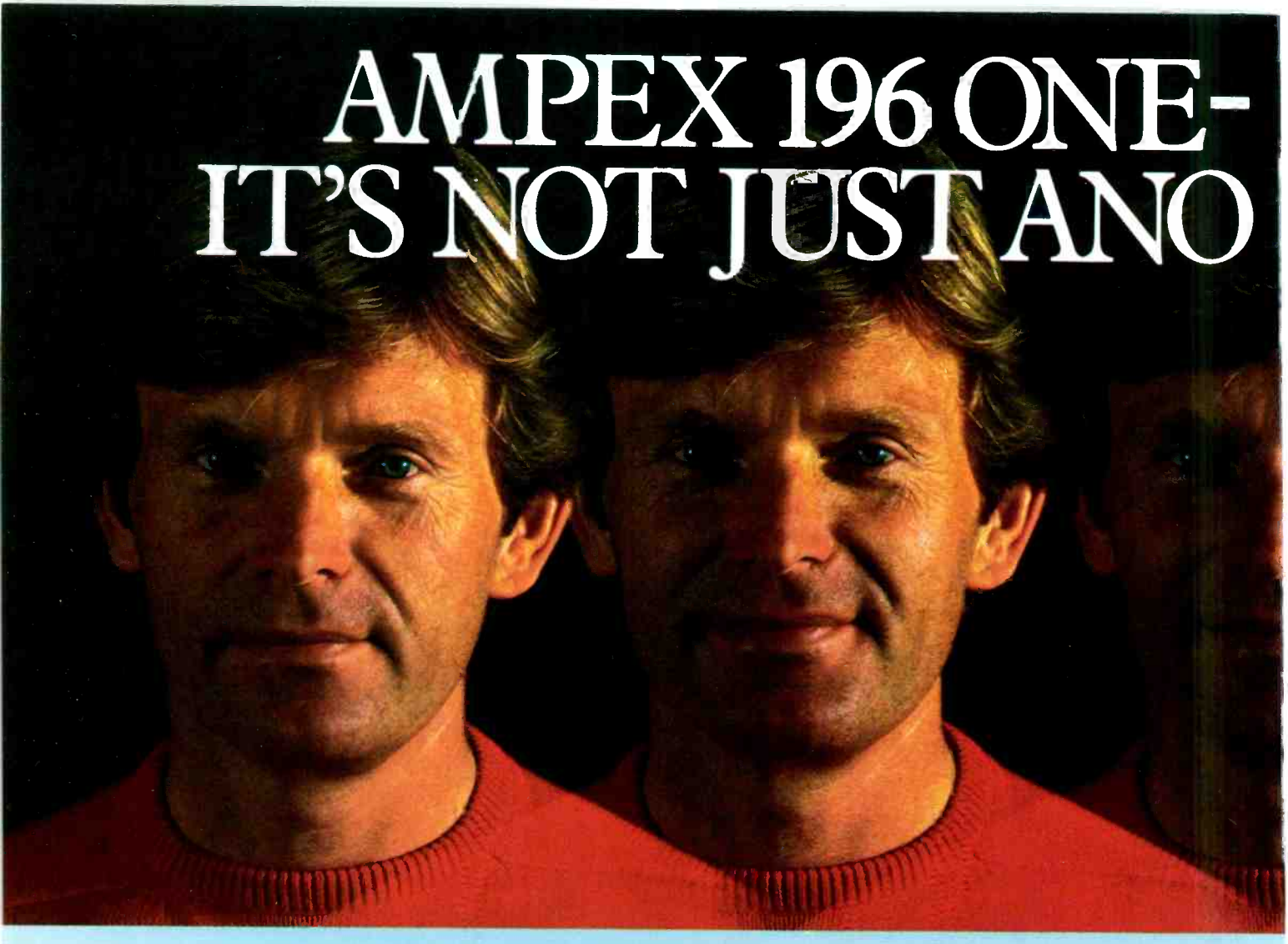
NTI America, Inc.

1680, North Vine Street, Los Angeles, California 90028 Phone: (213) 462-8945

Inquiries from sales representative are invited.

Circle (45) on Reply Card

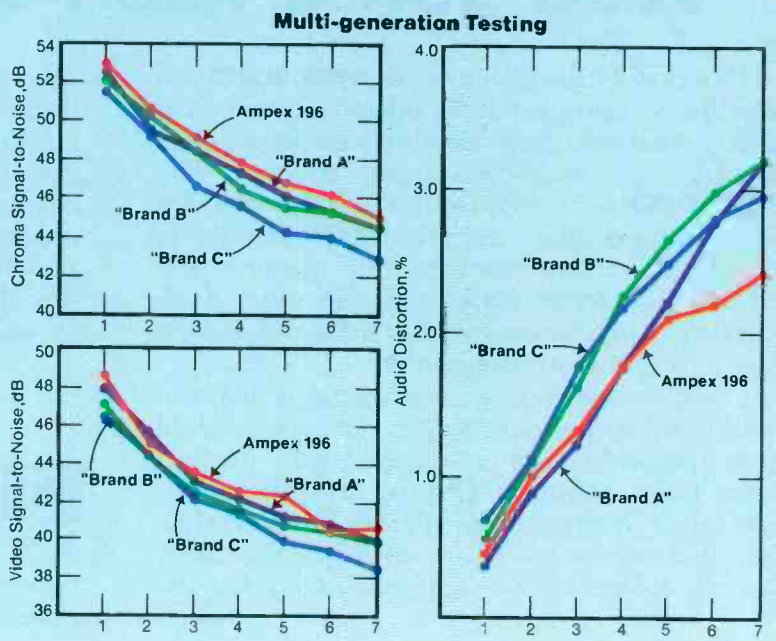
AMPEX 196 ONE-
IT'S NOT JUST ANO



Beautiful pictures generation after generation.

The high energy formulation of Ampex 196 has been designed to give you pictures of perfection time after time. With clarity and color rendering that's truly amazing even after many generations.

Recent laboratory tests comparing signal loss after multiple generations demonstrated Ampex 196 is measurably superior in chroma signal-to-noise, audio distortion and video signal-to-noise. These tests put Ampex directly against all other leading brands in multi-generation uses.



INCH VIDEO TAPE. THER PRETTY TAPE.

Even troublesome shades of red hold up brilliantly after seven generations with Ampex 196. And audio distortion is insignificant.

But don't take our word for it. Check the charts that show the test results. Better yet, give Ampex 196 your own test. You'll quickly realize why so many video professionals use Ampex 196 for mastering, editing and duplication.

To find out more about how Ampex 196 One-Inch Video Tape can make your productions look brilliant over and over again, call your Ampex representative.

AMPEX

Ampex Corporation • One of The Signal Companies

QUALITY WORTH BROADCASTING.

AMPEX CORPORATION, MAGNETIC TAPE DIVISION
401 Broadway, Redwood City, California 94063 (415) 367-3809

Circle (46) on Reply Card

Continued from page 54

of the language of the descriptive code used in the transmission, we can then think in terms of an international receiver, and the resulting world market will surely bring the costs of the large-scale integrated circuits tumbling down. Broadcasters could then compete on more equal terms with the other distribution media.

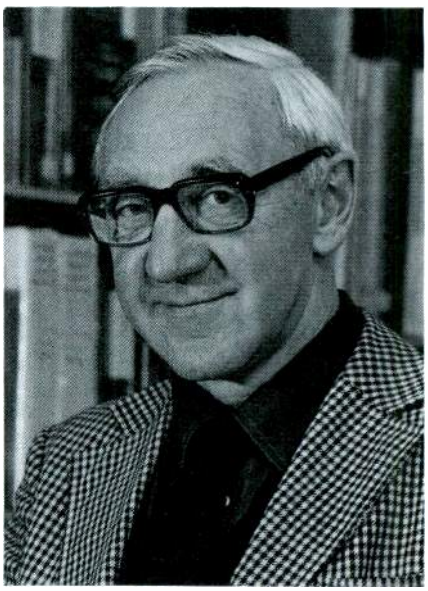
International cooperation

New ideas are flooding in upon us, and at the same time the cost of research and development escalates. It becomes remorselessly more sensible to avoid duplication of development effort, yet it seems that national pride and short-term self-interest conspire to ensure that we continue to have several solutions to some problems, and none to others.

Inexorably, the technology of television is forcing us forward into international cooperation. It was in 1949 that Teilhard de Chardin wrote:

"A revolutionary possibility becomes apparent: All around us and right under our eyes, a process of great importance is going on. It is favored by the sudden multiplication of ultrarapid means of travel and transmission of thought...collective cerebralization using the sharp spearhead of its vast power to complete...the brain of each individual...and here I am thinking of those astonishing electronic machines."

Our mutual collaboration in technology, program making and transmission is now a necessity. Let us not waste too much of our time and effort on duplicating our research work.



Townsend

About the author:

Dr. George Boris Townsend *took a First Class Honours Degree in physics at Kings College in London, where he was the Sambrooke Scholar. He spent some 20 years with the General Electric Company, primarily in its research laboratories at Wembley. He has, in turn, been manager of the TV equipment department of GEC Electronics, manager of Rank Cintel TV Ltd., head of engineering research at ABC Television and head of engineering at Thames Television. Presently, he is head of the engineering information service for the Independent Broadcasting Authority.*

Townsend likes to say that he has done most things in television, from the mass production of TV receivers to the marketing of studio equipment to acting in front of the camera.

He is the author of a number of papers and books on color television. He was awarded the first doctorate in the United Kingdom for research work in color television. Townsend serves on the technical committee of the European Broadcasting Union and a number of its subgroups, and is chairman of the technical subgroup on film in television. He also is chairman of the UK National CCIR commitee on recording.

Minolta Broadcast Meters

Remarkable versatility combined with superb accuracy—
Minolta meters conform to CIE Spectral Response Standard.

MINOLTA TV COLOR ANALYZER II

Used for monitor set-up in TV control rooms and for on-line quality control in the manufacture of TV sets.
- Analyzer mode for white balance
- Chroma mode for setting white standard
- Matrix system eliminates cross-over interference
- Four white-memory channels; four CRT memory channels

NEW CHROMA METER II INCIDENT

ILLUMINANCE METER

LUMINANCE METER 1°

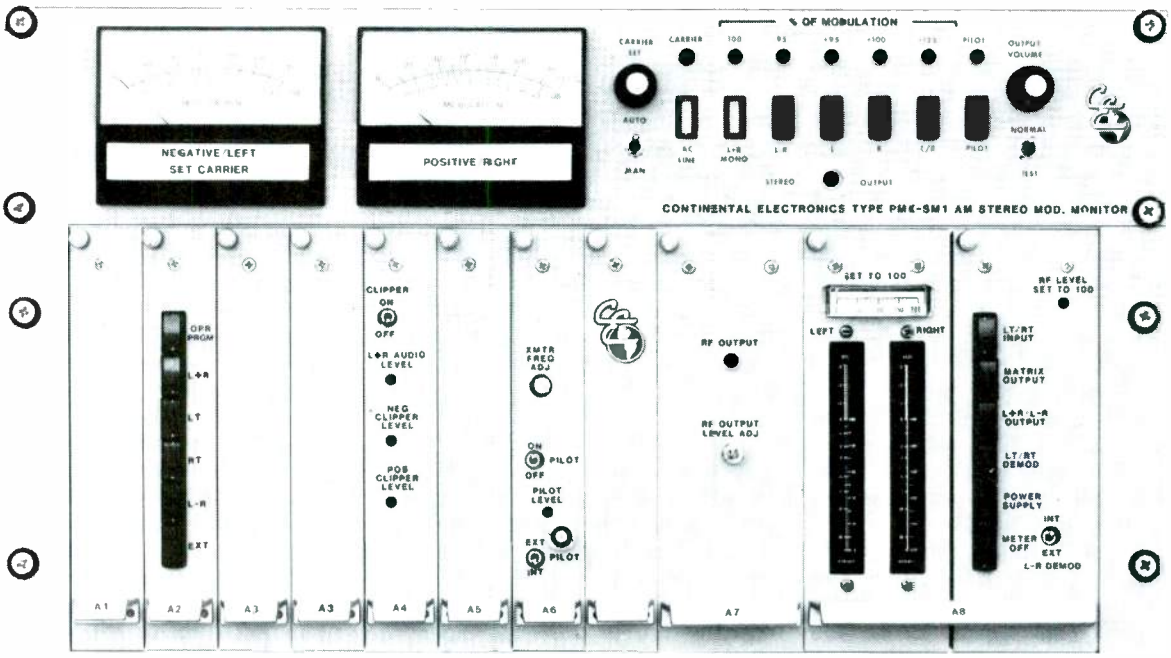
MINOLTA HAND-HELD INDUSTRIAL METERS ARE:
- Lightweight and compact
- Battery powered for portability
- Rugged—ideal for field use

MINOLTA

For more information, write Minolta Corporation,
Industrial Meter Div., 101 Williams Drive, Ramsey, NJ 07446
Or call 201-825-4000
© 1983 Minolta Corp
Product appearance and/or specifications subject to change without notice.

Circle (47) on Reply Card

Your winning combination for AM Stereo



Is AM Stereo ready to move up?

Market-place decisions notwithstanding, the recent introduction of receivers able to decode signals from any of the four systems in use today makes it easier for broadcasters to move ahead with AM Stereo plans.

Which system is #1?

The PMX (Magnavox) System was first selected by the FCC to be the Industry Standard for AM Stereo.

We established the system's viability during the 1979 NAB Show.

The politically-inspired "market-place" decision hasn't affected the technical performance of the PMX System one bit.

Hearing is believing.

With the PMX System, AM Stereo music sounds like FM Stereo music. So it makes for higher listener appeal and better numbers: For audience and the bottom line.

The Winning Combination

Our Type 302A Exciter, developed for the PMX System, and our new Type PMX-SM1 AM Stereo Modulation Monitor give you a superior package for AM Stereo broadcasting.

We've built a world-wide reputation for high-quality AM transmitters that offer unmatched on-air reliability with complete transparency.

Ultimately, the day-to-day operation of your AM Stereo System will depend upon equipment and service.

We stand on our track record of providing the best of both.

If you're considering AM Stereo, or if you just want more facts, give us a call. You can't lose.

Continental Electronics Mfg. Co.
PO Box 270879 Dallas, Texas 75227.
Phone: (214) 381-7161

Continental Electronics

© 1983 Continental Electronics Mfg. Co./5452

Circle (48) on Reply Card

Radio and TV trends

By Dr. Robert S. Powers, Jr., chief scientist, FCC, Columbia, MD

Program services available to the public are mushrooming almost on a daily basis. Over-the-air broadcasting still provides the majority of home entertainment services, but numerous new competitors for that traditional market lurk on the horizon. If broadcasters are to keep significant shares of the audience, then new technologies must be swiftly employed.

Only a few years ago, people marveled at being able to hear the voices of performers through crystal sets. Families huddled around the radio to gallop through the West with the Lone Ranger. Soon radio gave way to black-and-white television as an important hub of home life. While radio broadcasters began to soothe their wounds by changing formats, TV broadcasters began delivering color pictures. And, thus, we evolved into the 1970s. The key point in this evolutionary process, until recently, is that over-the-air, terrestrial signals have dominated home entertainment centers—signals that all were supplied by broadcasters.

Alternate delivery sources

The situation now has changed dramatically and will continue to change. Others have begun providing entertainment services that arrive at the home through cable, magnetic tape, polymer video platters, terrestrial microwave and satellite. Most of these new services cost the consumer some nominal amount of money, but they increase the freedom to choose one's entertainment. Americans have always been willing to pay the price for greater freedom, and perhaps that movement even extends into choices of programming sources. Although broadcasters may never exactly duplicate some of the new services, clever application of technology certainly will keep broadcasters competitive in the marketplace.

There are two separate goals that must be attained for a broadcaster to be successful. First, and perhaps most important in terms of use of a natural resource (namely, the *radio spectrum*), a quality program must be delivered to the consumer's spigot. If that quality product is absent, the spigot will be turned off. Second, the broadcaster must be sufficiently solvent to keep the station on the air. The income need not necessarily come entirely from regular programming. Let me elaborate a bit more on that second point.

Using the spectrum

A few years ago, a movie called *Paint Your Wagon* was popular. In one scene, a fellow was asked if he were a doctor. His reply was that he was a horse doctor, but that "bones is bones." That type of thinking applies equally well to the radio spectrum. "Radio spectrum is radio spectrum." In other words, once the authority to radiate power in some portion of the spectrum has been obtained, the spectrum may have multiple uses. Those various uses may piggyback a primary service or may be totally separate at different times of the day. While others are diversifying their methods to provide entertainment, broadcasters should be developing *on-channel diversity* techniques.

A TV station license grants 6MHz of spectrum to its licensee. With the NTSC standards in place, the use of that 6MHz is limited. Assume, for a moment, that the NTSC standards did not exist from midnight until 6 a.m. During that time, one could use that 6MHz in any way that does not cause more co-channel or adjacent channel interference than a normal TV signal. The possibilities of how that spectrum could be used to supplement the income of the station and better serve the public are almost limitless.

Just as a few examples, TV stations could deliver the morning headlines or financial data to home printing terminals or magnetic recording media. Daytime viewers could request delivery of magazine articles, books or encyclopedic information while they slept at night. Certainly, digital information need not be all that this versatile 6MHz channel could supply at night. How about delivery of the top 40 songs out of *Billboard* magazine on a subscription basis? Any of these possibilities, and undoubtedly others, would force that spectrum to stay active in a real sense, and in an economic sense, more hours of the day. The broadcasting medium requires no wires or cables to every home to do its magic. So why turn off the transmitter at the end of the late show?

Even during regular programming, broadcast channels unquestionably can be made to work harder. High definition and enhanced NTSC television have the promise of adding a completely new dimension to the viewing experience. Multichannel sound combined with high definition television should compete favorably with movies in theaters for realism. Elimination of NTSC compatibility for subscription TV stations could lead to multiple-program transmission. Piggyback services such as teletext offer even more potential for greater audience size and increased revenues.

Radio also benefits

Most of what I have presented so far relates to the TV broadcast service, but I believe AM and FM broadcasters also have potentials not yet tapped. The action taken by the commission to expand the use of FM subcarriers should soon be "audible" in a variety of ways. Few other types of transmis-

Editor's note:
The views expressed in this article are the author's and do not necessarily reflect the views of the commission.

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-striping 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-striping capability	√							
Built-in audio mixer	√							
Built-in audio/video routing switcher	√	COMPARE THE IVES EDITING SYSTEM WITH THESE... YOU'LL FIND A LOT OF BLANK SQUARES AND A FEW ADD-ONS.						
Programmable audio/video fades	√							
Non-volatile memory	√							
Printer output	√							
"Mix and match" VTRs with smart interfaces	√							
Price	$6950							

Circle (49) on Reply Card

sion media can so easily and so efficiently serve to carry information to vast numbers of people. The pipeline is in place already; it needs only to be more effectively used. AM broadcasters now help in load management of power grids because of their unique ability to relay information efficiently over wide areas. Certainly, more and more work can be squeezed out of the 500W, 5000W or 50,000W that now do little more than provide the main-channel program. As another extra use, why not use the radio carriers to transmit traffic information to motorists? Some experiments in that area have been quite successful. I urge radio broadcasters to be creative and think of new ways to tap that resource available to them through their transmitters. Make on-channel diversity work.

Main-channel programming improvements also offer the broadcaster opportunities for greater audience satisfaction. In television, satellite distribution of network programming, all-digital studios, stereo sound, high definition pictures and perhaps even three-dimensional video and audio can and will keep clever broadcasters as major home entertainment sources.

The setting of industry standards in such areas as digital studios can make it easier to trade programs between various sources, even internationally, without regard to the particular format being used to ultimately transmit the entertainment. (The International Radio Consultative Committee, CCIR, has recently recommended such standards for international use.) Radio broadcasters have similar opportunities. Consider, for example, transmission of digital audio instead of analog audio to compete with improved recording and hard-copy distribution techniques. How about all-request automated radio where the listeners make the choices through their touchtone phones? The possibilities boggle the mind!

Work being done today to improve the behind-the-scenes aspects of television and radio also will help the industry survive. Single-camera production techniques and improved videotape editing promise to make electronic recording more economical and effective than traditional cinema film techniques. Continued development of digital television and audio may allow entire programs to be preserved on floppy discs. Electronic techniques can help minimize production time and maximize finished product quality. But these advances will require a heavy dedication on the part of the industry to be first and best.

Channel diversity

The key to the future rests with greater on-channel diversity. The commission has moved, and will continue to move, in a direction that will allow more on-channel diversity and more options to broadcasters. We want to remove those throttling regulations that unnecessarily limit free choice in how the broadcast spectrum is used. It must never be forgotten that the broadcaster's first responsibility is to provide service to the public, but government regulations need not limit the extent of that service. In fact, government regulations should *encourage* development of newer and better services.

One major step taken during the last year to review excessive government regulations was the issuance of Docket 83-114. In that Notice of Inquiry, the basic question asked was whether there need be any on-channel technical regulations except for co-channel, interference-related parameters. The commission certainly must be concerned with interference potentials of new technologies, but beyond

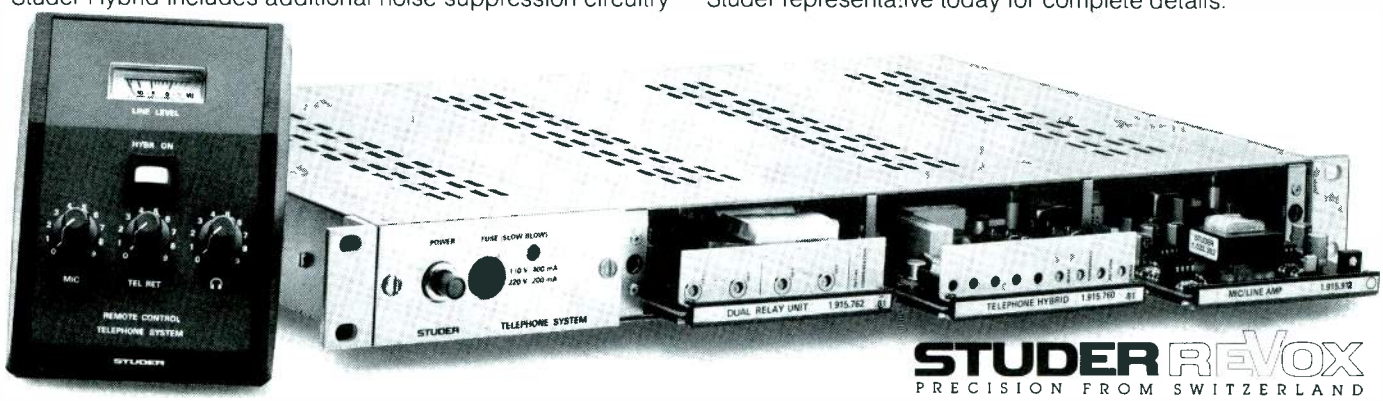
The Standard-Setting Telephone Interface (Modestly Improved)

It's no secret. Studer has become the acknowledged leader in high quality telephone interfacing equipment. The Studer Telephone Hybrid – already selected by hundreds of U.S. broadcasters, including all three major networks – has been praised for its straightforward design, long-term reliability, and consistently outstanding performance.

At the heart of the Studer Telephone Hybrid is an auto-balancing hybrid circuit which automatically matches phone line impedance while isolating send and receive signals for maximum sidetone attenuation. A built-in limiter prevents sudden overloads, and bandpass filters shape the voice signals for optimum clarity and system protection. The new updated Studer Hybrid includes additional noise suppression circuitry to eliminate unwanted noise and crosstalk while still preserving true 2-way hybrid operation.

Now the Studer Telephone Hybrid is also available as part of a complete Telephone System. Designed to operate independent of the studio console, the self-contained Telephone System includes a microphone input plus a palm-sized remote module (on a 30' cable) with VU meter for line level, headphone output, and level controls for microphone, headphone, and telephone receive.

The time-tested Studer interfaces. Improved for even better performance. Expanded for more flexible operation. And built to set the quality standard for years to come. Call your Studer representative today for complete details.



STUDER REVOX
PRECISION FROM SWITZERLAND

1425 Elm Hill Pike, Nashville, TN 37210 (615) 254-5651 • Los Angeles (213) 780-4234 • New York (212) 255-4462 • Dallas (214) 760-8647

Circle (50) on Reply Card

Quality Reliability Performance

"Exceeds all my expectations. Great performance and range. Unexpected power and performance." That's three experienced broadcasters talking about the new Andrew TRASAR™ UHF-TV transmitting antennas recently installed at their stations.

Here are some important features that convinced them to buy TRASAR™: • Unique traveling-wave slotted array design • Excellent null fill • Up to 2.5° beam tilt without loss in gain • High power rating with reserve capability • Very low VSWR • Fiberglass radome for protection from the elements • And there's more! Obtain complete information in Bulletin 1083 or contact your Andrew Sales Engineer.

ANDREW

ANDREW CORPORATION
10500 West 153rd Street
Orland Park, IL 60462
Telephone (312) 349-3300

Plants and representatives throughout the world.

Chester Smith
Owner, Manager
KLOC, Modesto, CA

Wayne Smith
Chief Engineer
Channel 66, Chicago

Robert Porter
Director of Engineering
Spanish Int'l. Network

Circle (51) on Reply Card

that concern, perhaps the commission should let individual licensees set transmission standards that best suit their divergent needs.

Some have criticized the commission for, as one broadcaster put it, "abdicating its responsibilities for setting standards." However, one should differentiate between the question of *standards* and *regulations* that have the force of law. Most industries in the United States meet the need for standards with *voluntary* standards rather than *mandatory* regulations. The commission has taken a posture of encouraging new ideas to emerge in industry with a minimum of bureaucratic regulation. Because government regulations often are oppressively slow in matching advances in the industries, the permissive type of regulations now being formulated by the commission should stand for years to come without impeding needed new services. If this style of regulation had been adopted years ago, teletext and multichannel sound could have been on the air much earlier, with no FCC action needed.

FCC staff members can help with industry committees to aid in the formulation of standards, but once standards are formed, they should remain in the private sector. There the standards can be flexible and can mature concurrently with advances in technology. That just cannot happen once a standard takes residence in a government rulebook.

Two committees have recently been chartered to look at emerging technologies. The FCC is sponsoring an advisory committee on technical standards for direct broadcast satellites. The NAB has initiated an Advanced TV Systems Committee to study new TV technology. These committees, and others, will help new technologies become realities, hopefully without excessive government rulemakings. On-channel diversity will happen only in a free environment that lets new ideas take root and grow vigorously.

Remember that if broadcasters do not lead the way in developing industry standards, such standards will be developed by others. That could be troublesome to the broadcasting industry, because several of its competitors are basically unrestrained by bandwidth restrictions. One does not have to ponder too long to begin to realize what effect an HDTV standard that cannot be broadcast would have on the broadcast industry.

The broadcast industry should not feel threatened by non-broadcast competition; the broadcaster can compete. If a common carrier broadcasts a subscription service, then the broadcaster is challenged to deliver a *better* program on his channel—a better program that the audience receives free. Further, broadcasters can offer paging on broadcast subcarriers and control of traffic lights with subaudible signals, among other things. If the broadcaster does not stay ahead of the game, the marketplace will choose one of his competitors.

Engineers and technicians have a challenge to develop and implement the new technologies. Also, they have an obligation to keep broadcast management aware of what is available today to enhance the on-air product. The responsibilities of the technical personnel go beyond keeping the transmitter on the air. Every aspect of broadcasting from production to sales rests squarely on the engineers to provide the best conduit possible between the performers and the viewers or listeners.

Deregulation by the FCC should be viewed by the broadcasting industry

Continued on page 68

7200 COMMUNICATOR

Certainly our 7200 Communicator produces high-resolution, proportionally spaced characters from a multitude of undistorted standard and special fonts. Instant italics, font intermix, animated graphics, and auto sequence are also included. These are all features you would expect to find in any Broadcast-class Graphic Generator.

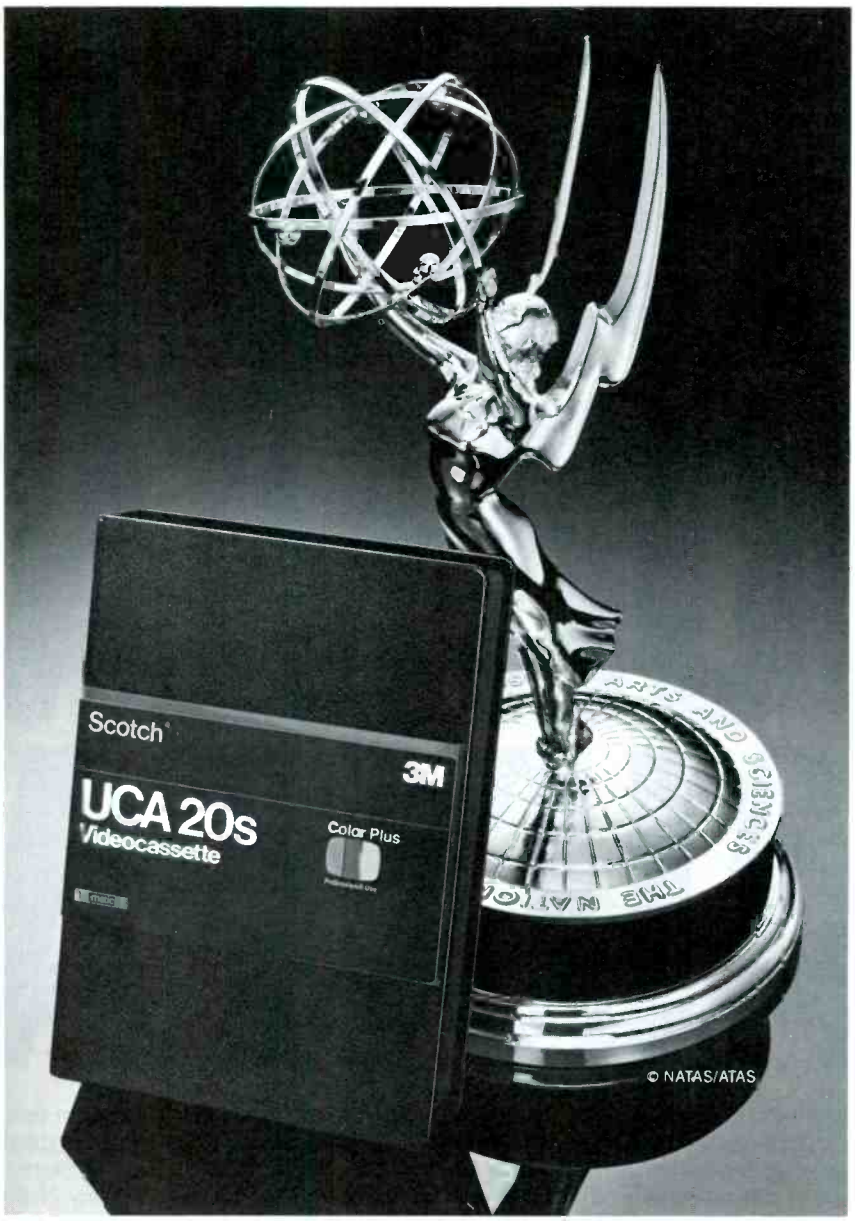
What wouldn't you expect? How about a choice of 32,768 background and character colors, a 100-line resident text memory, four 128-character resident fonts. How about a full-screen status/preview display and a basic PROM alternative to RAM/disk memories.

What you will come to appreciate the most, however, is that our imagineering has made the operation and maintenance of the 7200 simplisticated.

LAIRD TELEMEDIA INC.®
2424 SOUTH 2570 WEST · 801 972-5900
SALT LAKE CITY, UTAH 84119

Circle (52) on Reply Card

WE GAVE THE WORLD VIDEOTAPE. NOW THE WORLD HAS GIVEN US AN EMMY.



In 1956, we pioneered the development of videotape.
In the years since, we've refined, redesigned, perfected it.
This year, for our performance over all those years, Scotch® videotape has been given an Emmy. It is an award unprecedented in the history of the industry. It is gratefully accepted.

THE WORLD WATCHES SCOTCH®
VIDEOCASSETTES

"Scotch" is a registered trademark of 3M. © 1983 3M Co.
The Emmy is presented by the National Academy of Television Arts and Sciences.

3M

HOW TO AVOID A FORMAT FAUX PAS.

There has been mounting confusion over which combination camera/recorder format to choose. And for obvious reasons. With the addition of so many new formats, nobody wants to make a mistake that can range from thousands to millions of dollars.

But if you follow these simple steps, you'll never get caught with your wallet, or your neck, in the proverbial wringer.

LOOK FOR EVOLUTION. NOT REVOLUTION.

Apparently, many manufacturers feel it's in their best interest to have you replace your existing U-matic™ equipment with their new stand-alone systems.

At Sony, we think it's foolhardy to leave you no option but to make a 180° turn and orphan your existing editing suite. So we designed Betacam™ as an evolutionary system. One that easily and efficiently plugs into what's come before.

This Sony theory of peaceful coexistence allows you to enter the world of one-piece camera/recorders at your own pace. And in this way you not only protect your existing U-matic investment. You gain field equipment that's more compact and portable, and a dramatic improvement in technical performance. Furthermore, dramatic improvements are also on the horizon for Sony U-matic. The evolution of both these formats is planned and it's total.

FIND A ½" SYSTEM THAT'S WHOLE.

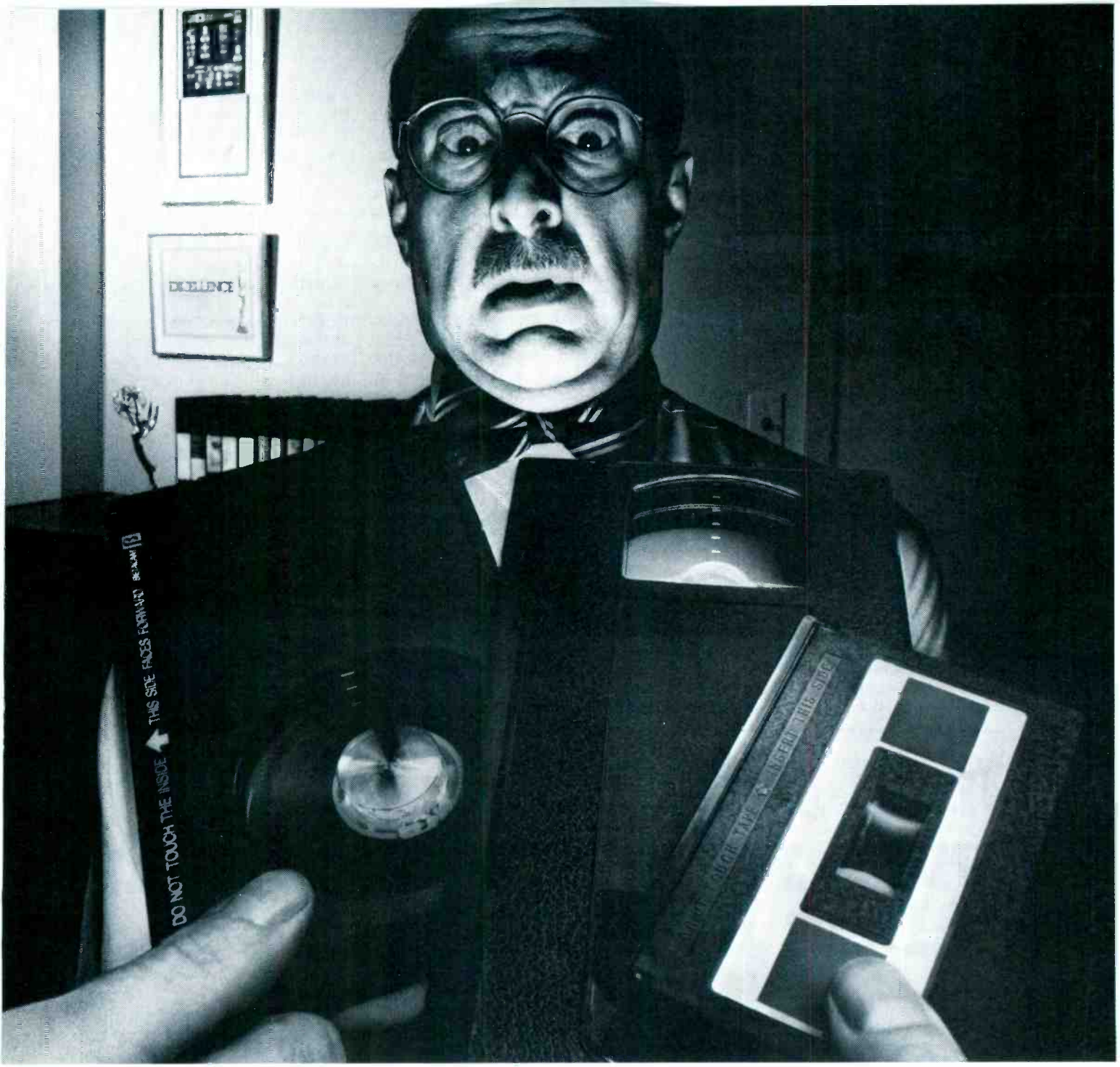
For those of you who want to capitalize on the outstanding technical performance of an overall ½" system, scrutinize carefully the complete system from Sony.

After all, who else has a portable color field player like our BVW 20? Or our ½" edit-recorder, the BVW 40, which looks and feels like the Sony U-matic equipment you're accustomed to using? And who else promises an ongoing commitment to ½" system expansion and refinements that you will see next year and every other year?

BE PENNY-WISE
WITHOUT BEING POUND-FOOLISH.

The Sony Betacam system has proven itself on both the

© 1983 Sony Corp. of America. Sony is a registered trademark and Betacam and U-matic are trademarks of the Sony Corp.



firing line in Nicaragua and the fifty-yard line at the Super Bowl.

That's because our format was chosen to be optimum for both ENG and EFP, which is why Betacam is not just the lightest, smallest, most compact ½" system you can buy (as well as the least expensive), but its picture quality rivals 1".

Whatever you've been told you might gain from the various ¼" formats, when and if they become available, will be totally erased by the fact that ¼" is not at all suitable for high-quality EFP. Which means, if you purchase ¼" for ENG, you'll no doubt have to purchase an entire new system for field production.

THERE'S SAFETY IN NUMBERS.

With over 1,000 Betacams already sold to key end users, Betacam is virtually the worldwide de facto standard now.

We believe Betacam is outselling all the others by such a wide margin because it's better than all the others by such a wide margin. It's the only camera/recorder that focuses on the big picture. A picture that includes your existing investment; your need for both ENG and EFP; your desire for light weight and high quality; and a total system approach.

If you want to make sure you'll own the standard of excellence in the years ahead, insist on the camera/recorder from the people who created the standard of excellence in the years past.

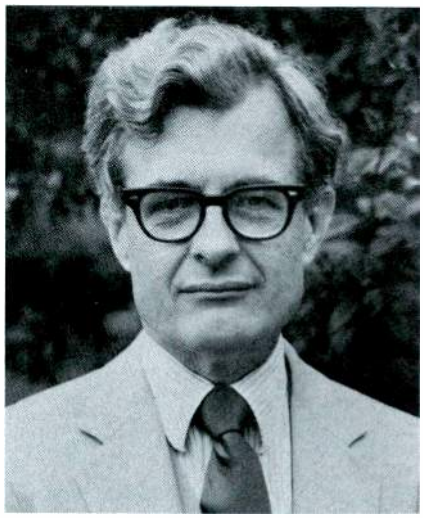
For a demonstration, in New York or New Jersey call (201) 833-5350; in the Northeast/Mid-Atlantic (201) 833-5375; in the Midwest (312) 773-6045; in the Southeast (404) 451-7671; in the Southwest (214) 659-3600; and in the West (213) 841-8711.

SONY.
Broadcast

Continued from page 64

as an opportunity to expand and prosper. The broadcasters must take advantage of the opportunity now being offered to expand their services beyond even what the imagination can envision today. I believe broadcasting is now at the threshold of a fabulous new frontier. This is a time not to rest on past accomplishments, but to forge ahead with dogged determination. Broadcasters have the experience, talent and capability to remain healthy and competitive in a market that could grow dramatically. The FCC will do its part to keep out of the way; will the broadcasters do their part?

On-channel diversity can work!



Powers

About the author:

Robert S. Powers, Jr., *with the FCC since 1975, has been its chief scientist since June 1983. From October 1982 to that time, he was acting chief scientist. Powers was deputy chief scientist from June 1982-October 1982.*

He was acting deputy chief scientist from September 1981-June 1982. From September 1980-September 1981, he was acting chief of the Research & Analysis Division. From February 1980-September 1980, Powers was acting deputy chief of the Research & Analysis Division. From September 1975-September 1980, he was a general physical scientist.

From June 1970-September 1975, he was a special assistant for Urban Telecommunications for the US Department of Commerce Office of Telecommunications.

From October 1960-June 1970, Powers held positions as a chemist (physical), chemist and physical scientist for the National Bureau of Standards.

Powers is a member of the Institute of Electrical and Electronics Engineers, American Physical Society and the American Association for the Advancement of Science. He was an editor of IEEE Transactions on Cable TV *from 1979-1980. He was a member of the 1979 IEEE delegation to the annual meeting of the Popov Society in Moscow, as part of the US/USSR Cultural and Technical Exchange Program.*

Powers received a BS in chemistry and mathematics from Southern Methodist University in 1955, and a Ph.D. in physical chemistry from the University of Wisconsin in 1960. In 1960-1961, he received an NBS-NRC Post-Doctoral Fellowship. In 1973, he received an Outstanding Performance Rating from the US Department of Commerce. In 1980, he received a Group Special Achievement Award from the FCC.

He has authored numerous articles and papers.

Until now, no component video system on Earth has been complete.

Shintron 390. The world's first and only component video switcher and editor-interface.

Now your M-format, BetaCam, or QuarterCam tapes can receive the full range of editing, effects, and other post-production techniques used on standard NTSC materials. Never possible before, because there was no such thing as the Shintron 390.

The Shintron 390 is the first switcher that can handle the three separate video component channels simultaneously; for M-format (Y, I, and Q), BetaCam (Y, R-Y, and B-Y), and for general purpose (R,G,B). It can be driven by time code, and its special Convergence port along with a standard RS-422 port permit direct interface with most professional editors. And, its two independent microprocessors make it smart enough to perform a wide variety of intelligent, programmable functions.

The Shintron 390 is the missing link. Without it, no component video system is complete. Call now for more information.

Shintron 390 lets you mix, wipe, key, edit, and post-produce component video tapes with the same flexibility of NTSC systems.

SHINTRON

SHINTRON Company, Inc.: 144 Rogers Street, Cambridge, MA 02142/Tel: (617) 491-8700/Telex: 921497
Shintron Europe: 198 Avenue Brugmann, 1180 Brussels, Belgium/Tel: 02-347-2629/Telex: 61202

Circle (53) on Reply Card

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 (54) on Reply Card

Case study: Taft looks to the future

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

The people at Taft Broadcasting Company are so encouraged about broadcasting's future that they are not content to wait for it to unfold. They are rushing forward to greet it and are encouraging its progress. To understand why Taft has become a pacesetter in the world of television and radio, one must first learn a little bit about the company.

Taft is composed of three operating groups, for which fiscal 1983 revenues exceeded $380 million. Listed on the New York Stock Exchange, it is a multifaceted company involved in three seemingly diverse businesses: broadcasting (radio, television and cable), amusement parks, and entertainment production and distribution. Actually, they fit together well.

Largest of the Taft groups is Taft Broadcast, which owns and operates seven TV stations (five VHF and two UHF), five AM stations and six FM radio stations. Also, through its partnership with Telecommunications Inc., Taft owns CATV systems in 49 communities in Michigan and New England; they have a total of 150,000 subscribers. Moreover, Taft has an equity investment in *Black Entertainment Television*, a growing cable network delivering black-oriented programming. Also, purely as a programming venture for WTAF-TV, its independent station in Philadelphia, Taft owns 47.5% of the Philadelphia Phillies. The Broadcast Group, as well as the entire company, has a 15% annual growth rate goal.

Next largest is the Attractions Group, which is the world's second largest seasonal theme park operator. These parks include the Old Coney Complex and Kings Island in Cincinnati, Canada Wonderland in Toronto, Carowinds in Charlotte, NC, and Kings Dominion in Richmond, VA.

And finally, the Entertainment Group displays potential as it expands to produce and/or distribute more programming to an insatiable marketplace. Included are animation kingpins Hanna-Barbera and Ruby Spears (*Smurfs, Scooby-Doo, Richie Rich, etc.);* live-action producers Q-M Productions (*Barnaby Jones, Streets of San Francisco*) and Worldvision Enterprises, distributor of such TV programs as *Little House on the Prairie* and *Love Boat* on a worldwide basis.

History of firsts

Because the people of Taft are more concerned with long-range profits than yearly bottom-line tallies, they are not afraid to invest in new ventures. They have a history of firsts that portends their future. Taft stations were among the first local stations in the country to change over to 1-inch tape, to install downlinks and uplinks at their various facilities, to broadcast teletext, to set up a satellite com-

Continued on page 74

Artist's rendering of the new Taft station, WCIX, in Miami.

ELEVEN THOUSAND DOLLARS TURNS A 103 INTO A 104

Upgradeability has been the promise of the 100 Series controllers ever since they were introduced in 1978. You took us at our word, buying over 2500 systems — more than any other editing manufacturer. Now our word is as good as gold. For $11,000 we will take back any functioning 103 (also 101 or 102) no matter how old, and give you a brand new 104. This extraordinary offer gives you the chance to have 800 lines of edit memory, Smart-Start synchronization, Comments and Advanced List Management at prices 40-50% below normal. Add it up, then call your local Convergence dealer or sales office. Offer ends January 1, 1984.

CONVERGENCE CORPORATION

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 Blvd., West, Los Angeles, CA 90068, (213) 506-POST

Your best editing investment just paid off again

Circle (55) on Reply Card

In the past ten years,
computers have gotten smarter,
cameras have gotten simpler,
ovens have gotten quicker,
beer has gotten lighter,
bodies have gotten leaner,
athletes have gotten richer,
hi-fi has gotten higher,
radio has gotten stronger,
studios have gotten smaller,
towers have gotten taller,
movies have gotten longer,
cars have gotten shorter,
film has gotten faster,
outerspace has gotten closer
and blue jeans have gotten classier.

Now it's our turn.

In the past 10 years, the Premium Line from ITC has seen refinements, but no major changes. Frankly, it hasn't needed any. The Premium Line has been a dependable workhorse that's found its way into more studios than its next two competitors combined.

But we couldn't leave well enough alone. So this year, the Premium Line gives way to the Delta Series, a new generation of cartridge machines that offers you more than ten years worth of improvements.

It's mechanically better. The cart guides are improved. There's a crystal-referenced servo capstan motor with a vapor-honed non-magnetic shaft. Modular construction makes alignment and service convenient. High-speed recue is standard. And the Delta III gives you three independently removable decks.

It's electronically better. There are new, high performance components, including NE5500 Series amplifiers. There's an exclusive ITC/3M playback head for smooth frequency response and improved signal-to-noise. We've added a toroidal power transformer with fully regulated and protected power supplies. And a digital cue tone detector controlled by a powerful microprocessor.

And it's physically better because it's smaller. The whole unit is only one-third rack width (5⅝"). The enclosure is made of ¼-inch milled or cast aluminum, for stability. And the panel inserts are made of Lexan®.

Of course, we left in all the good things that made the Premium Line so popular. The ½-inch tool plate aluminum deck. Durable, high quality switches. And a solenoid-actuated, chain-and-sprocket pressure roller assembly. All backed by our famous two-year warranty on parts and factory labor, plus a 30-day guarantee of satisfaction. If, for any reason, you're not completely satisfied, you can return the unit within 30 days of purchase and we'll refund your money in full.

The good things are still there. But what you'll notice are the improvements. We think they were worth the wait.

For more information, or to place an order, call us collect from Alaska, Hawaii or Illinois, at 1-309-828-1381. From the rest of the U.S., call the following. Toll-free number:

1-800-447-0414.

1983

1973

3M hears you...

3M

Circle (56) on Reply Card

Continued from page 70

munication network for themselves (and for sale) and to use computers for animation. Taft also was among the first to produce, along with its partners, such specialized programming as *Entertainment Tonight*, *Star Search* and *Black Entertainment Television*.

Top management sees many options and challenges as it looks to the future. "The most exciting challenge the future offers is the opportunity to take a new piece of technical equipment, evaluate it and find a way to use it so that it becomes income-producing," John Owen, vice president of TV engineering, said. Owen, former chief engineer of Taft's Columbus, OH, station does not hesitate when making decisions about the future because he does his homework before taking a plunge. The major decisions involving new technology are not made by one person, but actually are made by a group of four vice presidents, covering four areas: engineering, radio engineering, data processing and business development.

Teletext

More than a year ago, Taft began broadcasting *Electra*, a video magazine format using the World System British teletext standard. Taft's Cincinnati station, WKRC, broadcasts the 100-page magazine in the vertical blanking interval. The entire investment was approximately $250,000. Now the company is showing other stations how to launch their own teletext system for less than $30,000.

Zenith has been manufacturing and distributing TV set-top decoders for the Taft teletext system since April. In July, the decoders went on sale in the Cincinnati area. To receive the service, a customer must purchase one of these decoders (approximately $300) and must use it with a Zenith TV manufactured within the past two years. Despite these conditions, Owen said he thinks the future is bright for Taft's version of teletext, which is the first commercially operating over-the-air system in the United States available to subscribers. It is based on the only system in use around the world.

WKRC-AM, WKRC-TV and WKRQ in Cincinnati.

Harris 50kW transmitters at WKRC.

Teletext generating area at WKRC for Taft's *Electra* video magazine.

When asked why Taft chose a different system than the one with which CBS Engineering is experimenting, Owen said that the Taft and CBS Engineering evaluations were done simultaneously and independently. Taft's selection of the British system was based purely on what it considered best for over-the-air broadcasters, as opposed to cable operators. Also, the system gave the company the capability for acting now.

"The networks are not as concerned about today," he said. "Also, they look at a different base—one of 200-300 affiliates and what is best for the group. We have seven stations and our needs are different. The performance of our teletext system over the last six months proves we are right."

Technically and operationally, Taft teletext is doing well. *Electra's* advertising sales increase each month. If purchases of decoders also continue to increase, Taft eventually will generate teletext from its other stations. The main cloud on the horizon is the consumer's reluctance to invest in specialized equipment while there is talk of another teletext standard. But Owen said he thinks Taft will prevail because, "Ours is performing and the CBS system is still a dream."

Combined camera/VTR: ½-inch and ¼-inch

Taft is looking at all the new ENG combined camera/VTR systems currently available. The company is field testing and evaluating a BetaCam system at WCIX in Miami for ENG use. Hanna-Barbera has been using the

Video routing and pulse distributing at WKRC.

WKRC's master control.

Spectrum Analyzer
& Tracking Generator

AL-51C SPECTRUM ANALYZER

Frequency range from 1-1,000 MHz

60 dB on-screen dynamic range

Selectable resolution settings (500 Hz, 10 KHz, 200 KHz)

Stepped rotary attenuators, 1 and 10dB

Switchable LIN/LOG Display

Internal battery power

Phase lock for added stability

Built-in markers (1 MHz, 10 MHz, 50 MHz)

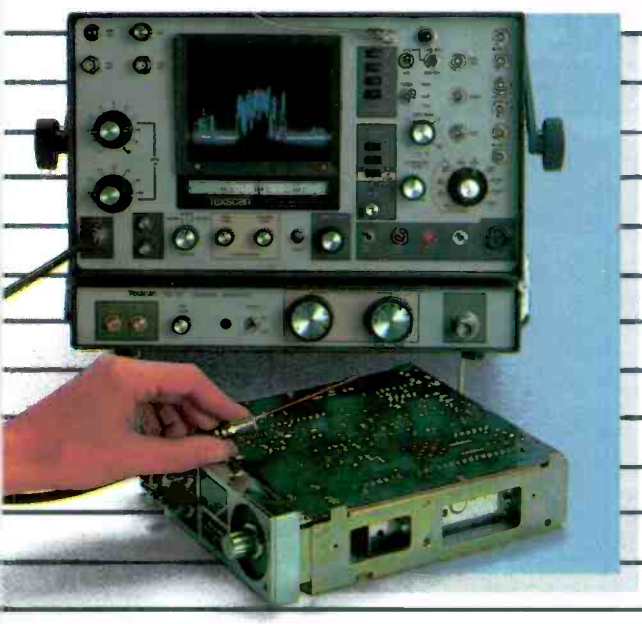
Optional digital storage with freeze and store modes

Optional AM/FM audio recovery with squelch and built-in speaker

COMPATIBLE TG-51 TRACKING GENERATOR

Swept response measurements from 1-1,000 MHz

60 dB swept dynamic range



OTHER TEXSCAN PRODUCTS

SWEEP SYSTEMS

RF MILLIVOLTMETERS

SYNTHESIZED SIGNAL GENERATORS

BROADBAND RF AMPLIFIERS

ROTARY ATTENUATORS

VSWR BRIDGES AND ACCESSORIES

TUNABLE FILTERS

DETECTORS

FIXED PADS

SPECTRUM ANALYZERS

SWEEP GENERATORS

YOUR KIND OF WORK DEMANDS OUR KIND OF QUALITY

Texscan

Texscan Instruments • 2446 North Shadeland Avenue • Indianapolis, Indiana 46219 • (317) 357-8781
Texscan Instruments, Ltd. • One Northbridge Road • Berkhamsted, Hertfordshire, UK • PH: 04427-71138
Texscan GMBH • Peschelanger 11 • D8000 Munchen 83, W. Germany • PH: 089/6701048

Circle (57) on Reply Card

Panasonic RECAM system for production of kids' shows now airing on the networks.

One of the two QuarterCam systems (¼-inch camera/VTR) brought into this country for SMPTE-'83 is going to Taft for evaluation. (The other goes to a network.) Taft will be the first non-network operation to evaluate the combined ¼-inch camera/VTR.

By April 1984, Taft will select a format. Then it will pick one of its stations and, when the equipment is available, it will totally convert that station to the new format and redistribute its ¾-inch gear among the other Taft stations.

Owen said he thinks that just buying one system and putting it alongside ¾-inch would be pointless, because the new equipment would have no backup. Only by converting an entire station would the new technology be effective. And, if it did not prove superior to ¾-inch, Taft would not convert its other stations, but would let the one station remain in the new format. That way, no money would be wasted.

If the one station reinforces Taft's decision, the company will then convert up to six stations, installing 12-15 new systems per station. Owen foresees the total investment approaching $10 million.

Earth station at WKRC.

Taft uses new technology, such as the Lexicon time compressor, in the videotape room at WKRC.

John Owen, vice president of engineering for Taft, shown with some of his TV tube collection at Taft's home office in Cincinnati.

Satellite distribution

Taft has downlink and uplink capability at its stations in Washington, DC, Kansas City, MO, and Birmingham, AL. With its cable partner, Telecommunications Inc., Taft owns a transponder 12X on Westar V. In addition to distributing its own programming, the company has set up a sales

THE MOST FAMOUS PICTURE IN HISTORY WAS SHOT WITH AN ANGENIEUX TV LENS

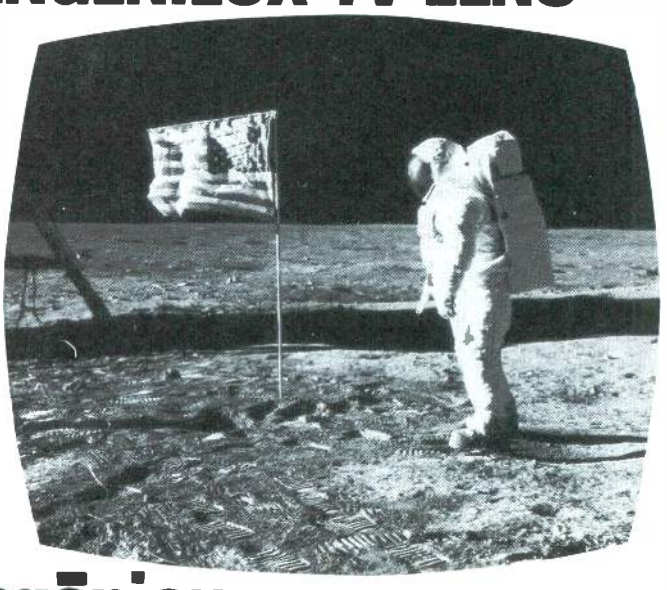
On July 20, 1969 over 600 million people watched as man first set foot on the moon. The lens which brought the excitement back to earth was an ANGENIEUX.

More recently, the most watched TV spectacular ever, "The Winds of War," was shot with an Angenieux lens.

Now you may ask, what makes Angenieux so special. Perhaps it's our reliability. We're dependable enough to have been selected by NASA for all its space to earth transmissions. We even give NASA a 50 mission guarantee on every Angenieux lens. Or maybe it's our innovation. After all, we pioneered the retro-focus lens and the world's first 10 to 1 zoom lens.

Or maybe it's our wide selection of lenses that broadcasters and production houses count on for top performance.

Before you buy your next broadcast lens, look at Angenieux. We'll make you famous, too.



angēnieux

FOR MORE INFORMATION ON OUR WIDE RANGE OF PRODUCTS CONTACT THE FOLLOWING ANGENIEUX BROADCAST SALES OFFICES

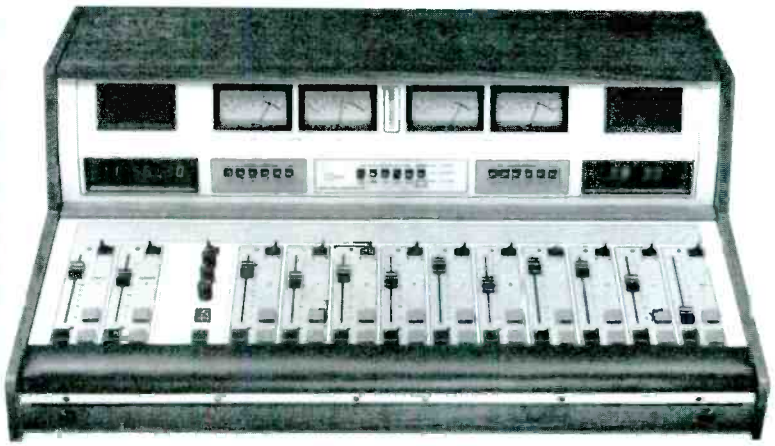
North/South Americas 12901 SW 74th St.
Miami, Florida 33183
Tel. (305) 386-1740
Telex. 80-8045 Intelac-Mia.

Canada 190 Don Park Road,
Markham, Ontario L3R-2V8
Tel. (416) 495-5454

Remainder of World Opticam S.A., Case Postale 91
1211 Geneva 17, Switzerland
Tel. (22) 362266
Telex. 27670-Opti-CH

Circle (58) on Reply Card

The Complete Sound Picture

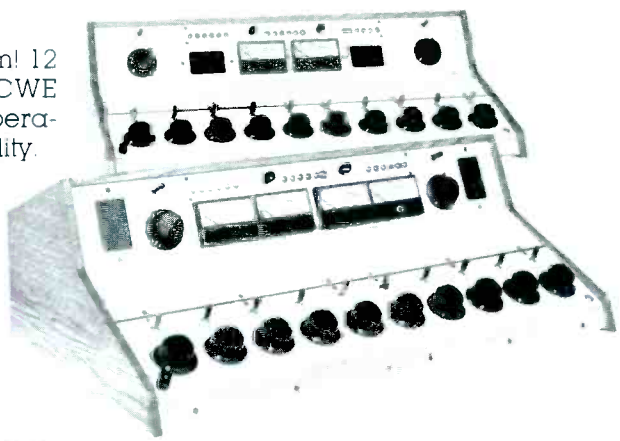


Howe . . . Simply Reliable Audio Products

7500 Stereo Console

The "Sound Solution"!

New this year and taking the market by storm! 12 channels, 22 inputs, using the quality of the HOWE AUDIO VCA Control. Digital logic for ease of operation. Undeniably the best value for sound quality.



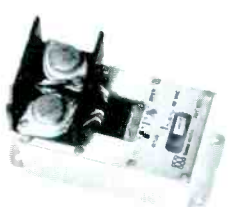
7000 Stereo Console

The simply reliable workhorse of the HOWE AUDIO family. The same VCA Control as the 7500 but configured with rotary faders. Ideal for the station that wants superb sound at a small cost.

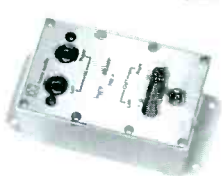
2100 Phase Chaser

The answer to phase errors common to stereo tape sources. This unit is an effective, low-cost solution that has been proven in many applications. Get your station in phase!

Accessories



30 watt Monitor Amp



Turntable Pre-amp

Telephone Coupler

ALL PRODUCTS CARRY THE HOWE AUDIO 3-YEAR WARRANTY!

howe audio productions, inc.
3085 A Bluff Street
Boulder, Colorado 80301
303/444-4693

For more information: 800/525-7520
Circle (59) on Reply Card

Taft headquarters in Cincinnati.

Production control at WBRC in Birmingham, AL.

Videotape area at WTVN, Columbus, OH.

division to sell its extra time. The Boston-based office of Taft Broadcasting, headed by Jack Morse, markets satellite transponder time, as well as uplink and/or downlink services. Average transponder time sells for about $500/hour.

Taft believes that in 3-5 years everything distributed in the United States, farther than 25 miles, will be sent *via* satellite. And, it will not be limited to TV programming, but will include radio, data, telephone, etc.

Taft does not have designs to compete with those making their living in the satellite business. It only wants to sell its excess time at what it thinks is a fair price.

Cellular radio

Taft is betting that in a few years people will carry their phones with them—in the car, to the office and on the beach. Those phones will be *cellular radio* phones. In September, the company announced that it had acquired a 22.5% interest in Midwest Mobilephone Corporation, an Indianapolis-based company developing cellular telephone services. Midwest owns one-third of the construction permit for the Indianapolis non-wireline cellular system, and is an applicant for cellular licenses in 11 other Midwestern cities. Through cellular, people will be able to make calls from anywhere-to-anywhere— cell-to-cell for short distance and satellite-to-cell for longer distance.

If this venture seems far afield for Taft Broadcasting, it is *not*. What better way to fully use its excess satellite time than by relaying cellular radio phone calls. Also, if it is related to communications, Taft is interested. Eventually cellular radio will tie in and Taft will find a place for the technology in its ever-enlarging mosaic.

Digital technology

Taft expects digital technology to be the overall area of greatest growth. Owen said, "Digital technology offers better and more effective techniques from pickup to transmission. Digital audio offers better quality and is repeatable. We've seen it in disc and tape format. The next to come will be digital recording with high performance and better repeatability—not on tape, but on hard disc. All of a station's programming will be stored on random-access hard disc. Computers will activate the various programs and commercials.

"The main technical problem to overcome is the disc storage capacity. And, digital transmission to the home

Boost transmitter efficiency with EIMAC TV tubes. VHF, UHF, MDS, ITFS.

EIMAC, a leader in communications tube design, introduces its new tubes for TV translators (transposers), low-power TV (LPTV), and TV transmitting service worldwide (VHF Bands I, II and III; UHF Bands IV and V).

In addition to concentrating on VHF and UHF applications, EIMAC has developed tubes specifically for Multipoint Distribution Systems (MDS) and Instructional TV Fixed Service (ITFS).

EIMAC tubes available cover power ranges from 100W to 1,000W peak sync/visual in the UHF range which can be used in combined aural and visual transmitting applications as well as separate diplexed transmitters. EIMAC tubes meet or exceed stringent IMD and gain requirements. Tubes used in MDS or ITFS service are capable of providing up to 50W peak sync/visual.

During the design phase, special attention was paid to efficient cooling and heater cathode operation for improved overall transmitter operation.

Varian EIMAC
1678 S. Pioneer Road
Salt Lake City, Utah 84104
Telephone: 801 • 972-5000, ext. 334

Varian AG
Steinhauserstrasse
CH-6300 Zug, Switzerland
Telephone: (042) 23 25 75
Telex: 78-841

varian

Circle (60) on Reply Card

is around the corner."

Owen said he does not think that the video equipment manufacturers are proceeding fast enough in the development of digital recording devices, nor are they looking in the proper direction. He is anxious for digital technology to arrive and to bring with it greater reliability, and thinks that digital recording is going to solve a lot of problems.

HDTV

For HDTV technology to be attractive to Taft, it needs to be compatible with current TV systems. Taft thinks that a system that will render obsolete 220 million TV sets will prove unacceptable to the general public.

Such reasoning is consistent with Taft's approach to teletext. The Taft system incorporates a low cost decoder that plugs into existing sets, whereas other systems call for a new receiver.

The proposed HDTV systems offer a superior picture, but are incompatible with current transmission, reception and demodulation equipment. New TV receivers, costing approximately $2000 each, would have to be purchased by viewers.

Uplink/downlink at WCIX.

Taft thinks that more research is needed to develop an NTSC-compatible HDTV system that could, perhaps, effect a compromise between true HDTV and the current US 525-line standard. The goal is to reach quality equal to that of a movie theater, but not at the cost of obsolescence asked for now.

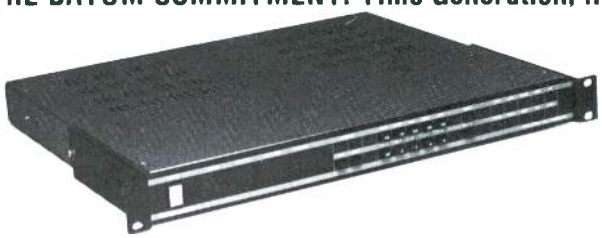
MDS and LPTV

Suffice to say that Taft has more than a passing interest in MDS (Multipoint Distribution Service). It has filed 74 applications in 74 cities.

In cases in which the applications are granted, Taft will install MDS systems and lease the facilities to programmers for distribution via 2GHz

Continued on page 84

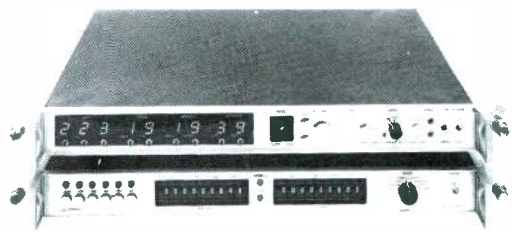
THE DATUM COMMITMENT: Time Generation, Reading, Recording, and Display for Video Applications



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



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

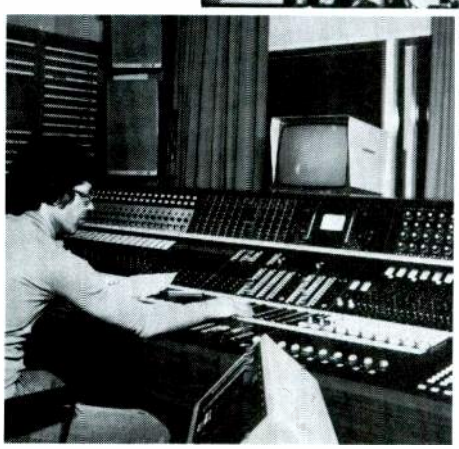
datum inc TIMING DIVISION
1363 State College Blvd., Anaheim, CA 92806
(714) 533-6333

TD109

Circle (61) on Reply Card

When you hear this orchestra live and in Hi-Fi,

ANT 8227E WAK



ANT is also in the play.

The highest quality the present-day technology can provide is required when transmitting high-grade orchestral performances. The numerous studio facilities, system components and completely furnished outside-broadcast vehicles delivered by our company fulfill these requirements.

We were right from the start active in the development of sound-broadcast and studio technology and made our technical contribution in these fields. Also today, sound-studio technology remains on of the most important areas of activity of our renamed company, whose equipment you knew until now under the label of TELEFUNKEN.

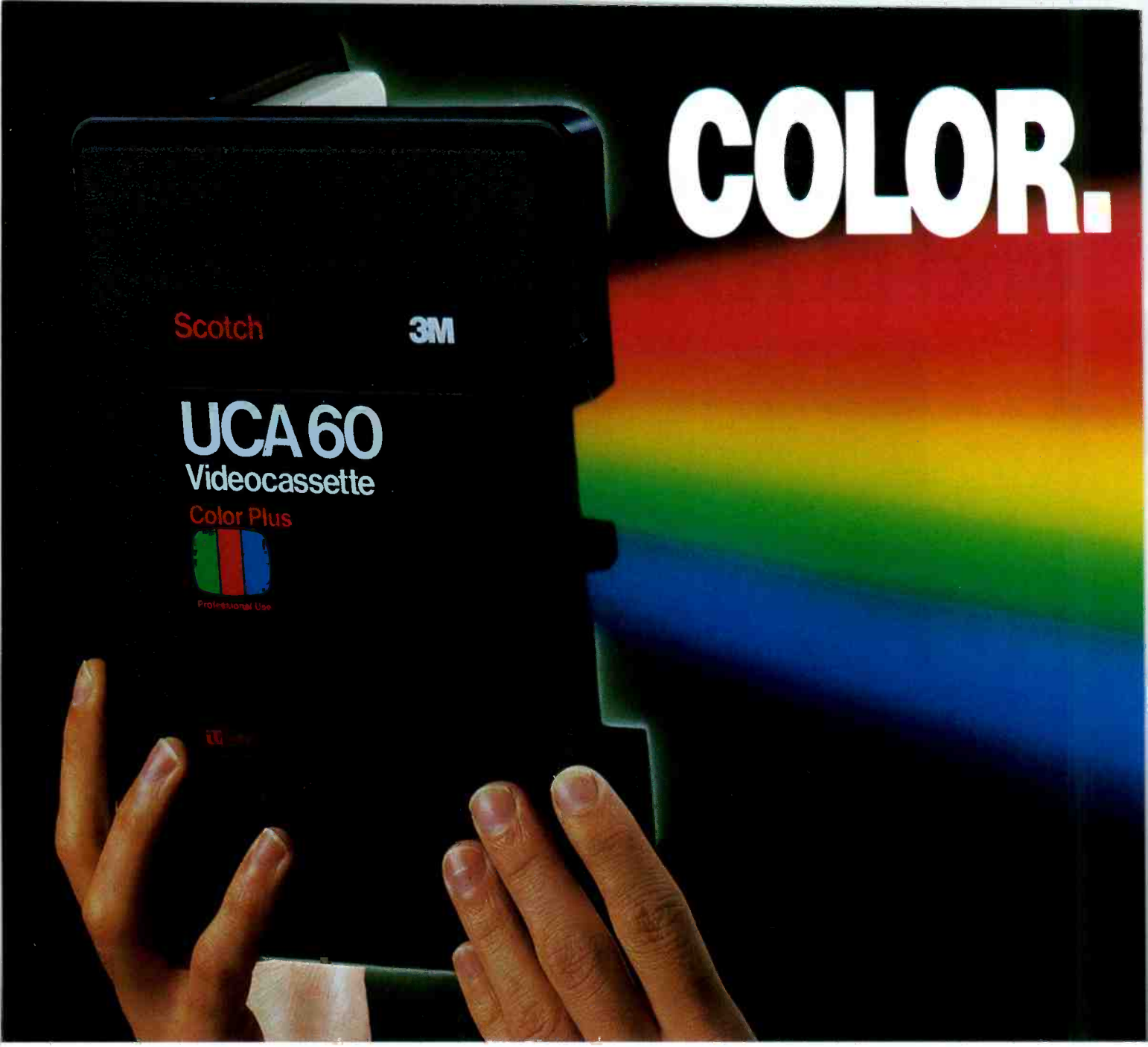
Other activity areas of ANT Nachrichtentechnik in Backnang, West Germany, are:
multiplex systems – radio-relay systems – telecommunication cable systems – communication satellites and earth stations – special communication systems.

Reasons enough to maintain the connection with us.

ANT Nachrichtentechnik
Gerberstrasse 33
D-7150 Backnang
Telephone (0 71 91) 13-1 · Telex 7 24 406-0

ANT
Nachrichtentechnik

Circle (62) on Reply Card



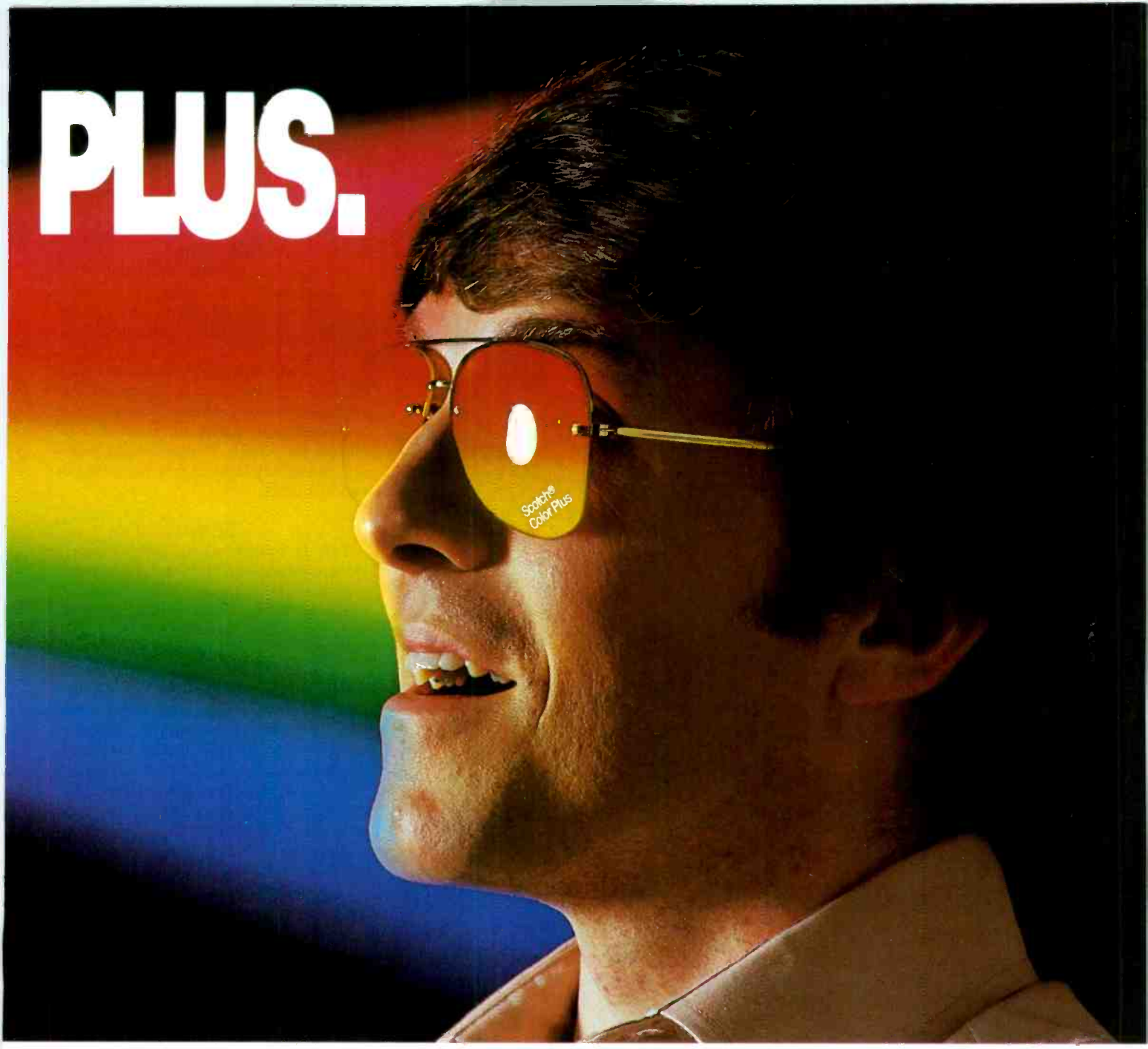
The difference between standard videocassettes and Scotch® Color Plus ¾" Videocassettes will be obvious to you right from the start.

Scotch Color Plus delivers exactly what its name implies. Bright, brilliant color for your ¾" mastering or editing needs.

Behind this dramatic color improvement is our unique Scotch Color Plus oxide that exceeds industry standards for color and video signal-to-noise. So you get a crisp, colorful picture, with significantly fewer dropouts.

But brilliant color is only part of the story. The special magnetic formulation

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



designed for the new generation of U-matic recorders reduces headwear to the lowest in the industry.

Most important of all, every Color Plus Videocassette is consistently made under the highest quality standards, which has made 3M the leading manufacturer of professional use video tape.

For more information about Color Plus ¾" Videocassettes, call 1-800-328-1684 (1-800-792-1072 in Minnesota). We'll send you details on the ¾" tape that lives up to its name.

Magnetic Audio/Video Product Division/3M.

SCOTCH COLOR PLUS 3/4" VIDEOCASSETTES.

3M hears you...

3M

Continued from page 80

microwave to pay subscribers.

Taft thinks that such ventures can be economically feasible and will afford a profitable way to narrowcast. For instance, in areas with large Spanish populations, such as Miami, MDS should be well-received. Another example is distribution to college students in a large educational area.

Low power television also offers many glittering possibilities to Taft because there are many individual segments in the general audience that LPTV can reach.

Satellite networking

In September, the company announced that it had acquired a 21.5% interest in Videostar Connections, an Atlanta-based company known for its point-to-multipoint video conferencing. The company has the capability for providing teleconferencing facilities at hotels, as well as designing and operating private satellite communication networks for corporations. Taft plans to have its transponder participate in the Videostar networking activity.

WTAF's studio.

Transmitter area at WCIX.

AM stereo

In the spring of 1983, Taft converted its Cincinnati and Buffalo, NY, radio stations to AM stereo. It anticipates the same at five other stations within the year.

Taft does not sit back considering the *chicken and the egg* argument. As with teletext, it realizes there are few receivers out there to receive AM stereo. But, it also realizes that people will never buy them if programming is not available.

SCAs

Taft is interested in using subcarriers available in TV and FM transmission for carrying other services, such as background music, paging, data and teletext.

TV stereo

When Taft began completely updating all its stations in 1978, it included TV stereo capability. The company's $25 million facilities and equipment renovation included building entirely new facilities. Taft started with Columbus, OH, and then renovated stations in the following order: Washington, DC, Philadelphia, Cincinnati and Birmingham, AL. Now that it has bought WCIX in Miami, it will soon break ground for an entirely new station facility there, too. And, by the end of 1983, the Kansas City, MO, station will be totally updated.

TV stereo will be offered by these stations, although initially there will be few listeners capable of hearing the programming in stereo.

Good testing grounds

Taft believes in using new technology—even if it means forcing its evolution. It participates in testing all types of new equipment and is sought out by manufacturers to field test new or improved items. For example, Taft was among the first to test the Ampex ADO, Weather Graphics, Ikegami HL-83 camera and HL-83 piggyback recorder. Not only does it put the equipment through a technical evaluation to verify parameters, but it actually field tests to determine reliability, performance, ease of operation and ease of training to operate.

Owen said that usually his people find that specifications match those stated by the manufacturer. Most suggestions offered concern human engineering about operational aspects.

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. **248** - a manufactured console with custom capabilities and an uncompromised heritage — **Quad-Eight** quality and experience!

quad/eight electronics

11929 Vose Street, North Hollywood, California 91605
Telephone: 213-764-1516 Telex: 662-446 QUADFATHER LSA

Circle (63) on Reply Card

The Beyer M 69 is designed for those who want studio quality in the field (and in the studio).

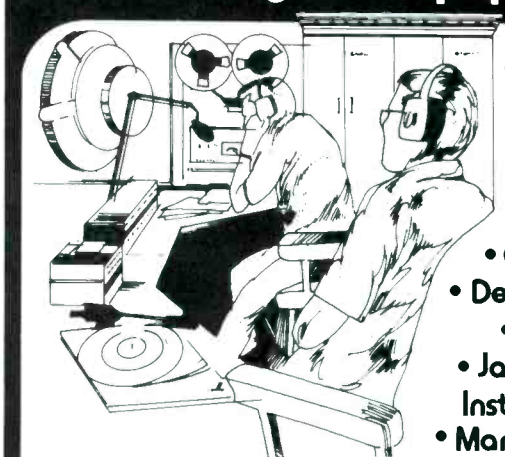
In this day and age, you shouldn't have to carry special microphones when you're leaving the studio to go out in the field. The Beyer M 69's wide hypercardioid pattern and high output give you the noise rejection you need with greater flexibility of mic placement in hand-held news-gathering situations. Highly versatile and rugged, the M 69 provides superior audio performance for any on-camera or mobile broadcast application as well as any video/film post-production job. The M 69 is also available with an optional Speech/Music switch.

The Dynamic Decision beyerdynamic

Beyer Dynamic, Inc., 5-05 Burns Avenue, Hicksville, New York 11801 (516) 935-8000

Circle (64) on Reply Card

THE SOURCE
For all your equipment needs



• AKG • Amperex • Ampex • Atlas • Audiopak • AudioTechnica • 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 (65) on Reply Card

Taft is always interested in what the networks have to say, because they are in a good position to evaluate. Owen thinks the networks have more money to buy equipment for evaluating, but they normally take longer than Taft to make decisions about entering new technology.

Although Taft buys equipment based on the requests from its individual stations, the home office exercises close control over purchases, because it is responsible for quality. For capital purchases, the company makes group buys whenever possible.

Future is bright

When asked what challenges the future holds, Owen described the excitement of beginning to construct the new facility for WCIX in Miami that will reflect the state-of-the-art for a local station. Starting with a vacant lot, Taft will built a completely new studio, erect a tower and install satellite facilities.

"This project allows us to ply our trade and build a highly effective station from the ground up," he said. "That's exciting. And, its only one-seventh of the total. The greatest challenge and the most excitement in the future will center around the group itself.

"The programming opportunities are growing because so many outlets are looking for programs. We have established a new department to develop program production—not just for our own stations, but for anyone who wants to buy. One thing we have found to be true is that if you have programming people want, they will do anything to view it. They will not only tune in; they will pay for it. Yes, programming is the key."

Taft is a growth-oriented company and its people, like Owen, think they have just begun. Obviously, Taft has discovered the formula, because it has yet to experience a year without growth.

Taft attributes this success to watching technology closely and trying to make the correct changes to stay competitive and to maintain its image. Most importantly, it strives to continually motivate personnel to make the most effective use of new technology.

Taft is one of the 10 largest group owners in the United States. Owen reflected the confidence of the entire corporation when he said, "I think we're the best. We're doing a lot of things right, and we're banking on the future."

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.

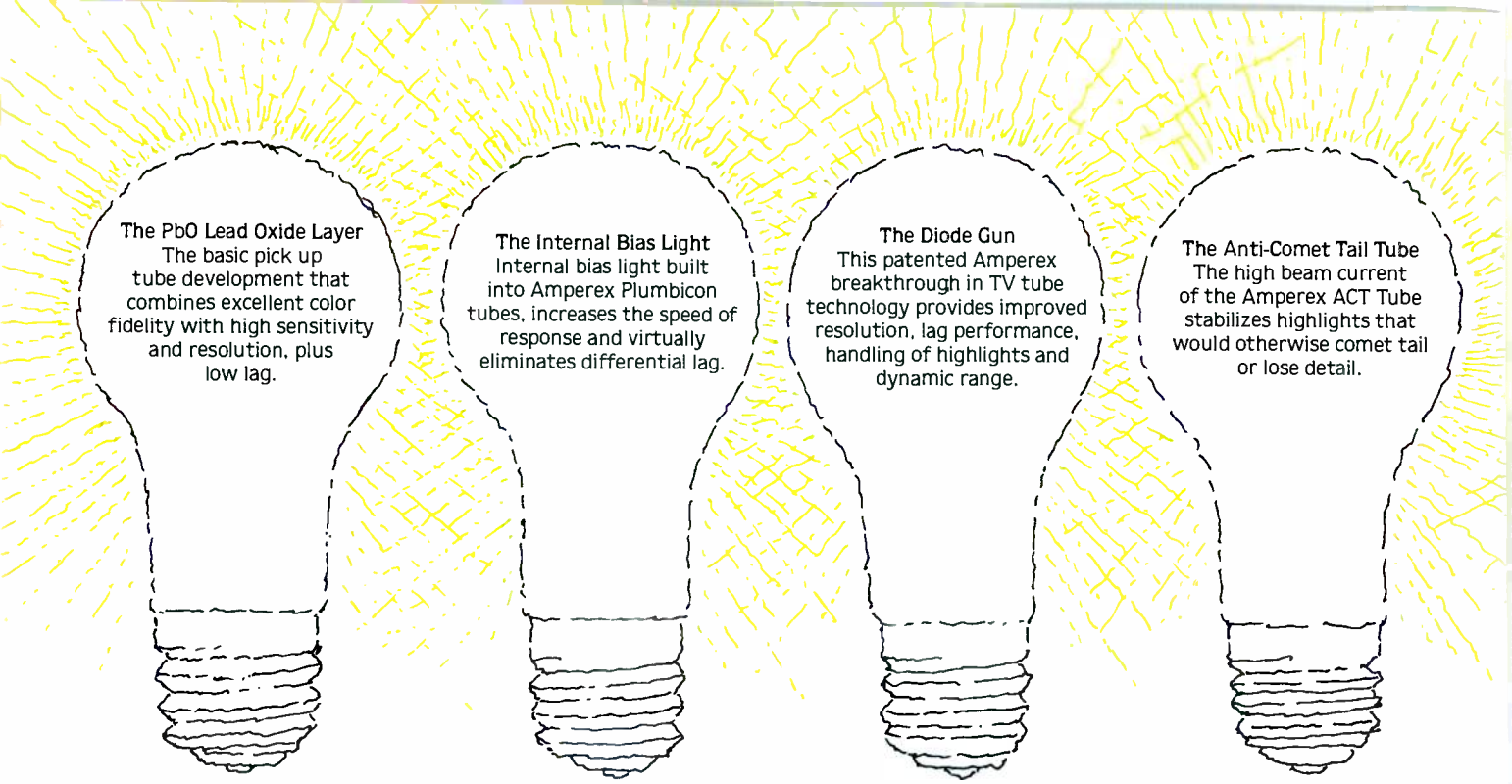
THE MARCONI LINE ARRAY TELECINE B3410

A.F.ASSOCIATES INC.

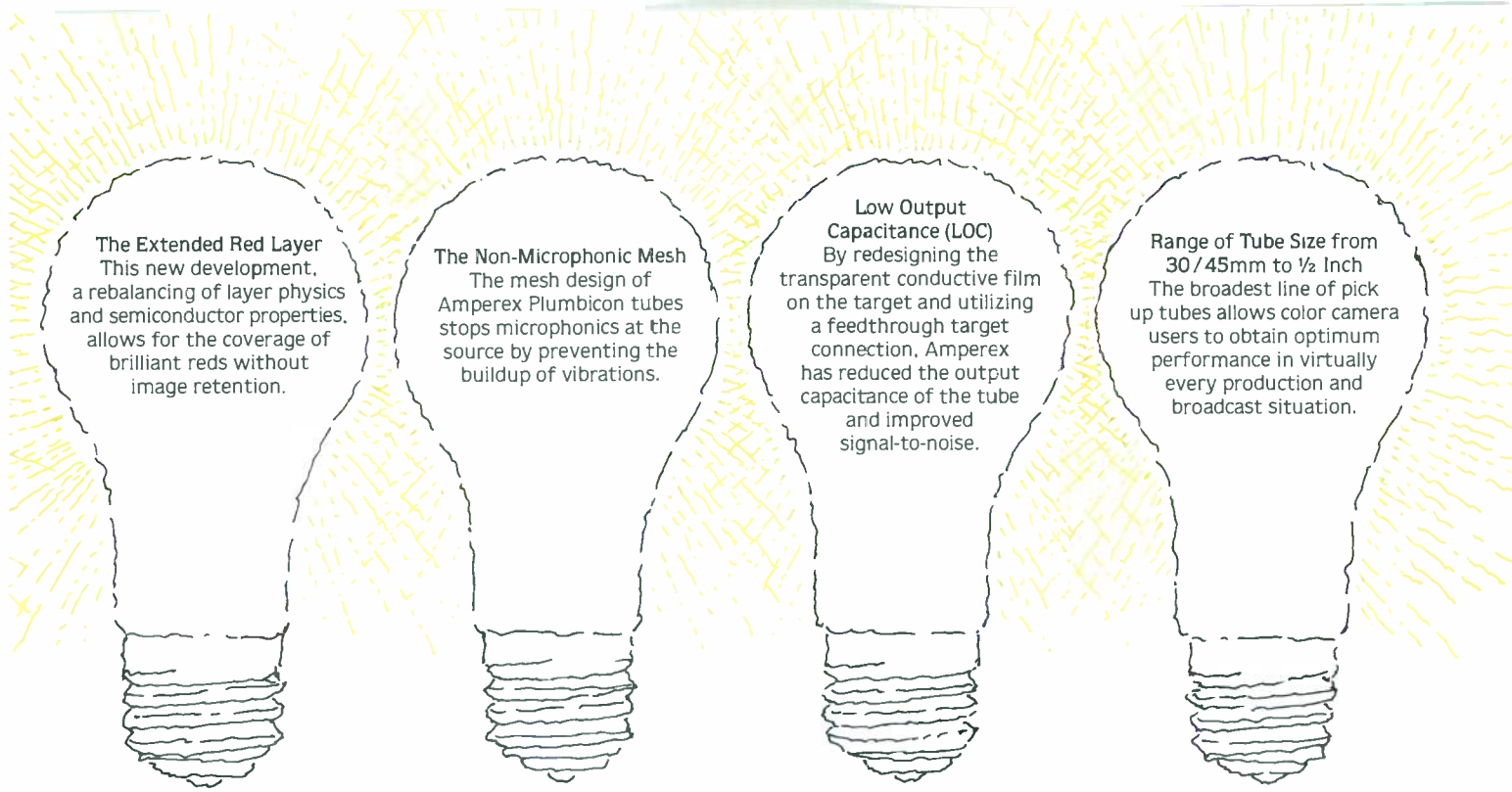
ADVANCED SYSTEMS AND PRODUCTS FOR THE VIDEO INDUSTRY

AFA PRODUCTS DIVISION/100 STONEHURST COURT, NORTHVALE NJ 07647 (201) 767-1000

Circle (66) on Reply Card



Eight brilliant ideas in TV



technology and what they mean to you.

The current high state-of-the-art of TV color cameras owes a great deal to the ideas and insights generated by Amperex and Philips. In fact, our corporate family has developed more innovations and refinements in pick up tube technology than anyone else.

Behind each flash of brilliance is a deep understanding of the broadcasting industry. We know, for example, how competitive pressures have created a need for cameras that deliver increasingly better performance in a variety of difficult situations.

We've responded... with one innovation after another until today, we offer the broadest line of extended performance Plumbicon tubes. No matter what cameras you use—domestic or imported—we have the tube that can optimize their performance. Which makes the specifying of Amperex Plumbicon tubes a pretty bright idea in itself.

For more information call or write Amperex Electronic Corporation, Slatersville Division, Slatersville, Rhode Island 02876. (401) 762-3800. Made in Rhode Island, U.S.A. Delivered to you in twenty-four hours or less.

Amperex®
WE MAKE IT HAPPEN

A NORTH AMERICAN PHILIPS COMPANY

Circle (67) on Reply Card

Reflections

At NAB-'83, the author asked leading broadcasters to comment on new technology they found of interest at the show and to reflect on future trends in broadcasting. Now, as we're approaching another NAB convention, it is interesting to review selected comments from the past show, especially because many broadcasters look to the exhibits as a communications forum in selecting new equipment.

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

"I think the most encouraging thing at NAB-'83 was the progress made in small tape recorders, particularly the progress made with ¼-inch. It appears that lightweight camera/recorders plus editing packages will be a reality in 2-3 years. The other advancement I have seen is the electronic graphics explosion. As the amount of memory increases, digital video and the manipulation of such video will become less expensive and lighter and will require less space."

Julius Barnathan
President
Broadcast Operations & Engineering
ABC
New York, NY

"The new M/A-COM portable multiband transmitter and receiver that will allow broadcasters flexibility and frequency agility is a welcome addition to the microwave field. The unit contains all the frequencies the broadcaster is licensed to operate. Its small size and weight should be ideal for portable and ENG applications. In addition, the equipment can be used for wideband component transmission of signals.

"Also, the advancement in portable auto setup cameras is welcome, because it enables the inexperienced camera operator to go out for days, and with the push of a button, have a perfectly setup picture."

Phil Godfrey
Manager
Engineering Laboratory
ABC
New York, NY

"Excellent demonstrations of HDTV equipment by Sony, Ikegami and Panasonic—very impressive results of component research, but still a long way from a broadcastable system or from a serious production medium. Much needs to be done. The private demonstrations by RCA of a CCD camera chip and a professional-level analog component recorder were dazzling.

"The ½-inch format in analog components produces good pictures, but TBCs, switchers and mastering equipment are notably behind in development. Digital video recorders are still some way off and the pressure to develop such a machine could well be reduced by analog component recorders which solve only the NTSC distortion impairments and leave untouched the multigeneration problems. Producers and broadcasters need a digital recorder, but analog components will come first."

Kenneth P. Davies
Assistant Director
Engineering
International Relations
CBC
Montreal, Quebec

"I was somewhat relieved to see at NAB-'83 that the recent dramatic advances in the technologies of our industry took somewhat of a pause. This will give broadcasters the opportunity to consolidate and assimilate some of the recent innovations and re-examine where, and how, we go next. The complete update of our New York facility, CBS Broadcast Center and some of our remote facilities cannot move as rapidly as have recent developments and it will be a great help to have this technological respite. I am sure that the process of change will resume at a rapid pace in many areas at NAB-'84."

Jack O'Donnell
Director
Technical Services
CBS
New York, NY

"I think, basically, what's new in the camera area is the charge couple device camera. Other than that I haven't seen anything revolutionary. There are some nice refinements in ¾-inch tape being presented by Sony. HDTV is a mind-blower, but how are we going to transmit it? The graphic systems look great."

John Swanson
Director of Engineering
Cox Communications
Atlanta, GA

"Smaller ENG cameras with ½-inch or ¼-inch tape are of major interest. The news people desire lighter weight equipment without sacrificing quality. We await further development by RCA and the CCD camera shown by appointment during the convention. Durability, reliability and ease of maintenance are necessary in all equipment, along with compatibility between brands."

LeRoy Bellwood
Director of Engineering
KGTV
San Diego, CA

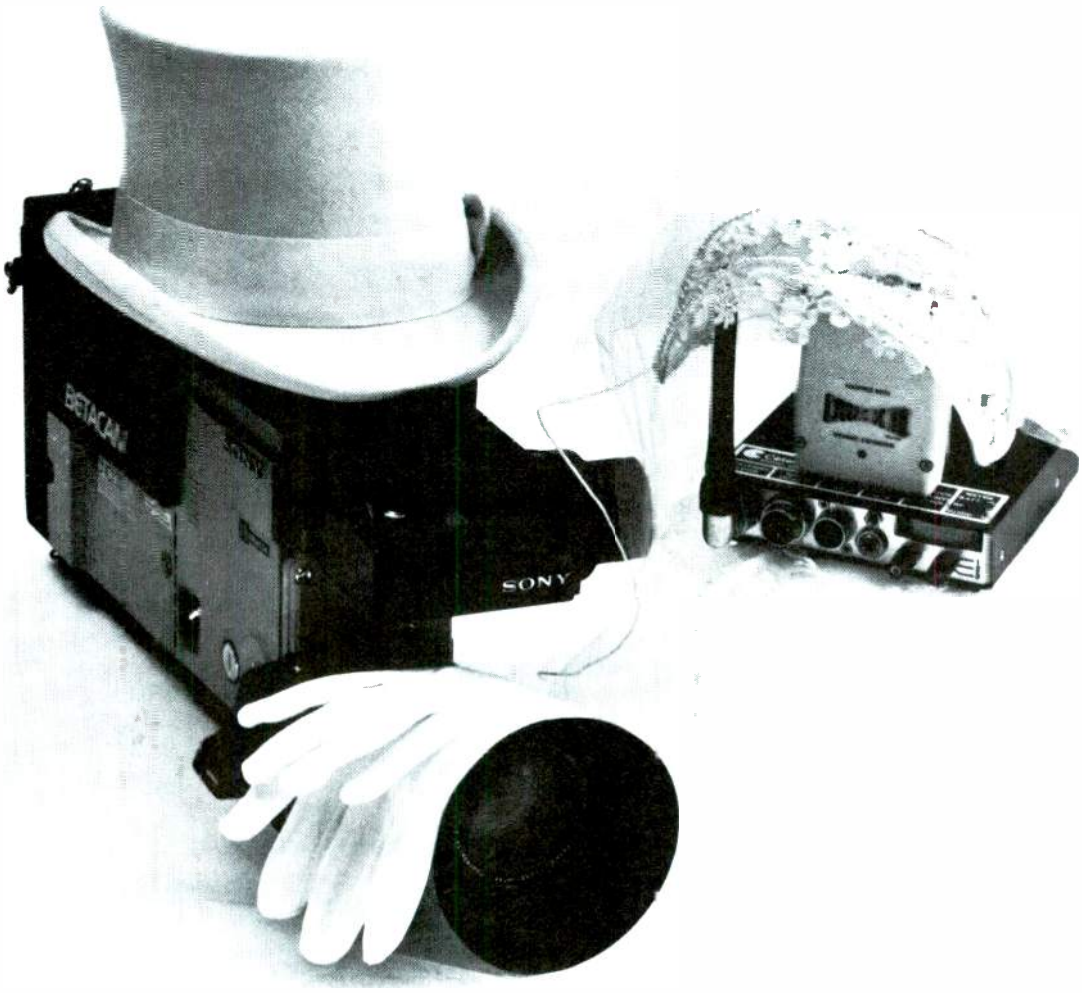
"The NAB-'83 show was very successful from a sports point-of-view. We sent a lot of operators and production people, in addition to more engineers than usual.

"A lot of what we saw we had seen in previous years, and it reinforced the direction we were going. For instance, we had ordered a Mirage before the show, but at the show our engineers gained a lot of information about the unit. The same was true with Chyron.

"As far as what we saw:

- "Quantel is always a mind boggler. The 'Cypher' graphic animation device is very exciting.
- "We are very interested in CCD cameras. Even though the manufacturers are still very much in the developing stage, we are impressed with the idea.
- "CMX 'Plus'—the new CMX edit-

The Perfect Marriage



That's what you'll have from Audio Services Corporation. You tell us all about your video system, whether it's big or small, a stay-at-home or a traveler, and what your plans are for its future . . . and we'll find you its perfect audio mate.

After all, you don't want just any old audio system getting involved with your carefully chosen video. These things are important.

We, at Audio Services Corporation, are experts at matchmaking audio with video. Not only do we have the wisdom to aid you, and the selection to offer you, but we'll be there to make sure that your systems will always know the bliss of a happy life together.

When the match is made by Audio Services Corporation . . . the honeymoon lasts forever. Call or write Audio Services today.
(And come see us again when you're thinking of having little additions.)

Audio Services Corporation

- Specializing in Professional Sound Services for Film and Video
- Digital and Analog Equipment
- Sales • Service • Rental • Consulting
- 24 Hour Service


VEGA DYNEX II TRAVELER

AUDIO SERVICES CORPORATION • 4210 Lankershim Boulevard • North Hollywood, California 91602 • (213) 980-9891

Circle (68) on Reply Card

ing system—was impressive.

• "RF equipment is growing by leaps and bounds. We looked at the M/A-COM multiband.

• "Nobody had really expected the ¼-inch systems to be as advanced as they were. Maybe ¼-inch isn't as far away as we thought."

Ken Aagaard
Vice President
Sports Operations
NBC
New York, NY

"Three things stick in my mind from NAB-'83. First is the extent to which analog component has become a major topic of discussion on the exhibit floor and in the suites. Presumably, the numerous small format cassette machines which use components and the level of interest in MAC-type systems for DBS have convinced many engineers that we will reach the digital broadcast plant via some interim use of analog component.

"Second, I was struck by the extraordinary growth in digital effects and paint systems. The Ampex ADO demonstration was very impressive, as was the Quantel Paint Box. And Quantel again offered a tantalizing glimpse of the next step in character generators in their suite.

"Finally, I think that all those who saw it were impressed by the potential shown by the CCD demonstration in the RCA suite. The extraordinary sensitivity and dynamic range and complete freedom from lag suggest a camera based on this technology could provide the next revolution in ENG."

Jeff Meadows
Vice President
Engineering
NBC
New York, NY

"NAB has become a show for production people as well as engineering. The biggest drawing exhibits were the video effects by Quantel and Bosch.

"Of particular engineering interest were fiber-optics, the QuarterCam, the new smaller, but more versatile microwaves and Tektronix ANSWER system."

Robert Porter
Vice President/
Director of Engineering
Spanish International
Communications

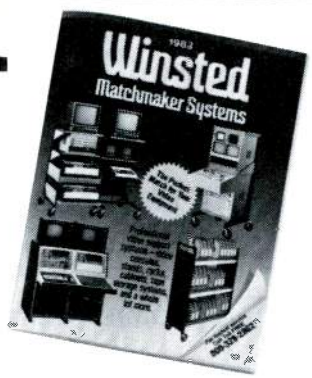
"It does appear that higher quality, more reliable, less expensive equipment is being developed to add to the industry's use of technology for flexibility, efficiency and capability. Miniaturization and sophistication is also being included at every turn. What all of this means is that new generation equipment will allow only the imagination to limit what technology can create. Areas of growth will include: increases in use of digital technologies for all audio and video generation and processing; digital video recording; computer animation; computer controlled animation from a single video frame generated from any source; development of low cost/long life UHF transmission tubes; HDTV compatible with our current NTSC system; growth of teletext nationwide; and continuation of the FCC to deregulate everything."

John Owen
Vice President
Engineering
Taft Broadcasting
Cincinnati, OH

"Four product types or technology areas attracted my greatest interest at NAB-'83. New hybrid circuit executions of audio-video routing switchers seem to offer advantages of reliability, maintainability, physical size, performance and cost over their conventional counterparts. Picture and sound multiplexing products and sophisticated scrambling devices offer economy and security for satellite transmission and receiving systems.

Winsted

FREE 1983 CATALOG



Winsted Matchmaker Systems

60 page, full color catalog includes complete descriptions, pricing and ordering information on:

● Editing Consoles ● Video Consoles
● Production Consoles ● Dubbing Racks
● Equipment Cabinets ● Micro Computer Stations
● Tape & Film Storage Systems

Winsted Matchmaker Systems... *the Perfect Match for all professional Video Equipment*

THE WINSTED CORPORATION
9801 James Circle • Minneapolis, MN 55431

WRITE TODAY OR CALL TOLL-FREE **(800) 328-2962**

Circle (69) on Reply Card

WANT ADDITIONAL COPIES OF SPEC BOOK?

You can easily obtain extra copies of Broadcast Engineering's Spec Book. With its many uses, this special issue is a must for **everyone** interested in comparison data on a multitude of broadcast products.

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.

5050 MARK III-2 Two Channel Recorder

IN 1994, YOUR STATION IS SURE TO HAVE ONE FAMILIAR FACE.

The compact console version of the legendary OTARI 5050 "B" is built to be around for many years. It's the ¼" two-channel professional machine that has been designed with the performance, features and flexibility a broadcaster needs—today and well into tomorrow.

The rugged MARK III-2 has three-speed capability (field-selectable in pairs of 7.5/15 or 3.75/7.5 ips) with ±7% vari-speed, dynamic braking for gentle tape handling, and it's the only machine in its price category that's available with a full-function autolocator. The MARK III-2 also features an external machine control interface connector for use with SMPTE time code-based synchronizers or the autolocator. Front panel record calibration adjustments, two-frequency oscillator and an extra ¼-track playback head are just a few of the helpful production features we've built in.

After you compare features, performance and price, you can feel comfortable making an investment in the machine that's built for the real world.

Circle (71) on Reply Card

We're confident of our new MARK III-2. And you can be too.

Contact your nearest dealer who represents The Technology You Can Trust.

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

OTARI®

Technology you can Trust.

Available on GSA schedule

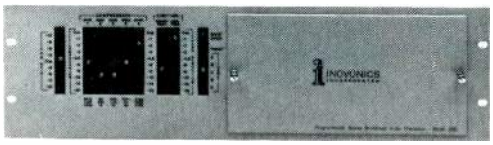
© 1983 Otari Corp.

The ENGINEER'S audio processor..... designed for PROGRAMMING!

Our 250 gives you the ultimate in audio processing with advanced programmable circuitry offering total control of your broadcast sound.

Multiple presets can be custom tailored for different program sources, for changing formats during a broadcast day or for other programming variables. The result? Uncompromised audio quality for each program source or format. No more tweaking for the best sound. The 250 lets you adjust any processing function digitally and with complete repeatability.

Gated A.G.C., 5 band compression, graphic equalization and peak limiting may be manually formatted *OR* put under computer control.



The 250 has been designed to meet the present and future demands of quality audio in AM stereo, FM stereo and TV stereo.

To make your job easier and your sound SUPERIOR, call today to arrange for a hands-on demonstration in your station.

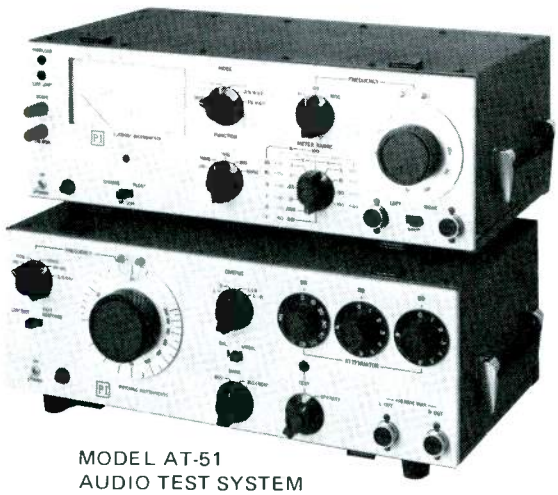
Inovonics Inc.
503-B Vandell Way, Campbell, CA 95008
Telephone: (408) 374-8300

MAGNETIC RECORDING • AUDIO PROCESSING • AUDIO INSTRUMENTATION

Circle (72) on Reply Card

The AUTOMATIC Audio Test System

That Measures. . .



- Harmonic Distortion
- Intermodulation Distortion
- Volts
- dB
- Signal + Noise / Noise Ratio
- Wow and Flutter
- Stereo Phasing
- Differential Gain in Stereo Channels

MODEL AT-51
AUDIO TEST SYSTEM

Contact Us Now For Complete Details And Descriptive Literature.

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

Circle (73) on Reply Card

The Direct Read After Write optical videodisc recorder/player introduces possibly advantageous new picture record/playback methods and media for thoughtful application in the future. Finally, HDTV pictures are always exciting to view, although I was disappointed that nothing new beyond that shown a year earlier in the CBS demonstration was shown at NAB-'83. It does not require much stretching of the imagination to recognize the importance of these products and technologies to the cable industry now and in the future."

Neil Neubert
Director
Video Engineering
Warner Amex Cable
Communications
New York, NY

"Probably most important to the broadcaster is the new equipment based on some sort of component signal processing. Although we still broadcast the NTSC signal, the added enhancements improve the end result. The QuarterCam is exciting. We need early settlement on a single format, then the inevitable improvements and equipment availability. This may be the next generation ENG/EFP and multiple playback system.

"Sorely needed is a replacement for the Quad Video Cart. It has high maintenance and barely acceptable reliability. Being a development almost 15 years old, we need new equipment, taking into account the latest technology. Other than the transmitter, this is probably the most used and needed equipment for airing commercials.

"Diagnostics that allow effective in-station troubleshooting methods lag behind state-of-the-art. There is too much need for expensive and time consuming printed circuit board exchanges. Test methods are needed that do not require the expertise of the circuit or equipment designers."

Pat McLaughlin
Chief Engineer
WXFL
Tampa, FL

"Teletext was impressive to me; teletext is going to be there...it's coming. ABC will premier with the alphageometric system, with which NBC will eventually have to compete. The odd thing is that CBS is on the air first and they might have to drop the entire system and convert to the alphageometric system. This means that anyone who purchases a decoder may have to purchase another decoder. They're not interchangeable."

Dave Frasier
Director of Engineering
WWBT-TV
Richmond, VA

When you'd give an arm and a leg for an extra foot...

A-T gives you a hand!

The new AT835.

Now there's a new way to reach out and hear. The Audio-Technica AT835 Condenser Line + Gradient Microphone. It's barely longer than a legal pad, but it zeroes in on the sound you want to hear, while blocking out noise from the sides and rear.

Baby Brother

The new AT835 is 4 inches shorter than our famed AT815a and its remote-powered brother the AT815R. Yet its performance in the field is remarkably close. The major difference is a slightly wider (60°) acceptance angle at higher frequencies. Credit a sophisticated "Fixed-Charge" element for the truly impressive sound and excellent directional control. The AT835 short "shotgun" fits in whether you are recording "actualities" for the evening news, picking up dialogue for film or A/V, or eavesdropping from the sidelines.

With Guts

Our FET impedance converter is super quiet, and runs for months on a single "AA" flashlight cell. The balanced, phased output matches any remote or studio input from 150 to 1000 Ohms without problems. And the AT835, like all A-T condensers, is built to take real punishment. Even so, it weighs just 7½ ounces for easy fishpoling or extended hand-held use.

If your goal is better control of your sound at moderate cost, your Audio-Technica sound specialist has a brand new answer. The AT835.

audio-technica®

AUDIO-TECHNICA U.S., INC., 1221 Commerce Dr., Stow, OH 44224 • 216/686-2600

Circle (74) on Reply Card

Research report:

State of the industry

By Bill Rhodes, editorial director, and Jerry Whitaker, radio editor

For the past several years, the **BE** staff has been bombarded by two factions seeking marketing information on broadcast equipment. On the one hand, broadcasters want to know the types and amounts of equipment that manufacturers will have available for them to buy. On the other hand, manufacturers want to know the size of broadcasters' budgets and the areas in which they plan their purchases.

The problem is that neither faction will unveil their records, not even when research is under blind survey conditions. However, encouraged by a number of broadcasters, we conducted a special project this year, covering the broad aspects of budgets for purchases, maintenance and staff updating in broadcasting. We intended to use the survey results as a *health-of-the-industry* report and to suggest how broadcasters could sharpen their tools in selecting and purchasing new equipment.

The analysis that follows is the result of our survey. Note that in the category: "What were your engineering expenditures/budget for 1982, 1983 and projections for 1984?" many broadcasters refused to unveil their plans, even in a blind survey format. The total response to our statistical mailing was 34%. Accurate conclusions can be difficult to determine, because of information not divulged and questionnaires not returned.

Our study took the form of the questionnaire shown in Figure 1. It covered topics ranging from the amount of money that broadcasters plan to spend on new equipment purchases to SCA activity and future plans. The results of our survey showed, among other things, a general upward trend in engineering budgets for most segments of broadcasting.

Because of the detailed nature of the study's questions, we can draw some conclusions on buying procedures and trends, keeping in mind the caution expressed previously.

Database

The questionnaire could have been filled out by any one of five station employees; however, the majority were completed by chief engineers at AM, FM and TV stations. Technical managers and staff engineers were second in line, each amounting to 10% to 20% of the respondents (depending on the category).

Of the **BE** questionnaires returned, TV accounted for 33%, FM radio for 36% and AM radio, to our surprise, finished last with 31%. We would have expected the AM and FM responses to be more closely matched.

Commercial stations accounted for the majority of respondents, with more than 58%. Network-owned outlets comprised about 14% of the AM and FM stations and 28% of the TV stations returning the questionnaire. Thirty-one percent of the FM responses came from public (educational) stations and 19% of the TV responses came from public stations.

Purchasing

The market size breakdown revealed some interesting patterns with respect to purchasing procedures for broadcast stations. As shown in Table I, a formal engineering budget generally is used only by TV stations and major market radio stations. Few operations use a multiyear budget forecast plan. Nearly all stations that formally budget their expenditures indicated to us that they do so on a calender-year basis.

Although station personnel were comfortable in talking about their purchasing procedures, they were tight-lipped when it came to how much money they plan to spend on equipment purchases, maintenance and renovation. No definitive statistics could be drawn from the responses, except in the case of new equipment purchases, which revealed a shifting in engineering budgets from one year to the next. Generally speaking, however, our study showed an upward trend in new equipment purchases for 1984, as compared to 1983. It is interesting to note that station personnel in the Top 50 to Top 100 AM and FM radio markets were the most hesitant to reveal budget information, making it necessary to average the equipment purchase figures shown in Table I.

The respondents' assessment of their stations' sales activity painted a rosy picture for large market AM radio, with 94% saying their sales were up in 1983, as compared to 1982. All other station classifications showed lower, but respectable gains over the previous year's level. A number of stations reported no change in their sales picture, and although many respondents declined to talk about their operations' sales activity, few reported any sales decrease in 1983.

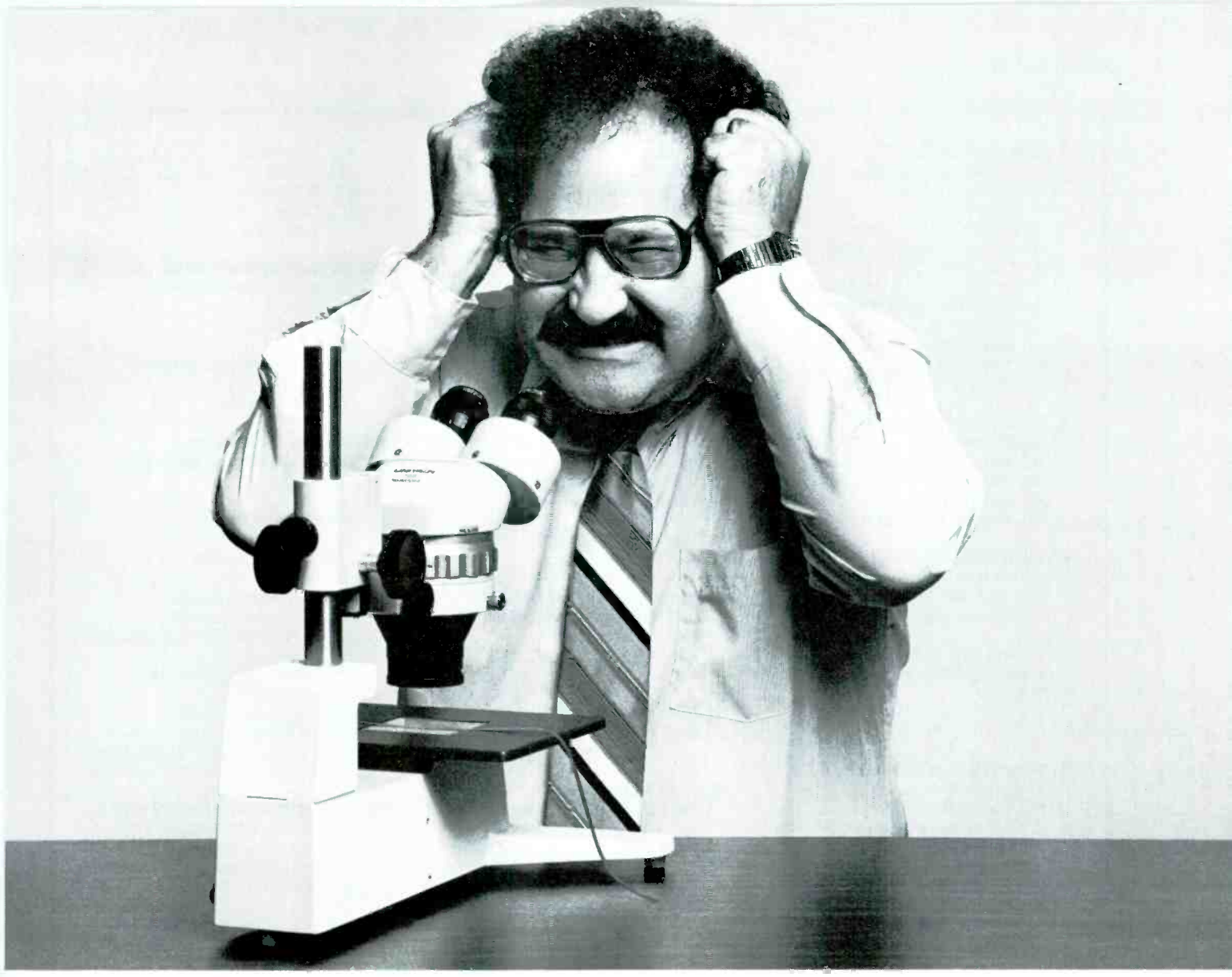
Our survey indicated that the majority of stations responding did not change their budgeting figures because of recent FCC deregulation of some technical aspects of broadcasting. The fear has been expressed that elimination of certain technical standards mandated by the commission would cause engineering budgets to decrease, especially in the smaller market areas. Our study showed, however, that this was not the case. Answers to questions specifically related to maintenance funding indicated that most engineers thought sufficient money was allocated by management for equipment service.

A separate question, however, added a discouraging note, showing that less than half of the stations responding had any budget for training seminars or programs in the coming year. With the rapid pace of technology, such trends are disturbing.

The staffing profile followed predictable lines, with larger stations far outdoing smaller ones in personnel resources.

Although the various national engineering conferences and conventions

Continued on page 102



When he spots volcanoes Arthur blows his top.

At 400x magnification, microscopic imperfections in the oxide coating of audio tape look like volcanoes. And when Arthur Constantine, our VP Sales, sees them, "K-A-B-O-O-M." He'll ship whole pallets back to suppliers rather than let an inch get into cartridges we ship to you.

The same thing happens every time Arthur discovers poor surface bonding, ragged edges or spotty lubrication. "K-A-B-O-O-M."

The tape we accept from our suppliers must meet our specifications. And our specs are tough to meet. That's why seven out of ten radio stations around the world use Fidelipac Tape Cartridges. The most rugged, most reliable audio cartridges there are.

We simply will not compromise on quality.

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 (79) on Reply Card

Continued from page 96

1. What is your TITLE?
1☐ Technical Manager
2☐ Chief Engineer
3☐ Engineer
4☐ Operations Manager
5☐ Other (please specify)

2. Please check (√) the type of BROADCAST SERVICE(S) your facility provides:
1☐ AM radio
2☐ FM radio
3☐ TV

3. Please check (√) your classification(s):
1☐ Commercial
2☐ Network
3☐ Independent
4☐ Public/educational

4. What MARKET are you in?
1☐ Top 50
2☐ Top 100
3☐ Below Top 100

5. Do you have a FORMAL ENGINEERING EQUIPMENT budget?
1☐ Yes
2☐ No

6. What is your FISCAL YEAR for budgeting?
1☐ Calendar year
2☐ Other (please specify)

7. Are you on a MULTIYEAR DEVELOPMENT/BUDGETING PLAN?
1☐ Yes
2☐ No

8. What were your ENGINEERING EXPENDITURES/BUDGET for 1982, 1983 and projected 1984 for the following categories?

	1982	1983	1984
1Equipment purchase	$___	$___	$___
2Equipment repair	$___	$___	$___
3Facilities renovation	$___	$___	$___
4Facilities expansion	$___	$___	$___
5Operations	$___	$___	$___
6Salary budget/ expenses	$___	$___	$___

9. Have FCC DEREGULATIONS affected your budgeting?
1☐ **Yes**
2☐ **No**

10. Have your 1983 STATION SALES increased or decreased over 1982, and by what PERCENTAGE?
1☐ Increased
2☐ About the same
3☐ Decreased

11. Is your budget for REPAIR/ MAINTENANCE sufficient to meet your needs?
1☐ Yes
2☐ No

12. How many people are on your ENGINEERING STAFF?
_____ Number of people

13. Are you budgeting for TRAINING SEMINARS/PROGRAMS in 1984?
1☐ Yes
2☐ No

14. Do you budget for CONVENTION SHOW attendance?
1☐ Yes
2☐ No
If YES, for how many PEOPLE to attend the following shows in 1983 and 1984?

	1983	1984
3☐ NAB	_____	_____
4☐ NRBA	_____	_____
5☐ SMPTE	_____	_____
6☐ AES	_____	_____
7☐ IBC	_____	_____
8☐ Montreux	_____	_____
9☐ WOSU	_____	_____
10☐ RTNDA	_____	_____
11☐ Other (specify)	_____	_____

15. Do you OWN or LEASE your present studio facilities?
1☐ Own
2☐ Lease

16. How OLD are your present studios?
_____ Years old

17. Are you considering UPGRADING your facilities?
1☐ Yes
2☐ No
If YES, what areas?
3☐ Production
4☐ Master control
5☐ Transmitter
6☐ Antenna system
7☐ Remote controls
8☐ ENG/EFP/RENG production
9☐ Editing suites
10☐ Other (please specify)

18. Are you planning on:
1☐ Redesigning your studios
2☐ Expanding your studio space
3☐ Relocating to new facilities

19. Do you currently have or plan to implement MDS and/or ITFS?
1☐ Currently have
2☐ Plan to implement
3☐ No current plans

20. Are you currently using or plan to use SCAs for ADDITIONAL REVENUE?
1☐ Currently using
2☐ Plan to use
3☐ No current plans

21. Do you use an ENGINEERING CONSULTING SERVICE?
1☐ Yes
2☐ No

Figure 1. Budget/expenditure questionnaire.

are excellent sources of hands-on technical information, more than half of the AM and FM stations responding to our questionnaire indicated they do not budget any funds for convention show attendance. TV stations, on the other hand, posted a good showing in this category, with 69% saying they budget for staff attendance at national engineering conferences. Of the stations that set aside money to send their people to these conferences, most choose the annual NAB show.

Facilities

The facilities picture, as outlined in Table II, showed that the majority of all AM, FM and TV stations own their present studio facilities, and that those facilities are getting old. We are somewhat surprised that larger market AM and TV stations do not have more up-to-date plants. This feeling is viewed, however, in light of the overwhelming number of broadcasters that told us they plan to update their existing operations in the near future. As Table II also points out, relocation or redesign of the present facilities will not be part of this update.

Our survey indicated that most of the upgrading is planned in production facilities. Radio stations place transmitting equipment as second in priority, and TV stations list ENG and EFP as their second choices.

The role of consultants in broadcasting is demonstrated by their showing in the **BE** questionnaire. Large numbers of AM stations indicated they use engineering consulting services to one extent or another. The use of consultants by FM and TV stations is less common, as we would expect, because the stock-in-trade of most consulting firms is AM directional antenna design and maintenance.

There has been much speculation of late on the future of SCA in FM broadcasting. Our survey addressed that topic and found SCA activity limited, especially in the Top 50 to Top 100 FM radio markets. A number of stations indicated they have plans to begin using their SCA channel(s) in the future; however, there certainly is

Harris All-Solid-State SX Transmitters

Bring Back Your AM Listeners!

Contrary to what you may have heard, your "average" listener has a better-than-average knack for finding stations with a quality, transparent sound—even on a crowded dial. The lower your sound quality, the higher your audience tune-out.

Bring back those listeners with a Harris SX Series all-solid-state AM transmitter. Harris' exclusive Polyphase PDM modulation system provides a ***discernible difference in sound***... a crisp transparency that virtually eliminates listener fatigue and compares with the best FM has to offer. The specs will show you why. On the SX-5, for example, Intermodulation Distortion (IMD) is less than 1%!

SX Series transmitters (available in 1, 2.5 and 5 kW) also offer diagnostic capability through a microprocessor-based, pushbutton information center. You get instant readings on vital parameters.

Solid-state design means you'll save up to 46% more power than with other transmitters currently in use. That's a plus you'll see immediately in lower power bills.

And Harris has designed the SX Series transmitters for optimum AM Stereo performance. Strict AM Stereo compatibility was a major design goal right from the start—not an add-on or an after-thought.

Make the investment in quality sound that can build and hold your listening audience. For more information on Harris SX Series AM transmitters, contact Harris Corporation, Broadcast Group, P.O. Box 4290, Quincy, Illinois 62305-4290. 217-222-8200.

HARRIS

Circle (80) on Reply Card

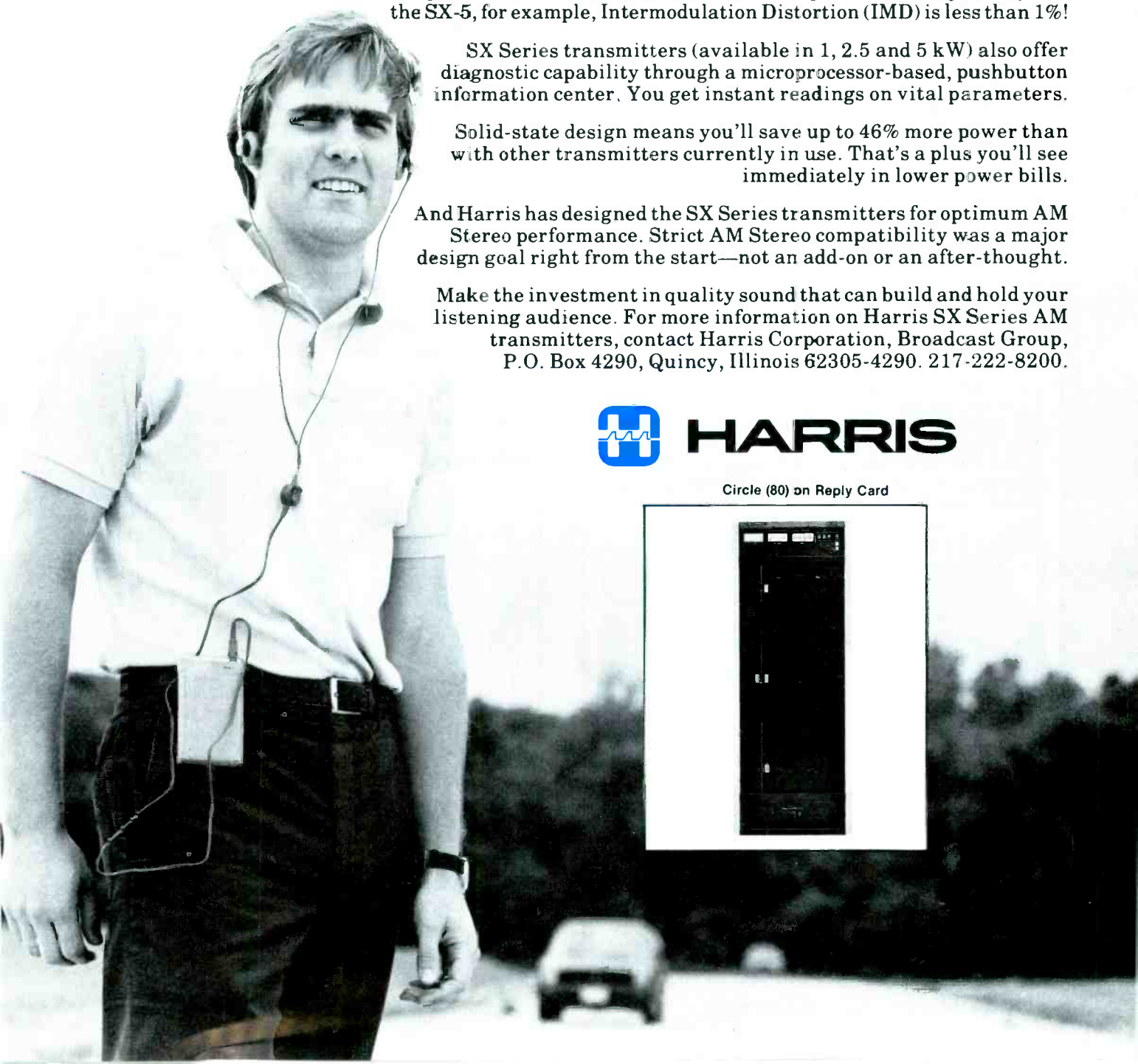


Table I.
Budgeting

Category	AM radio			FM radio			Television		
	Top 50	Top 50 to Top 100	Below Top 100	Top 50	Top 50 to Top 100	Below Top 100	Top 50	Top 50 to Top 100	Below Top 100
Stations that use a formal engineering budget	59%	42%	37%	74%	35%	39%	84%	75%	64%
Estimated 1982 new equipment purchases	Median $15,250			Median $9,600			$525,000	$175,000	$100,000
Estimated 1983 new equipment purchases	Median $14,950			Median $15,500			$475,000	$175,000	$90,000
Estimated 1984 new equipment purchases	Median $20,000			Median $13,500			$550,000	$186,000	$100,000
Stations that reported increased sales	94%	67%	37%	48%	45%	36%	46%	29%	39%
Stations that reported no change in sales	6%	25%	41%	17%	20%	19%	16%	36%	31%
Stations that think FCC deregulation has not affected engineering budgets	77%	83%	82%	87%	95%	90%	89%	86%	82%
Engineering staff	6	2	1	1	1	1	22	15	6

no stampede toward the higher frequency subcarriers.

TV broadcasters showed little interest in the SCA channel(s) available to them on their aural carrier, and despite talk about increased flexibility and profitability of TV SCAs, few stations indicated any interest in such ventures.

Auxiliary services such as multipoint distribution (MDS) and instructional TV fixed service (ITFS) are operated by only a handful of TV stations (6%), according to our questionnaire. Just more than 7% of the stations surveyed indicated they plan to construct new MDS or ITFS facilities in the near future.

Final notes

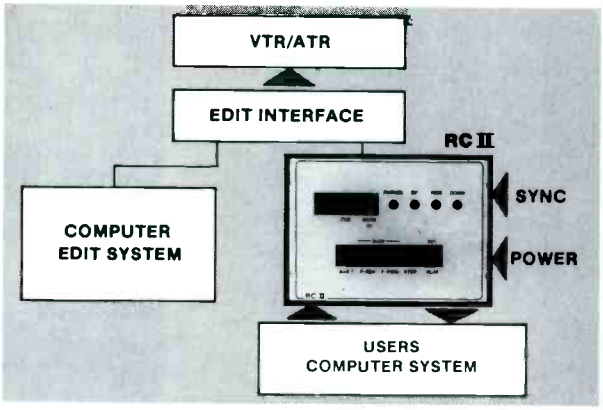
From the industry's response to this

RCII

REMOTE CONTROL BY CALAWAY ENGINEERING

The RCII by Calaway Engineering is a most flexible manual remote control for Video tape machines that are equipped with Calaway or CMX Interfaces... The RCII has many features that provide the utmost in remote control... PLUS, it's compact; 5" x 7" x 2", requires 12 VDC power . . . may require sync for some applications . . .*

**CMX is a registered trademark of the CMX Orrox Corporation.*

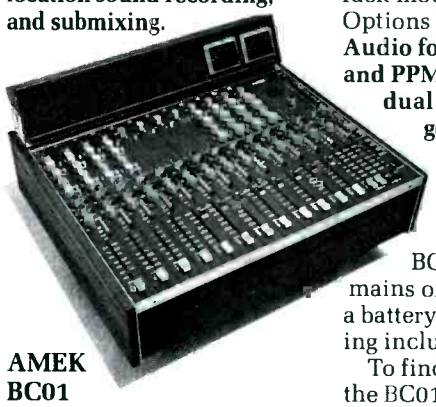


CALL OR WRITE
CALAWAY ENGINEERING
49 SOUTH BALDWIN AVENUE / P.O. BOX 323
SIERRA MADRE, CA 91024 / (213) 355-2094

Circle (81) on Reply Card

EUROPE'S #1 SELLER
NOW AVAILABLE IN AMERICA

For **broadcast, video editing, location sound recording, and submixing.**



AMEK BC01 Broadcast/Video Production Mixer

The BC01 has a variety of input and output modules including mono and stereo mic-line channels, and stereo line channel, **all balanced.** Standard configurations are 8/4 and 12/4; mono and stereo channels may be mixed in the same chassis.

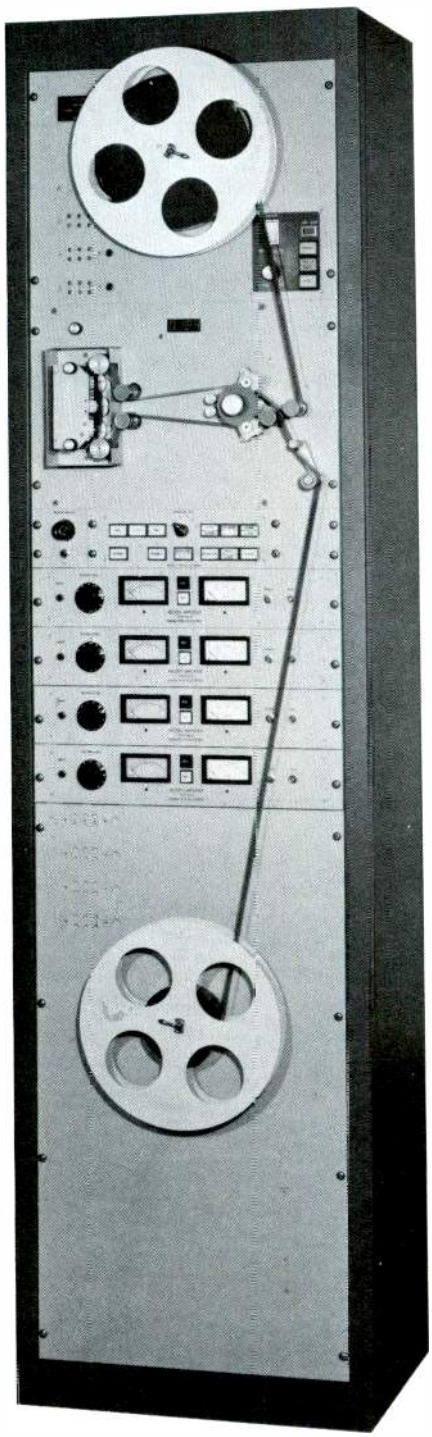
The smaller chassis is 19" rack-mounting format. Options available include **Audio following video, VU and PPM metering, individual channel cart triggers,** and a **meter hood** into which may be fitted limiters and a Pre-fade listen speaker. The BC01 may be 110/220 mains or battery powered, a battery compartment being included in the chassis.

To find out more about the BC01 or to arrange a personal demonstration, contact us at (213) 508-9788 for the name of your nearest AMEK dealer.

AMEK CONSOLES, Inc. U.S.A.
11540 Ventura Boulevard
Studio City, California 91604
(213) 508-9788

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

Circle (82) on Reply Card



MAGNA-TECH
THE SOUND HEARD AROUND THE WORLD

Magnetic Film Recorders and Reproducers for Television and Film Sound Post-Production

HIGH SPEED

Telecine Magnetic Followers
Video Tape-Film Interlock
Electronic Looping
Dubbing Systems
16 and 35mm Electronic Projectors
Total Facility Engineering

WORLDWIDE SALES OFFICES

Paris
Hi-Fidelity Services
4 Rue Semard
75009 Paris, France

Sydney
Magna-Techtronics (Aust.)
PO Box 150
Crows Nest NSW 2064
Australia—Telex 24655

Johannesburg
General Optical Co., Ltd.
15 Hulbert Road
Johannesburg 2001,
South Africa

Rome
Alberto Sciaretta
Via Siria 24
Rome 00179
Telephone 7943618

Brussels
A.R.C.
Rue de Boisde Linthout 45
1200 Brussels Belgium

Hong Kong
Paul Yang and Associates
901 Star House
3 Salisbury Road
Kowloon, Hong Kong

Bombay
Capt. P.K. Vishwanath
234/4 Rama Baug,
Deodhar Road
Bombay 400 019, India

Kehl West Germany
Zenon GMBH
Postfach 1743
Hauptstrasse 128
Kehl am Rhein
Tel: 07851/2991
Telex: 753537

London
Branch & Appleby
42 High Street
Harrow-on-the-Hill
Middlesex HAI 3LL,
England

Kuala Lumpur
Kinematronika Sdn. Bhd.
2852, Jalan Selangor/
Persekutuan,
Federal Hill
Kuala Lumpur, Malaysia

Caracas
Cine Materiales srl
Apartado Postal 61.098
Caracas 106 Venezuela

MAGNA-TECH ELECTRONIC CO., INC.

630 Ninth Avenue, New York, N.Y. 10036

Telephone (212) 586-7240 Telex 126191 Cables "Magtech"

Circle (83) on Reply Card

Table II.
Facilities

Category	AM radio			FM radio			Television		
	Top 50	Top 50 to Top 100	Below Top 100	Top 50	Top 50 to Top 100	Below Top 100	Top 50	Top 50 to Top 100	Below Top 100
Stations that own their studio facilities	53%	67%	82%	70%	70%	77%	82%	93%	85%
Median age of present studios, years	7	8	12	8	8	5	14	16	16
Stations that plan to update facilities	82%	83%	60%	83%	80%	52%	77%	86%	90%
Stations that plan to relocate	29%	17%	7%	4%	20%	7%	16%	11%	13%
Stations that plan to redesign facilities	47%	58%	22%	35%	30%	16%	16%	25%	39%
Stations that use consultants	77%	58%	52%	44%	45%	48%	34%	40%	31%
Stations that currently use SCA	...	...	...	35%	15%	36%	5%	7%	3%
Stations that plan to use SCA	...	...	...	44%	50%	23%	11%	7%	10%

year's survey, it can be seen that many broadcasters are reporting increased sales, especially in the larger markets; most broadcasters have not let FCC deregulation affect their budgeting plans; and most broadcasters are planning update programs for their facilities.

Although broadcasters were reluctant to unveil their specific budget figures, the previously mentioned overall disclosures show that the broadcast industry is moving forward on sound financial and technical bases.

We plan to conduct research again next year as a continuing series. If you would like to see other facets of the industry covered, send your suggestions to the **BE** Research Editor, P.O. Box 12901, Overland Park, KS 66212.

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 (130) on Reply Card

Microdyne's New Multiple Feed System Lets You Receive Up To Five Satellites

With new programming constantly being added, you may want to pick up programs from several satellites. Previously, this would involve the expense of another dish. Now with Microdyne's new multiple feed system you may be able to add programming from additional satellites at about 1/5 the cost of a new dish.

The MSF-16 Multiple Satellite Feed System can receive up to five satellites on the same parabolic reflector when the satellites are located in close proximity. In a TVRO system designed with adequate margins, the MSF-16 will provide quality pictures on all feeds.

Existing Microdyne/AFC antennas can be easily retrofitted to accommodate this new system. Only the spars and brackets of the feed support hardware must be changed — no other antenna changes are required. This simple modification can be done by the user or by Microdyne field service personnel.

Even if you purchased your existing antenna from another manufacturer, it may still be possible to modify it for use with the Microdyne Multiple Satellite Feed System. Please give us a call.

So, whether you are planning a new system or expanding an existing installation, the MSF-16 can provide increased capability while saving both the cost and the real estate required by a second dish.

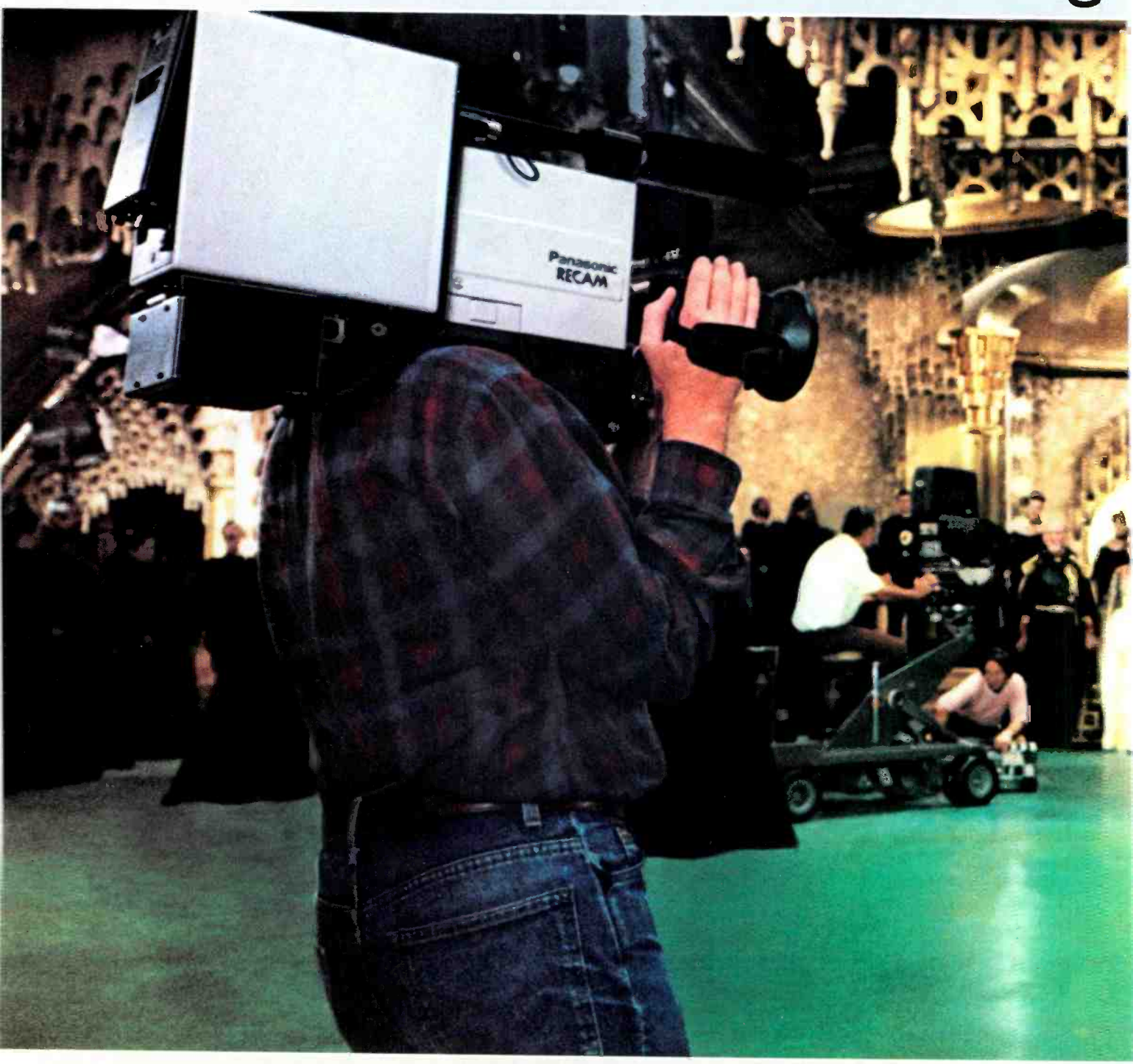
We have prepared a brochure to help you to determine if the MSF-16 is suitable for your system. For a free copy, write on your company letterhead to Microdyne Corporation, TV Sales, Dept. F, P.O. Box 7213, Ocala, FL 32672.

Microdyne Corporation

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

Circle (84) on Reply Card

Why Panasonic Recam™ "The Making



When Dino De Laurentiis and producer Raffaella De Laurentiis got together with director David Lynch to film Frank Herbert's classic science fiction novel, "Dune," they knew it wouldn't be easy. But it wasn't just the eight sound stages, desert locations, a cast of up to 20,000 people and a crew of 900. Perhaps Raffaella De Laurentiis said it best: "Dune is the most technical picture ever made."

That's why it was no surprise that Panasonic Recam was selected to record "The Making of Dune." The reasons: Recam's picture quality and technology. After all, Recam had already made headlines by recording ABC Sports' momentous ascent of Mt. Everest which was broadcast on "The American Sportsman." And "Benji," the new CBS television series, is also being recorded by Recam.

was selected to shoot of Dune."

David Lynch
Director of "Dune."

Panasonic helped capture all the action from "Dune" on Recam's ½-inch format which will later be transferred to 1-inch for television broadcast. All made possible by Recam's incredible YIQ M-format picture quality.

You can see "The Making of Dune" in 1984. But you don't have to wait until then to see Recam. Call your nearest Panasonic regional office:
Northeast: (201) 348-7620
Midwest: (312) 981-4826
Southeast: (404) 925-6835
Southwest: (214) 258-6400
West: (714) 895-7200.

Panasonic
AUDIO-VIDEO SYSTEMS DIVISION

Circle (85) on Reply Card

SMPTE preview:

Image Quality: A Time for Decisions

- Queen Elizabeth Hotel
- Montreal, Canada
- Feb. 10-11, 1984

The 18th Annual SMPTE TV Conference will focus on the many opportunities now offered to television by new technological developments. It will also recognize the need for standards decisions that would allow full use of these developments.

Among the technological developments that are expanding opportunities in television are high definition television, direct-to-home broadcast satellites, smart home TV receivers and digital VTRs.

Conference schedule

The conference will be divided into four half-day sessions, with the first devoted to principles of image quality, the second to video recording, the third to distribution and the fourth to displays. Papers presented will focus on future equipment, rather than systems and hardware presently in use.

Technical sessions

The technical program, as we go to press, is still tentative. However, the current schedule calls for the following presentations (titles abbreviated):

Feb. 10

Basic Concepts and Perspectives

- *Image Quality*, Harry Mathias, Panavision
- *Perceived Resolution of an Image*, Curt Carlson, RCA
- *Psycho-visual Characteristics*, William Schrieber, MIT
- *A Producer's View of Quality*, Norman Campbell, CBC
- *Evaluation of Image Quality*, C. Daubney, IBA
- *Why Better Pictures*, John Lowry, Digital Video Systems

New Recording Technologies

- *VTRs: What is Needed?* K. Davies, M. Auclair, T. Cavanagh, CBC
- *Digital Video Recording*, Takeo Eguchi, Sony
- *Analog Component Video Recording*, Bob Flory, RCA
- *Technical Choices*, John Watney, Ampex
- *Vertical Recording Techniques*, Dr. Michal P. Sharrock, 3M
- *Consumer VTRs*, Matsushita
- *Erasable Optical Laser Disc*, Matsushita

Feb. 11

New Distribution Technologies

- *Distribution Alternatives*, Alexander G. Day, CAB
- *North American DBS*, Jim Whitworth, Satellite Television
- *Programmable Digital Video Coder*, Ulf Lumbrink, Bell Northern
- *Fiber-Optics HDTV Transmission*, Tsuboi, Yokosuka Electrical Comm. Lab
- *High Quality on CATV*, Israel Switzer, Cablecasting
- *Scrambling/Encryption*, Keith Lucas, Digital Video Systems
- *MAC in an Interference Environment*, G. Choinard, Dept. of Communications
- *European DBS Overview*, Rudi Gressman, EBU

New Display Technologies

- *Developments in VLSIs*, W. M. Webster, RCA
- *DBS Home Terminals*, Dennis Fraser, NEC
- *Signal Processing for Consumer Display*, R. N. Jackson, Philips
- *Display Devices*, Matsushita
- *3-D Filtering*, Professor B. Wendland, Dortmund Univ.
- *Widescreen Approach*, Dr. Joe Nadan, Philips
- *HDTV Fully Compatible with Existing Standards*, T. Fukunuki, Hitachi

Following the last paper, the 2-day sessions will be summarized, discussing methods to transform today's technology into that of the future.

Additional papers are being reviewed and may be included within the final program. Questions regarding the program may be addressed to Conference Program Chairman, Stanley F. Quinn, CBC, Engineering Headquarters, Montreal, Canada 514-488-2551.

Equipment exhibit

The 1984 TV Conference will include a comprehensive equipment exhibit with the technical papers program. Because the equipment directly relates to the technical papers, participants will be able to examine in-depth the new systems and technologies covered.

Included will be equipment for production video sources, video processing, video distribution and switching, recording, editing, picture display, multiplex analog and TV testing. The latest types of cameras, digital special effects equipment, production switchers, recorders, synchronizers, time code generators/readers, monitor and projection units, display devices, decoders and other studio production equipment, and analog and digital test generators and test equipment will be included. Approximately 65 exhibitors are expected.

A technology demonstration center will be part of the exhibit, giving the public a chance to see some of the equipment still being developed in laboratories around the world and not yet commercially available.

Editor's note:
Conference data provided courtesy of the SMPTE, 862 Scarsdale Ave., Scarsdale, NY 10583.

Digital processing of video signals

A one-day tutorial session on digital processing is scheduled to precede the 1984 SMPTE TV Conference. However, arrangements must be made independently with the Canadian Broadcasting Corporation, Bell Northern Research and INRS Telecommunications from the University of Quebec.

In this tutorial session, many of the fundamental and applied aspects of digital processing of video signals are covered. Engineers and technical managers that need more data on emerging aspects of digital video signal processing techniques will benefit from this presentation.

Tutorial outline

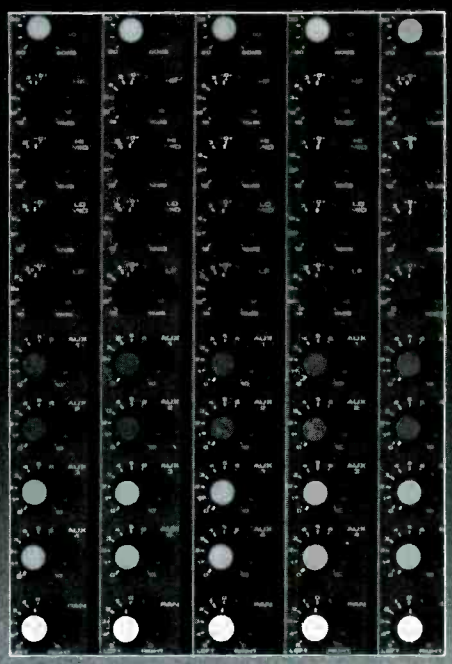
- *Sampling and Quantization*
- *Digital TV Systems*
- *Digital Transmission and Distribution of Video Signals*
- *Digital Video Processing Hardware Systems*

Final notes

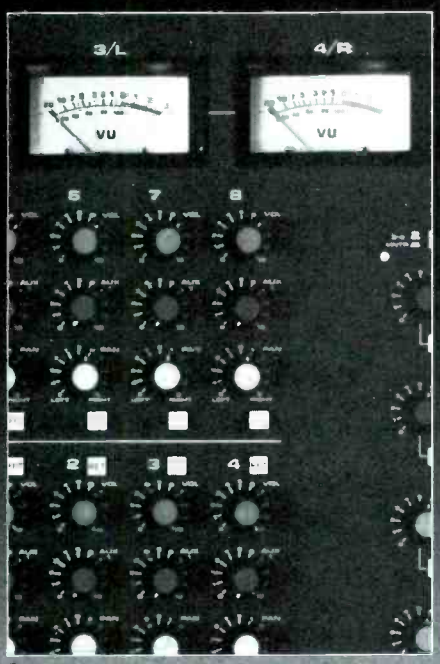
The tutorial will be given by experts in the digital video field: Dr. S. Sabri, Bell Northern Research; Dr. E. Dubois, INRS Telecommunications; Dr. E. Tarnai, Bell Northern Research; and K. Davies, Canadian Broadcasting Corporation.

For registration forms and more information, contact Dr. Shaker Sabri, manager, video systems, Bell Northern Research, 3 Place du Commerce, Nun's Island, Quebec, Canada H3E 1H6; 514-761-5831.

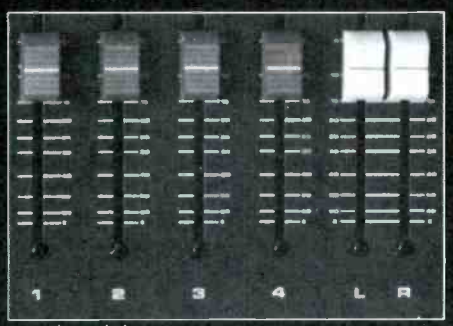
It carries the features that are a cut above the competition.



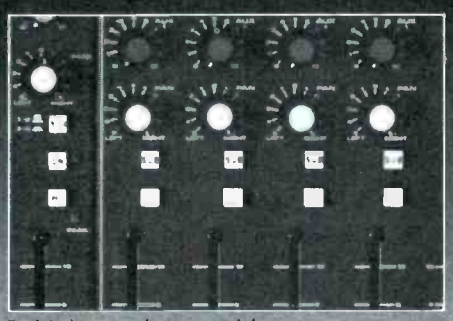
EQ and Q sends



Tape returns 1-8

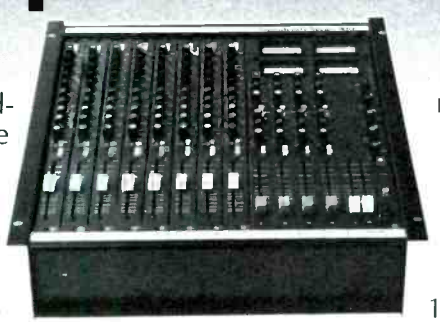


Long throw faders



Peak indicator, solo, mute, sub button

It carries a price that's a cut below.



At Soundcraft, the tradition of building mixing consoles like no one else can, continues.

The Series 200 represents a complete redefinition of what you can expect from a four buss mixer. And where you can expect to use it. Post production editing, video sweetening, club installations or on location. So revolutionary that it is suited to more applications than any other portable system. And perhaps most impressive, it's priced to suit the tightest budget.

Available in an 8 input rack mount or 16 and 24 channel sizes, it is as versatile as you are talented. When used in 8 track recording, the separate monitor section allows you to monitor all 8 returns individually in creating your mix. With 4 auxiliary sends (2 pre and 2 post) it has twice the capacity of comparable consoles making it ideal for small clubs, PA and broadcast requirements.

Unlike semi-pro mixers that have a −10dB nominal operating level, the Series 200 at +4dB conforms to industry standards when interfacing with VTR's and multi-tracks, for post production and a variety of other demanding professional applications. Additional sound improvements include a 1kHz oscillator for external alignments, electronically balanced mic and line inputs and long throw faders.

As with all Soundcraft consoles, the Series 200 is distinguished by 4 band EQ's so musical it sets the industry on its ear. However, for all the sonic breakthroughs, there is one sound you'll be pleased not to hear. Contamination caused by distortion and limited headroom. And, an outboard power supply eliminates any transformer hum.

Offering features like these that are a cut above other mixers, for a price that's a cut below, might sound amazing to our competition. To our customers it sounds unmistakably like Soundcraft.

Soundcraft

Soundcraft Electronics Canada, Inc.
1444 Hymus Blvd.
Dorval, Quebec, H9P 1J6
(514) 685-1610 Telex: 05-822582

Soundcraft Electronics
1517 20th Street, Santa Monica, CA 90404
(213) 453-4591 Telex 664-923

Soundcraft Electronics Limited
5-8 Great Sutton Street,
London, EC1VOBX, England
Telephone 01-251 3631 Telex 21198

Circle (88) on Reply Card

Time base correction:

An equipment survey

By Carl Bentz, television editor

The advent of videotape recording into the TV broadcast industry more than 25 years ago introduced an exciting technology. Since then many changes have occurred in recording. Although many aging 2-inch quadruplex machines continue to provide high quality reproduction, today heavy dependence also is placed upon 1-inch, ¾-inch and ½-inch formats, with a current stress on developing a ¼-inch recorder/reproducer standard. Also, a variety of videodisc-based field/frame still-store systems are in use. In each case, electronics and mechanics are married to sense, process and reproduce video images from a magnetic-material-oriented storage medium.

Incorporating the video recorder system into a broadcast or production operation requires that the video signal must be stable in respect to themselves and in respect to the other equipment in the station. Gen-locking is used to tie the video reproducer to the station in terms of time, often using highly sophisticated servo control to keep tape moving smoothly past even more tightly controlled moving video reproduce heads. Unfortunately, mechanical systems are subject to a variety of errors or instantaneous instabilities, which result in unlocked color, picture rolls and picture breakup. Fortunately, time base correctors (TBCs) may be used to alleviate nearly all such problems.

Although some TBCs are based on analog techniques, nearly every unit available on the marketplace today uses digital circuitry to sample an analog video signal, changing it into a digital stream of information that can be clocked into a memory system and held momentarily. Then, at the proper time, the signal is clocked back out of the memory, processed by a digital-to-analog converter and finally displayed without any of the aberrations caused by the videotape recorder or disc reproducing mechanism.

Time base correctors are commonplace items. However, new products continually are being introduced with additional capabilities to meet new demands placed upon correction systems. New recording formats, for example, needed a different approach in handling component video signals. The following comments are limited specifically to currently available TBC products. Frame synchronization is

Condor *THE PREMIER DIGITAL DISPLAY CLOCK FOR BROADCAST TIMING*

ET SERIES-ELAPSED TIMERS

ET 500
3½ 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 — 3½ 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 - 3½" LED Display

• Large 3½" 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 1½"), 6-digit (27-3/8" x 5-3/8" x 1½").

"2" Series - 2" LED Display with similar features as above

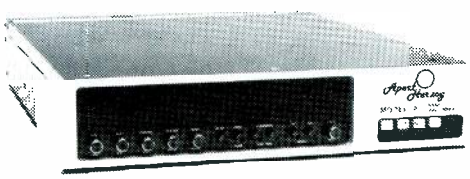
CALL OR WRITE FOR COMPLETE CATALOG AND SPECIAL INDUSTRY PRICES

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 (86) on Reply Card

Two New Products



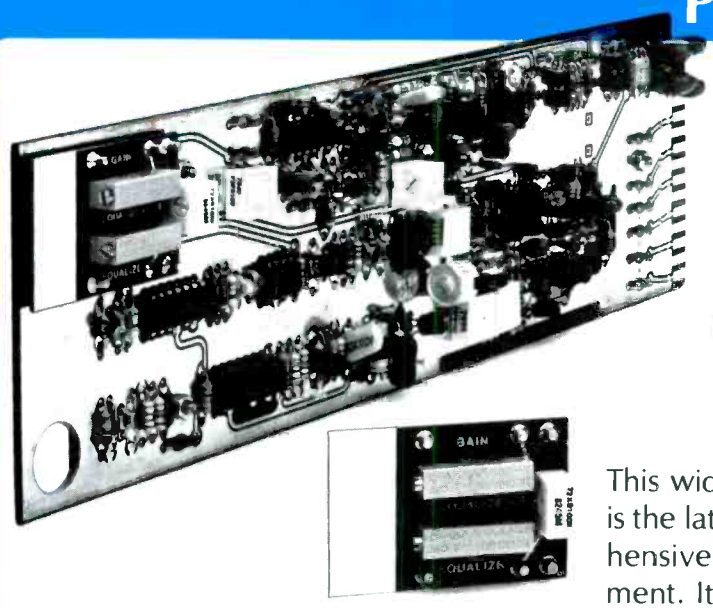
MODEL A2 — Digital frame synchronizer with digital comb filter provides field or frame freeze on command..... $7,995.00

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

Circle (87) on Reply Card

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.
8251k Greenbrier Circle
Chesapeake, VA 23320
Tel.: (804) 424-7920
Telex II: 710 882 4342

LEITCH

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

Circle (89) on Reply Card

mentioned only as an adjunct when both correction functions are served by the same equipment. Some products are not aimed at the US (NTSC) market. For more details, use the included Reader Service Numbers.

ADDA

Joining the ADDA VW TBC/synchronizer products is the AC20A dual-channel video signal processor. The unit allows time base correction and frame synchronization of two independent video sources, plus it provides digital switching effects such as split screen and wipe effects between the two signals. With 8-bit sampling at $4Xf_{sc}$, the AC20A offers at least 16TVL correction in the TBC mode. An optional synchronizer mode allows an infinite correction window.

AMPEX

Ampex's TBCs were designed for the company's VTR equipment, but work equally well with many other manufacturers' products. The TBC-2B provides reliable time base correction for Ampex 1-inch recorders and for many other non-segmented, helical-scan VTRs. Eight-bit sampling at $3Xf_{sc}$ allows a 12TVL correction window. Intended for use with the VPR-3, the TBC-3 produces stable color reproduction of the VPR-3 playback, including slow motion in forward and reverse play modes.

The latest Ampex entry is the TBC-80. Not only will the unit work with VPR-80 VTRs, but it interfaces to other 1-inch, ¾-inch and ½-inch recorders. The 8-bit $4Xf_{sc}$ sampling allows heterodyne processing as well, for up to 14TVL correction of ENG material being dubbed up to 1-inch.

APERT-HERZOG

The model H TBC includes an infinite window of correction for use with heterodyne-type recorders. The 8-bit, 14.318MHz sampling system uses a digital comb filter for signal separation and reduced noise. A newer system, the H2, is designed to be a low cost infinite window corrector for VTRs with 3.58MHz feedback and the $4Xf_{sc}$, 8-bit sampling. A comb filter remains in the unit, as well as frame/field freeze features.

DIGITAL VIDEO SYSTEMS

Known for the Phaser series of TBC/synchronizer equipment, DVS's most recent entries include the DPS-1 modular system and the DPS-103 component TBC/synchronizer. The DPS-1 offers look-ahead vel-comp, heterodyne processing and interfacing to non-servoed capstan machines with a 32TVL correction window. The DPS-103 operates with direct-process color on servoed VTRs for a 16TVL window. Both are 8-bit, 14.318MHz sampling systems.

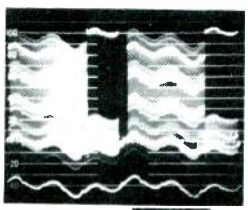
FORTEL

One series of equipment from Fortel is the CCD line, which uses a charge-coupled-device memory scheme. Digital control of the analog CCD devices in the CCD1H offers simple timing correction for CATV and closed-

STOP GROUND-LOOP HUM!

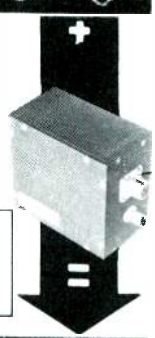
VIDEO HUM STOP COIL...HSC 1

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".

NEW!



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

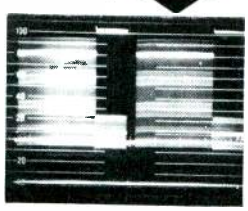
ELIMINATES HUM AND INTERFERENCE:

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



Available on 10 day free trial

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

Circle (90) on Reply Card

STL Offers The Most

Complete Selection

Of Test Tapes

Available Anywhere

STL can serve all your needs with precision test tapes for frequency alignment, level set, azimuth set, flutter & speed tests, sweep frequency tests and pink noise analysis. Also available is the Standard Tape Manual & the Magnetic Tape Reproducer Calibrator.

Phone for fast delivery or free catalog

STL

STANDARD TAPE LABORATORY, INC.
26120 EDEN LANDING ROAD #5 HAYWARD, CALIFORNIA 94545 • (415) 786-3546

Circle (131) on Reply Card

Microtime synchronizers. The features you want. The prices you can afford.

S–230. A TBC that synchronizes. A synchronizer that time base corrects. In a 3½" high, 27 lb. package. The S-230 synchronizes and time base corrects external signals such as network, ENG, microwave, satellite and remote studio feeds. And because it contains an infinite window TBC, it works with all 1/2" and 3/4" heterodyne VTR formats, with or *without* capstan servos.

The Auto Mode switching feature samples incoming signals and automatically selects the correct mode, TBC or synchronizer. The 8 bit, 4X subcarrier digital design and microprocessor-directed memory mean high reliability and transparent performance. Full frame memory allows manual selection of Field 1, Field 2 or Full Frame Freeze. Operator-selectable automatic freeze detectors permit controllable response to fading signals. All for only **$13,450.**

S–130. The most full frame synchronizer for the money. Like the S–230, it features a microprocessor subrcutine that provides ease of maintenance and confidence testing. The S-130 synchronizes external signals such as network, ENG, microwave, satellite and remote studio feeds, and is ideal for the new Harmonically Related Carrier (HRC) designs in CATV applications. Only **$10,990.**

MICROTIME

A Subsidiary of ANDERSEN GROUP

1280 Blue Hills Ave., Bloomfield, CT 06002. (203) 242-4242. TWX 710-425-1165.

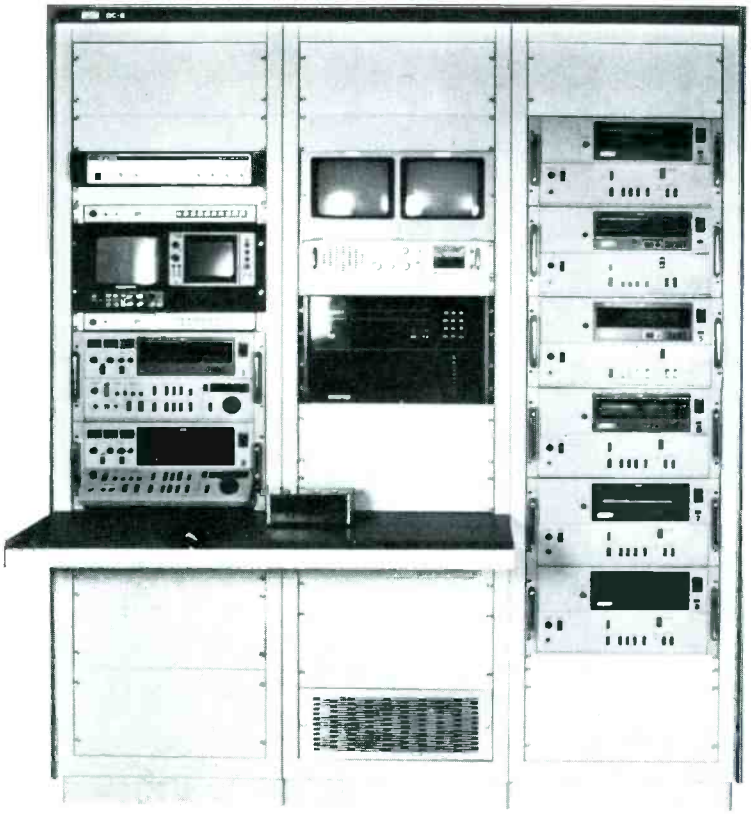
Circle (91) on Reply Card

Savings in synch.

NEW!

Video Cart Machine

$61,500



DC-8

Our DC-8 provides a low cost method of computer automated playback of commercials and programs for Television stations and cable operations. It is very simple and easy to operate. All the DC-8's components are time-proven for reliability and good performance.

- Sequentially plays back randomly accessed transports.
- Eight transports.
- Two record/playback transports.
- Program 98 events.
- Vertical interval switching.
- Auto cuing.
- Will play ten-second spots back-to-back.
- Will playback up to one-hour program with commercials automatically inserted.
- Synchronous video output.
- Full A/V monitoring.
- 10X1 A/V input switcher.
- Low cost carts.
- Very simple and reliable operation.
- Optional network joiner.
- Optional stereo audio.

Call now for more information
800-531-5232
Broadcast Systems Inc.
Austin, Texas

BSI
BROADCAST SYSTEMS INC.

Circle (124) on Reply Card

circuit applications. For more critical uses, the CCDHP and CCDHPS TBCs include tighter tolerances on specifications for broadcast use. While continuing with the CCD memory, the CCDHPS also includes the Faroudja color noise reduction circuitry for improved performance from heterodyne-formatted material.

The TBC[32] DIGIBLOC corrector is based on a modular concept with direct and heterodyne processing in a 14.318MHz, 8- or 9-bit sampling scheme. Features include a 32TVL window, Phase Comp velocity compensation, drop out compensation and dynamic tracking from 2X reverse to 4X forward play speeds and stop. Also, video frame and audio synchronizer capabilities are available.

In the Y-688[32] Total Error Corrector, luminance/chroma (dub) signals or encoded video are processed in two 32-line memories. Three-line adaptive comb filtering on encoded video reduces vertical smear. Improved signal rise times and the Faroudja noise reduction circuitry result in greater horizontal resolution. Outputs are available in dub or encoded formats.

For applications involving Y/I/Q component video (the M Format), the C-YIQ[32] offers wide versatility by accepting encoded video or separated luminance and IQ chroma with conversion to an 8-bit digital format. Time base correction uses dual 32TVL correctors and reinserts reshaped sync and burst signals. Three output formats allow composite video, Y/688kHz chroma or separate Y/I/Q components as required in the production facility.

GUNNERFIELD LTD.

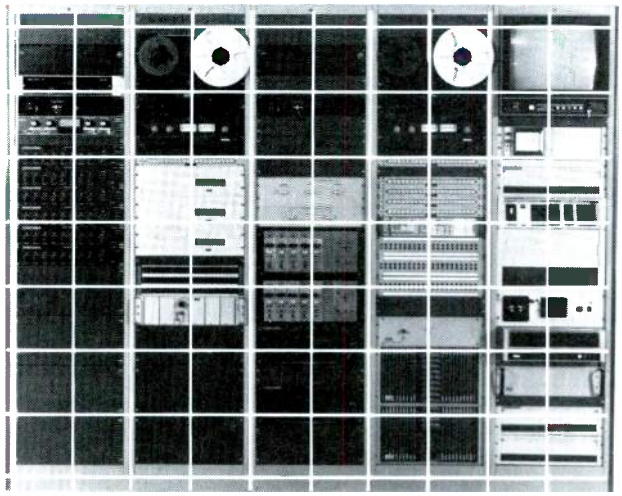
The Gunnerfield Ltd. products of England are new to the market. The GML 8000, GML 1002S and GML 2002S units provide time base correction, with the GML 8000 also acting as a synchronizer. Based on the PAL standard, 8-bit sampling at 14.4MHz serves heterodyne and non-servoed equipment with color correction capability. The GML 2002S also includes dynamic tracking and noise reduction features.

HARRIS

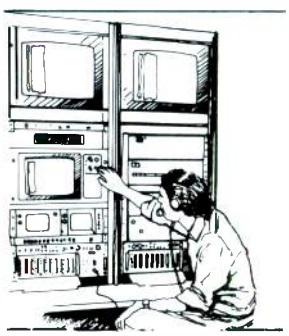
Harris Video Systems markets the 506 analog TBC, based on CCD technology, for the non-broadcast market. Its use is suggested for helical-scan, heterodyne color VTRs.

The 590 digital TBC is applicable to

To Totally Appreciate A Video, Audio/Visual or Teleconferencing Communications System Created By Avtec, You Have To Take It Apart.



Whether it's a conference room, a training center, a video studio or an audio/visual center, to fully appreciate the thought and care that went into a total communications system created by Avtec, you have to take it apart. And when you do, you'll begin to appreciate why Avtec has been acknowledged as a worldwide leader in total communications systems.



Design

Avtec designers begin a system at the very beginning. They will work with you, your architect and/or your communications consultant during initial planning. They'll study your requirements and provide all of those little details that ultimately lead to a system's successful operation.

Engineering

Avtec's engineering department is comprised of dedicated, talented professionals. Together, they control every facet of every system designed by Avtec. They'll consider the designer's concepts and translate those concepts into the technology a system specifically calls for.

Procurement

Avtec considers every communications system individually. We realize each has a specific purpose. We keep in mind the client's specific requirements, so we select and procure all system components on the basis of the best available technology and technical compatability.

Fabrication

Avtec procured equipment is tested individually as well as a total system and retested to make certain it meets our client's requirements and Avtec's demanding standards. Enclosures, consoles and alike are fabricated and finished and the system's components are assembled and shipped to the installation site.

Once the system is on site, Avtec personnel test every function. When we're absolutely certain the system is performing as it should, only then will we approve it for operation.

Documentation And Training

We don't consider our job to be over until our clients fully understand how to operate their systems. So we document every piece of hardware and software. Avtec engineers will remain at the installation as long as necessary to train all client personnel and we'll return to the site to repeat training sessions on an as needed basis.

Maintenance

If you appreciate the fact that during the life of any communications system problems sometimes arise, you'll appreciate Avtec service. Avtec's service group is available virtually anytime, anywhere in the world to solve problems quickly, efficiently and professionally.

AVTEC In Total

Each individual part of any Avtec communications system can be considered a specialty. The fact that Avtec can and does have proven expertise in each of these specialties, has established Avtec as a premier company in video, audio/visual and teleconferencing communications systems.

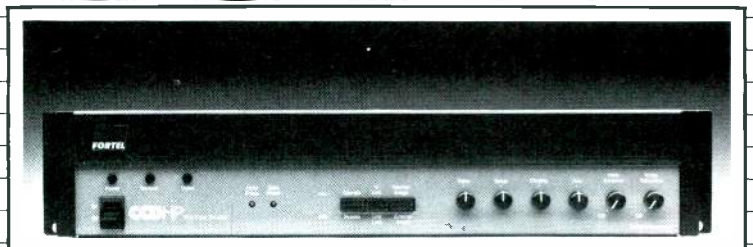
So if you are considering creating parts of a communications system or a total system, consider Avtec—the total company for total communications systems.

avtec INDUSTRIES, INC.

39 Industrial Avenue, Teterboro, NJ 07608
(201) 288-6130 • Telex: 134421 AVTEC TTBR
Regional Offices: Orlando, Florida; Riyadh, Kingdom of Saudi Arabia

Circle (92) on Reply Card

CCDHP™



TIME BASE CORRECTOR

$5,995

The POWER of INNOVATION ... FORTEL uses it to give you the world's only full function TBC for under $6,000. Want to know more? Call or write today.

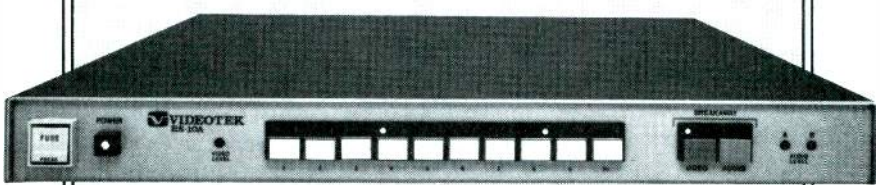
Fortel Incorporated
6649 Peachtree Industrial Boulevard
Norcross, Georgia 30092
404-447-4422

FORTEL

™CCDHP is a trademark of FORTEL Incorporated

Circle (93) on Reply Card

PROGRESS



"Breakaway" from the Crowd

...with Videotek's new RS-10A Audio Follow Video Routing Switcher. Ten bridging video inputs with dual channel audio breakaway make this an extremely versatile switcher. A remote control model is also available.

Now that's Progress...

BY·DESIGN

125 N. York St., Pottstown, PA 19464
(215) 327-2292. TWX: 710-653-0125

9625 N. 21st Dr., Phoenix, AZ 85021
(602) 997-7523. TWX: 910-951-0621

VIDEOTEK INC.

Circle (94) on Reply Card

segmented and non-segmented VTRs equally, with a 9-bit, $4Xf_{sc}$ sampling scheme. A 16TVL correction window is useful for heterodyne or direct color with advanced sync and 3.58MHz feedback available.

For operation with any heterodyne VTR, the new 550 includes 8-bit, 14.318MHz sampling in a compact package for 16-line correction and automatic vertical advance for large gyro errors. Reliability is suggested by abundant PCB signal paths, circuit board contact redundancy and integral shielding.

MCI/QUANTEL

Versatility is provided by the DFS1750 TBC/frame-store unit. Advanced sync is not required for handling of non-phased/heterodyne VTRs, but is available, allowing a playback of U-matic material via microwave if necessary. The heterodyne circuits automatically are activated if the input signal switches from phased to non-phased, and hot cuts are possible. Easy field diagnosis of component failure is possible with built-in reference signals.

MERLIN ENGINEERING WORKS

The Merlin ME-28 is based on the NEC NTC 5000 TBC. Through a special adaptation, the ME-28 operates with helical VTRs as well as quadruplex machines and replaces the original proc amp, Amtec, Colortec vel-comp and DOC sections of Ampex VR1200 and VR2000 machines.

The ME-228 TBC/synchronizer is another adaptation from Merlin. Based on the ADDA VW-2 synchronizer, the ME-228 meets quad requirements with full-frame, infinite window time base correction or synchronization. Heterodyne processing with velocity compensation is supplied in direct and heterodyne TBC modes.

MICROTIME

Microtime's T-120 system is designed for use with non-segmented ½-inch and ¾-inch U-matic equipment with 8-bit, $4Xf_{sc}$ sampling. A 16TVL memory, 3.58MHz feedback and averaging velocity correction operates as a stand-alone or genlocked system. A variation, the T-120D, includes dynamic tracking operation with Sony's BVU-820 U-matic VCR. By use of two T-120D systems and an E-120 effects pro-

UNITED MEDIA offers everything you expect in a quality video editor, except a high price tag.

United Media incorporates every capability into the Commander II for sophisticated video editing, along with quality construction and built-in reliability while providing personalized customer support.

Exploding the price stigma.

Some people will tell you that a quality editor is not possible at our low price tag. Wrong. And here's why.

United Media's designers, engineers and technicians always go to extremes. They settle for nothing less than impeccable design, the finest components and precise assembly techniques. Because their uncompromising attitude results in high efficiency, United Media is able to be profitable while selling its editors at a price lower than its competitors.

At any price you can't find a more versatile, more capable video editor than the Commander II.

Take the Editor Challenge.

We challenge you to compare United Media with any competitor by giving the Commander II a rigorous test. Only then will you learn what our customers have known all along. That in an editor-to-editor showdown measuring performance, construction, reliability, customer support and price, United Media is the forerunner. Give us, or your local dealer a call and we'll bring the Commander II to your facility so you can put it through the toughest editing tasks. You be the judge.

United Media

4075 Leaverton Court, Anaheim, CA 92807 (714) 630-8020 TWX 910-591-1669

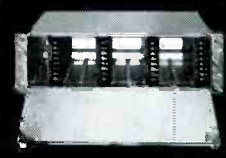
Circle (95) on Reply Card

RACK MOUNTABLE VIDEO DELAY LINES

A complete Rack Mountable series of Video & 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 KHz 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 (96) on Reply Card

When accuracy Counts...Count on Belar for AM/FM/TV MONITORS

BELAR ELECTRONICS LABORATORY, INC.
CALL ARNO MEYER (215) 687-5550
LANCASTER AVENUE AT DORSET, DEVON, PA. 19333 • BOX 826 • (215) 687-5550

Circle (97) on Reply Card

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

SEE PAGE 61

EECO Incorporated

Circle (125) on Reply Card

Want More information on advertised products?

Just refer to the reader service # beneath each ad. Circle the appropriate number on the Reader Service Card in the back of this issue. Complete the remaining information and mail!

BROADCAST engineering
P.O. Box 12901, Overland Park, KS 66212 U.S.A.

cessor, digital effects or A/B roll editing features are possible.

The T-100 TBC is priced low, but will fully lock and correct capstan-servoed, non-segmented ½- and ¾-inch heterodyne VTRs. Feedback of 3.58MHz, as well as a 16TVL memory range to mass VITS, VIRS and teletext information included on the videotape, are provided.

NEC AMERICA

Updating previous models, the NEC FS-18 frame synchronizer may double as a TBC with plug-in options. As a TBC, heterodyne and direct color in the frame synchronizer format allow flexibility. An automatic detection system determines the type of color processing to be applied. Expanded memory handles four fields simultaneously, preventing chrominance shifts during switching. The integral data rotation/memory analyzer feature provides quick diagnostics of component problems. Eight-bit, 14.318MHz sampling is used.

QUESTECH LTD.

The English QuesTech 6001P is currently limited to PAL (625/50 CCIR) standards, but the 9-bit component coding system offers a 2-field correction window for TBC or synchronizer modes. Encoded video and RGB signals are available for use in the station.

RCA BROADCAST SYSTEMS

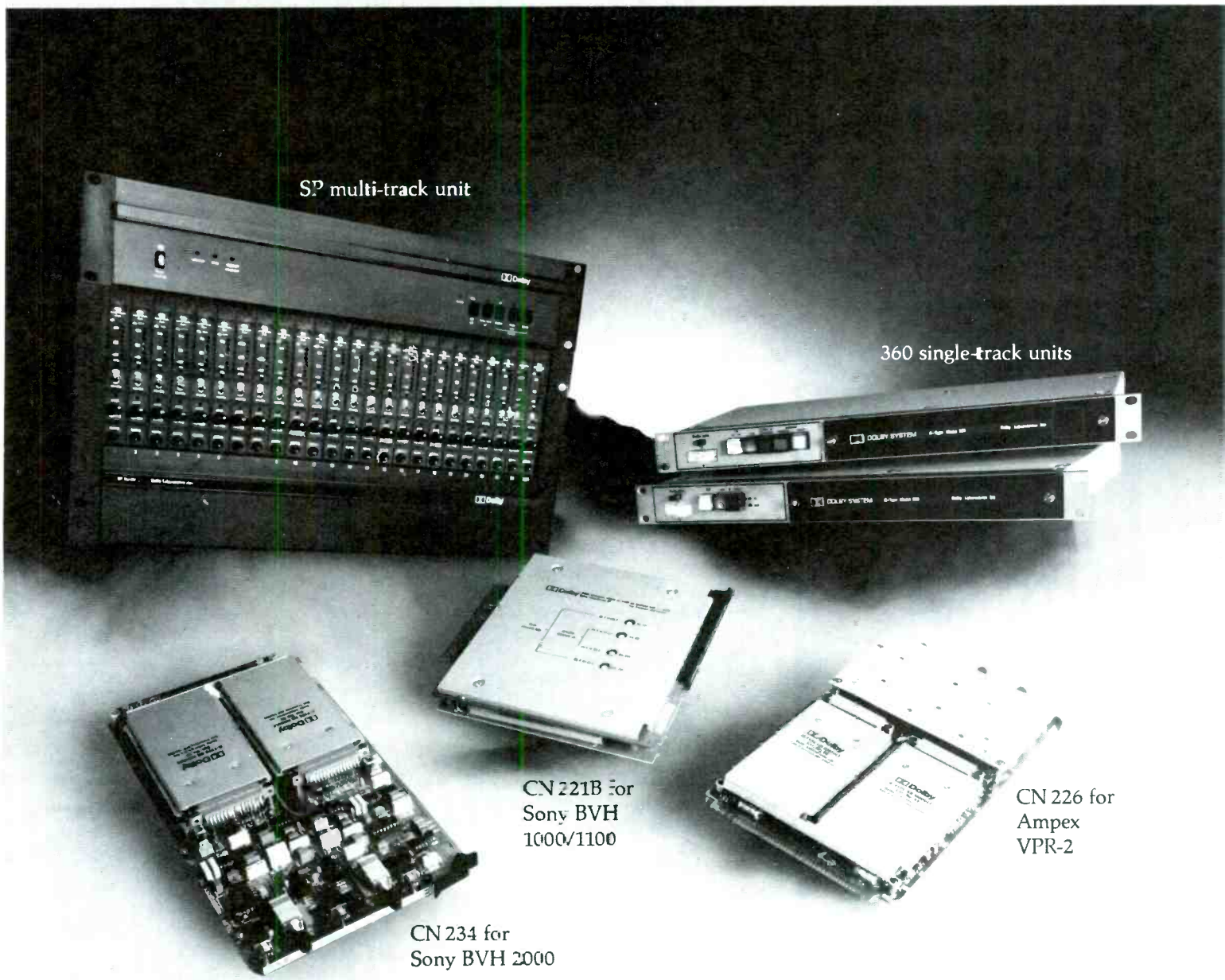
Two TBC units from RCA include the HT-32 and TBC-210P, both 8-bit, 14.318MHz sampling systems. The HT-32 includes a 32TVL window, line-by-line velocity compensation and applications with heterodyne color processing. The TBC-210P increases capability by allowing operations with non-servoed capstan machines, dynamic tracking heads and drop-out compensation. The TBC-210P's correction is 20TVL.

RCA also will be marketing a TBC as an integral unit with the TH-400 VTR on an agreement with Ampex. The package will include the VPR-80/TBC-80 system.

REGIS-BLT

The FSC 780 is referred to as a universal resynchronizer by the Italian Regis World Operation Company. Currently limited to 625/60

DOLBY® NOISE REDUCTION FOR THE 1980'S



Dolby noise reduction is keeping pace with today's demand for high-quality sound — everywhere. With the introduction of such products as plug-in modules for VTRs and the SP multi-track unit, it is easier than ever before to protect *all* your irreplaceable audio tracks from hiss, hum, and print-through. From broadcasting to music recording, from video sweetening to motion picture dubbing, Dolby A-type NR reliably continues to fulfill its original promise: effective noise reduction combined with complete signal integrity.

Dolby Laboratories Inc., 731 Sansome St., San Francisco, CA 94111. Telephone 415-392-0300. Telex 34409. 346 Clapham Road, London SW9. Telephone 01-720-1111. Telex 919109. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corp. 583/5050

Dolby®

Circle (98) on Reply Card

PAL-CCIR standards, the FSC 780 corrects any PAL signal, interlaced or non-interlaced, phased or non-phased, from VTR/VCR equipment, with or without servoed capstans. The digital component coding format typically provides 392 luminance and 196 R-Y or B-Y chrominance elements per line from its 8-bit sampling system.

SONY BROADCAST

The BVT-2000 TBC may be obtained in NTSC, PAL, PAL-M or SECAM standards with 9-bit, $4Xf_{sc}$ sampling and a 12TVL correction range in the NTSC version. With VTRs having dynamic tracking heads, the BVT-2000 allows variable speed playback. Velocity error, drop-out compensation and auto advanced sync generation are included in the system.

With dynamic-tracking-equipped BVU-820 VTRs, the BVT-800 series TBC provides capstan-servoed color-under correction from 1X reverse to 3X forward play speeds. An 8-bit, 10.9MHz sampling in NTSC combines with a 15TVL correction window, interfacing to the machine on a single multicore cable. Recognizable pictures in monochrome are possible at ±40X play speed. A digital drop-out compensator provides 1H (NTSC) and 1H (Y), and 2H (C) in PAL and SECAM formats.

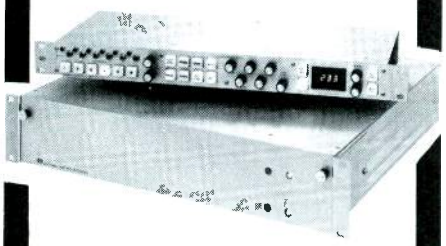
For use with BVH-2000 machines, the BKH-2100 (NTSC) and BKH-2200 (PAL) TBCs consist of four plug-in circuit boards. Eight-bit, 14.318MHz sampling allows a 1TVL correction window, recognizable pictures at ±50X play speed, selectable vertical blanking widths and an improved quadratic velocity compensation feature.

Specifically for color-under system VTRs, the BVT-500 (PAL) and BVT-500S (SECAM) allow flexibility of line in/line out, dub in/dub out, dub in/line out or line in/dub out use. A 3.5TVL window, color picture replay at 2X play speed and built-in drop-out compensation are features.

THOMSON-CSF BROADCAST

With frame synchronizer and TBC modes, the 9100 processor offers coherent 3.58MHz feedback, advanced signals and the capability for processing heterodyne color. An 8-bit, 14.318MHz sample rate is used, along with 15dB noise reduction and comb filtering for separation.

How to Get the Keying You need Without Replacing the Switcher You Already Have



The NEW 1231 DOWNSTREAM KEYER Can Give You:

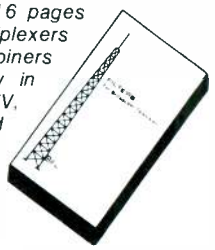
- 6 Simultaneous Keys
- Key Bordering
- Key Masking
- Key Dissolve In and Out
- Fade to Black
- Post Production Editor Interface

GPS GRAHAM-PATTEN SYSTEMS, INC.
P. O. BOX 1960
GRASS VALLEY, CA 95945
(916) 273-8412

Circle (122) on Reply Card

Filters for Broadcast TV

Catalog BTV — 16 pages of filters, traps, diplexers and channel combiners that are currently in use in UHF, LPTV, MDS, L-band and microwave instructional TV applications.



Diplexer for combining two educational channels.

Custom Design, Fast!

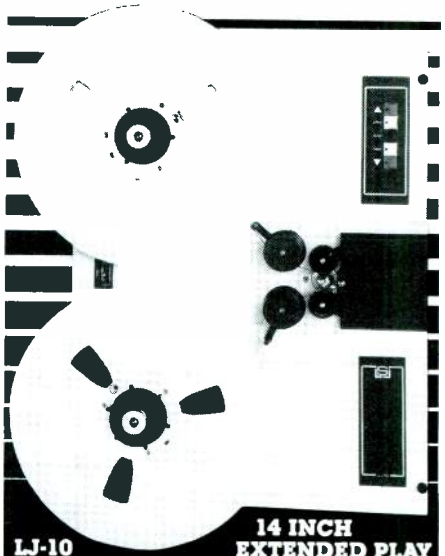
If we don't already have the broadcast TV filter you need for your installation, we'll build it, fast!

We've been helping all branches of communications for over 15 years — we can help you too! Write or call toll free for your free copy of Catalog BTV.

MF MICROWAVE FILTER COMPANY, INC.
6743 Kinne St., East Syracuse, NY 13057
Toll Free 1-800-448-1666—TWX 710-541-0493
NY/HI/AK/Canada (Collect) 315-437-3953

Circle (99) on Reply Card

THE LEGEND LIVES



LJ-10 14 INCH EXTENDED PLAY REPRODUCER
THE ORIGINAL SCULLYS
LJScully
THE L.J. SCULLY MFG. CORP.
138 Hurd Ave., Bridgeport, Ct. 06604 U.S.A.
203/368-2332

Circle (126) on Reply Card

NEW FROM UTAH SCIENTIFIC

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 (100) on Reply Card

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 (117) on Reply Card

Eventide Is On The Move

We're expanding to new and larger facilities. As of January 1, 1984. You'll find us at:

Eventide
the next step

1 Alsan Way
Little Ferry, N.J. 07604

Our new phone number is:
(201) 641-1200

Attention Digital Hardware and Software Design Engineers

Our expansion has created career opportunities. Send us your resume for a prompt reply.

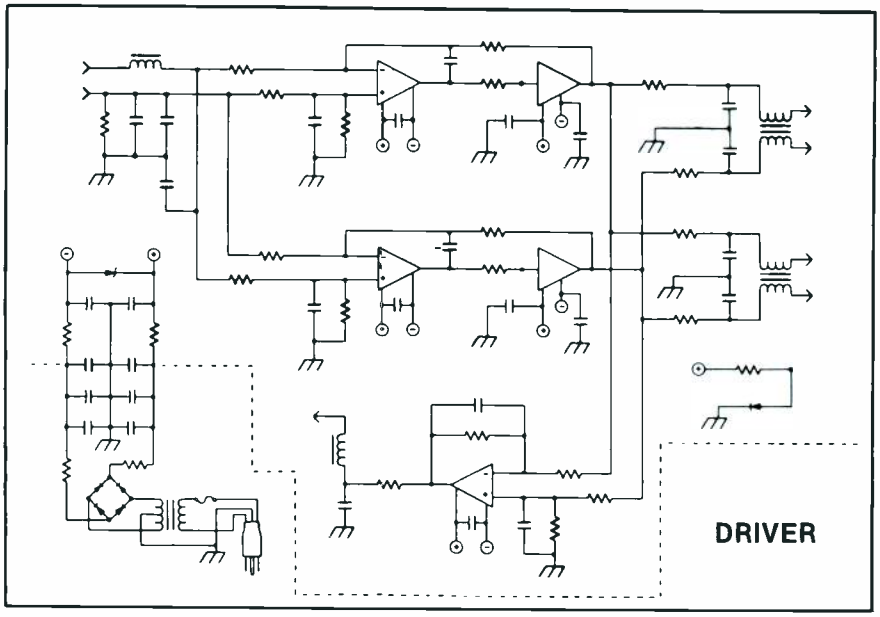
Circle (127) on Reply Card

Field report: Modulation Sciences

By Harold L. Buttermore, II, chief engineer, WHYT, Detroit, MI

On Sept. 15, 1982, WJR-FM (beautiful music) became WHYT ("hot hits"). The new Top 40 format required a complete studio rebuild. Included in the all-new equipment installation was the first Modulation Sciences (MSI) composite line driver system to come off the line. The CLD-2500, a wideband composite line driver/receiver that can drive up to 10,000 feet of twinax cable (an *in-house STL*), solved many problems we encountered during the project.

WHYT's studios are located on the



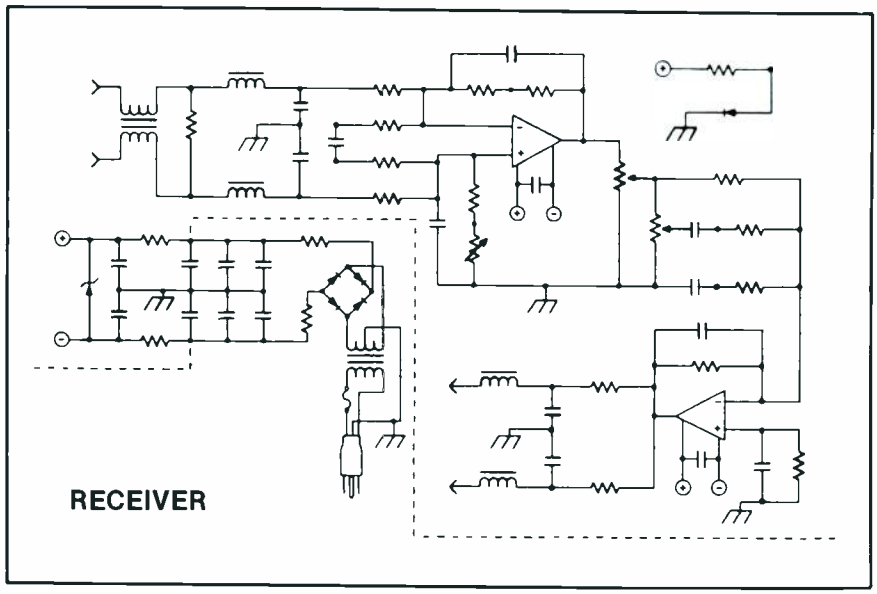


Figure 1. Shown are schematics of the CLD-2500 composite line driver/receiver system.

CLD-2500 line driver/receiver

21st floor of the Fisher Building, the transmitter on the 29th floor and the antenna on the roof. The transmitter room is small and acoustically hard, because of the brick construction; also, it is extremely noisy because of the transmitter's blower motors. We decided quality listening and tedious processing adjustments would be better accomplished if the stereo generator and processing gear could be placed closer to the studios. Proofs and other test procedures would be simplified as well.

The problem is that most stereo generators can drive a line of 30 inches or so, but certainly not 300 feet or more. Eric Small of MSI suggested a method for achieving the separation of stereo generators and exciters that developed into the CLD-2500. Basically, a high current, balanced, impedance-matching driver couples to twinax cable. The receiver terminates the cable and an active circuit converts the balanced twinax circuit to a coax driver capable of the short run to the exciter. Figure 1 shows the driver and receiver. An extremely high quality hybrid amplifier with a slew rate of lkV/ms at 2.5W is used. The published specs were enticing enough, and our proof on the CLD-2500 confirmed its performance.

To test the CLD-2500, we first bench tested the driver and receiver separately for noise, response and distortion. Test equipment, consisting of a Tektronix AA-501 and SG-505 test set, produced the results shown in Table I.

Table I.

	Noise	THD	IMD
Receiver:	– 88.6dB	0.0032%	0.0025%
Driver:	– 88.6dB	(Response...Flat)	

Table II.

	Noise*	THD	IMD (4:1)
Receiver:	– 79dB	0.0104%	0.0052% (or – 85dB)
Driver:	(Response...Flat)		

*Unweighted

Circle (123) on Reply Card

Video Amplifier

SERIES 1500 1 in, 4 out Video Distribution Amplifiers provide high quality performance in color and high resolution monochrome systems.

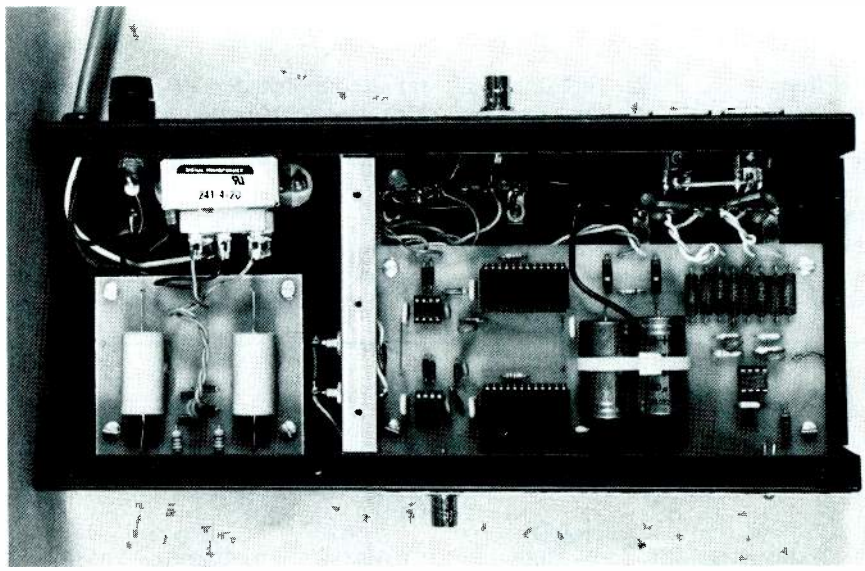
Precision hybrid video operational amplifiers provide ±0.5 dB frequency response to 10 MHz, +1, -2 dB at 30 MHz, and 0.25%/0.25° differential phase/gain.

- ★ 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 (101) on Reply Card



This internal view of the composite line driver unit shows the circuit construction. Power input, fuse and system output are on the rear. Front panel has BNC test connector and LED power-on indicator. Unit is mounted to standard 1.75"x19" rack panel.

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 (102) on Reply Card

We then tested the system through the approximately 300 feet of twinax used in our installation. The results are shown in Table II.

System tests

The next step was to put the entire chain through the system. With the line driver and receiver in-line, we obtained the same noise figure as with just the exciter and transmitter, −72dB. Adding the stereo generator brought it to −67dB. This was clearly the only gear in the chain that showed any noise at all. I am convinced that the CLD-2500 is transparent in the chain, measurably and sonically. I must admit that my figure of −72dB is conservative, as it actually was testing the limit of my modulation monitor and was so far down scale that we had to put a number "guesstimate" on it.

The system is easy to install, with an optional rack-mount kit available. It is small, occupying only one rack unit, or 1¾-inch rack space. Connections are simple, yet mechanically and electronically reliable. Starting with the driver, the input is a floating BNC connector that receives your stereo generator composite output.

There are two outputs—handy if you need to feed the same composite to two exciters or transmitters. (This allows, for example, the same processing to feed a main and auxiliary transmitter.) A BNC test jack on the front panel provides grounded isolated output. The output connectors are standard XLR. This is a controversial item, because some people do not like XLR connectors. However, I understand that twinax connectors are cumbersome to work with. XLR connectors, on the other hand, are quickly and easily installed to the twinax cable.

The receiver unit is the same size as the driver. An XLR connector receives the composite via twinax cable. The signal passes through an isolation amplifier, then the unit provides a low impedance output on a grounded BNC connector on the back of the box. The connector feeds your exciter, and the unit will handle a moderate length of cable. There is a BNC test jack on the front panel, which provides a separately isolated output, useful in checking composite parameters before the exciter.

A storage scope could permit comparison with the test jack on the driver, allowing a check on the cable itself. An output level pot provides system gain adjustment of 0dB to −20dB. The high frequency (20-turn) compensation control is a high frequency equalizer used to compensate for losses in the interconnecting cable.

If you demand absolutely the best audio transformer,

insist on a Jensen!

Choose From a Wide Variety of Types and Packages

- Microphone Input
- Microphone Bridging
- Line Input
- Direct Box
- Low Freq. Crossover
- M.C. Cart. Step-up
- Electret Mic Output
- Bridging
- Repeat Coil
- Line Output
- Special Types

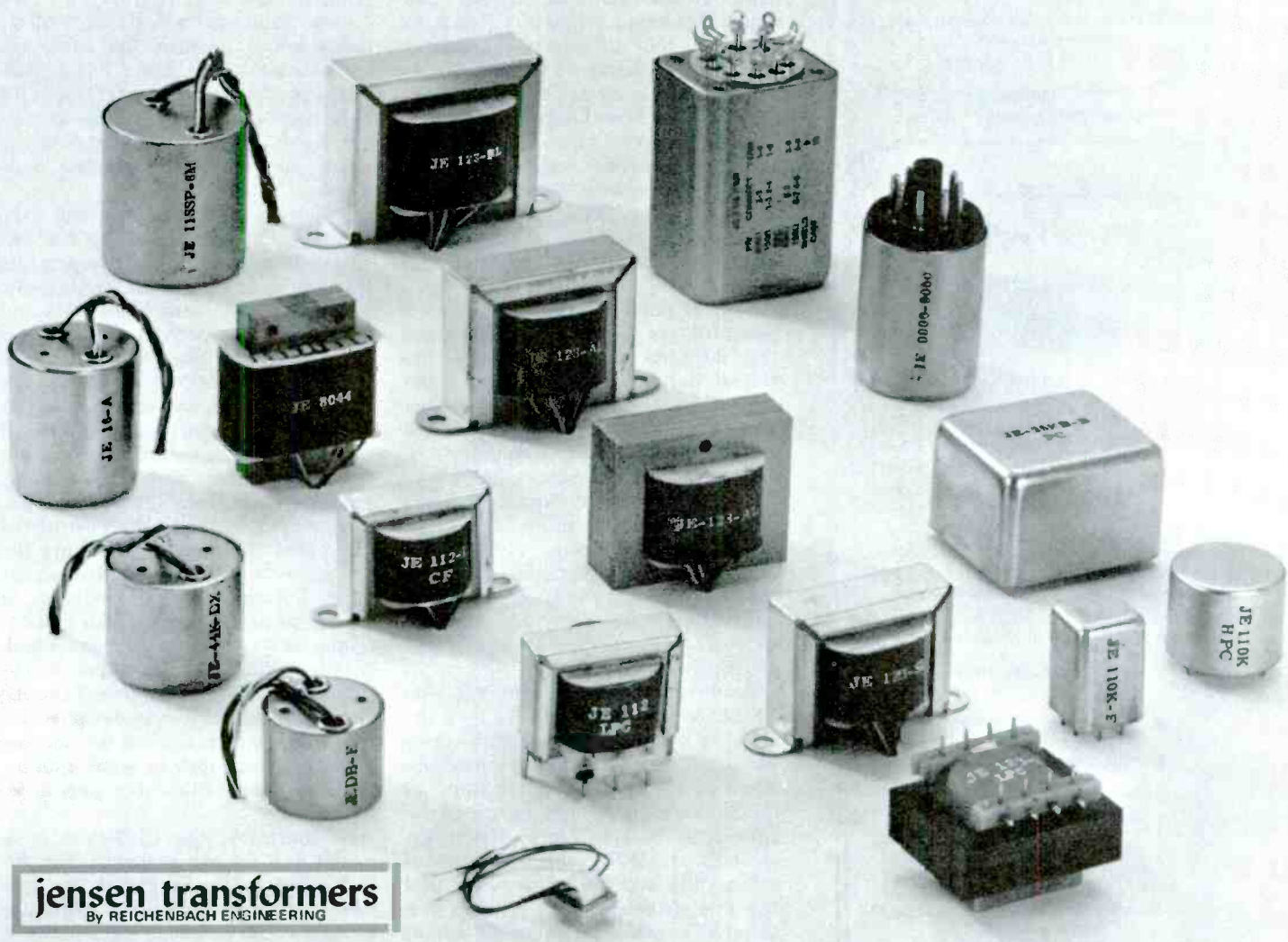
Superb specifications, consistent performance, and unsurpassed reliability have earned Jensen a solid reputation as the world's preeminent manufacturer of audio transformers.

We control every facet of design and construction, from core alloy up, using sophisticated computer modeling techniques. With 5 years software development background, including an AC circuit analysis for Hewlett-Packard's 9845 desk top computer, we now market our own advanced circuit optimization programs. Because Jensen transformers are designed to function as an integral part of the circuit, not as an afterthought, *all* parameters can be optimized. The result is *a clearly audible improvement in transformer technology.* For example, our Model JE-115K-E mic input transformer has under 1% overshoot with no RC damping network (bridged output), and exceptional magnitude and phase response.

Our highly qualified technical staff is eager to assist you with expert applications engineering. Discerning engineers have field proven our transformers, by the tens of thousands, in the most demanding environments—professional recording studios, fixed and mobile broadcast facilities, and touring sound systems. That returns and failures are rare is no accident; we place strong emphasis on quality control.

We carefully inspect every transformer before and after encapsulation. Then, in our computerized automated test lab, we verify that each and every transformer meets or exceeds its specs.

We take this extra care because we are dedicated to excellence. So next time you need a transformer, *insist on the best—Insist on a Jensen.*



jensen transformers
By REICHENBACH ENGINEERING

10735 Burbank Boulevard/N. Hollywood, CA 91601/(213) 876-0059
Write or call for information. Visitors by appointment only (closed Fridays).

Circle (103) on Reply Card

Balanced Equalizer

SERIES 1500 Balanced Equalizing Amplifiers provide high quality video transmission through 124 ohm cable runs.

High performance 24 dB post-equalization for cable runs to 3,000 ft. Extends to 7,500 ft. when used with pre-equalizer.

★ Front panel adjustments and test points

★ Two outputs

★ High thermal stability

★ Self-contained with internal power supply

DYNAIR

5275 Market St., San Diego, CA 92114
Phone 619/263-7711
TWX 910/335-2040

Circle (119) on Reply Card

Unbalanced Equalizer

SERIES 1500 Unbalanced Equalizing Amplifiers provide high quality video transmission through 75 ohm cable.

High performance 24 dB post-equalization for cable runs to 3,000 feet.

★ Differential/grounded inputs

★ Front panel adjustments and test points

★ Two outputs

★ High thermal stability

★ Self-contained with internal power supply

DYNAIR

5275 Market St., San Diego, CA 92114
Phone 619/263-7711
TWX 910/335-2040

Circle (120) on Reply Card

Adjustment procedure

The equipment operating manual provides an easy adjustment procedure for this control, which consists of inserting a 10kHz tone on the left channel only and observing the composite on the driver test jack with an oscilloscope. The stereo generator L – R gain is then adjusted for the flattest baseline display. The scope then is moved to the receiver and connected to the test jack. The HF comp control is adjusted to duplicate the waveform observed on the driver unit. Alternatively, a spectrum analyzer can be used to measure response to 53kHz. The HF comp control then is adjusted for ±0.05dB from dc to 53kHz.

You may question the use of twinax. Not generally used in broadcasting, the type specified by Modulation Sciences, Belden 9463, often is used in computer data communications. The reason for using balanced cable is to eliminate the difference in ground potential developed when running unbalanced cable more than a few feet, especially between floors or buildings, resulting in ground loops, noise, hum, etc. A square wave response through 2500 feet of cable at 50Hz showed no tilt or ringing. Other advantages of twinax are its availability and reasonable price, compared to other special cables.

Before talking with Modulation Sciences, we had searched for some way to send the composite to the transmitter, a distance of 300 cable feet. Video DAs came to mind. They have the necessary high frequency response, but their low frequency roll-off often results in separation degradation. Other faults found are less than desirable S/N ratios and insufficient RF immunity. Fiber-optics, although certainly capable of passing the composite, are limited by the optical drivers and receivers, and the cost of a fiber-optics system seems prohibitive.

Because we have dubbed the CLD-2500 the in-house STL, we decided to compare it to a typical composite STL. Noise is usually a problem here, and the CLD-2500 is rated at 85dB below 4Vpp broadband noise from 20Hz-100kHz. Stereo separation is 55dB at 15kHz with 1000 feet of cable, 45dB at 2500 feet. It seems that the line driver/receiver exceeds the usual STL specs and definitely would not degrade any parameter of a high quality broadcast system.

The CLD-2500 solved our problems related to placement of the stereo generator and processing and performed beautifully as such. If your station has co-located studios and transmitters, whether on a high office building or at ground level with the tower several thousand feet from the studio building, this product allows a more desirable placement of the stereo generator and audio processing devices.

Another feature of the driver portion of the CLD-2500 is that it can be used stand-alone for a composite DA. Its one-in, two-out configuration is ideal, for example, in sending one stereo generator output to two exciters. If two stereo generators were on hand, two CLD-2500s could be used in conjunction with a video patch panel to obtain maximum flexibility, allowing complete redundancy, as often is required with today's competitive situations.

I was impressed with the CLD-2500's construction. It uses the same enclosure used in MSI's CP-803 composite processor. The metal box is RF tight, using 21 screws to secure the top cover. Construction used ferrite beads and other RF proofing techniques.

There were several things that bothered me, however. First, the manual, although thorough on the operating side, is a bit deficient technically. There could be more schematics and circuit layouts. Second, the receiver placement is critical. My experience with the CLD-2500 revealed that the placement of the unit in the rack was critical to the noise figure obtained. If placed too close to the exciter, hum was picked up. Third, XLR connectors may not seem the best choice, however, considering the cost of the unit, plus the ease of installing the XLRs to twinax, the choice seems valid. Fourth, for total flexibility, it would be useful to have two outputs on the receiver, rather than one. Finally, there could be a trimpot in the driver unit to adjust the level from the stereo generator. It was designed for unity gain, which worked fine for me. However, there may be some applications in which adjustable gain is required.

In summary, the CLD-2500 composite line driver/receiver is the perfect solution for any FM station that needs to place its stereo generator more than 30 feet from the exciter. It allows up to 10,000 feet of cable to be used, which, in some cases, could be-

Manufacturer's specifications: CLD-2500 driver/receiver system

SPECIFICATION (Note 4)	DRIVER/RECEIVER ONLY (NO CABLE)	WITH 1,000 FEET OF BELDEN 9463	WITH 2,500 FEET OF BELDEN 9463
FREQUENCY RESPONSE (DC to 53 kHz)	± 0.01 dB	± 0.02 dB	± 0.03 dB
DIFFERENTIAL TIME DELAY RELATIVE TO 38 kHz AT:			
1 kHz	- 40 nS	+ 10 nS	+ 20 nS
10 kHz	- 10 nS	+ 30 nS	+ 20 nS
19 kHz	- 5 nS	+ 10 nS	- 15 nS
53 kHz	+ 5 nS	+ 10 nS	- 40 nS
STEREO SEPARATION AT:			
1 kHz	> 60 dB	> 60 dB	55 dB
15 kHz (Note 5)	60 dB	55 dB	45 dB

Note 4: All specifications relating to system with cable were measured with HF compensation control adjusted.

Note 5: Separation figures were calculated from measured amplitude and delay response, assuming an ideal stereo composite input signal

come an economical alternative to a conventional microwave link. The system allows your audio processing equipment to be removed from often terrible transmitter areas to more civilized areas nearer to the studios. I was impressed with the CLD-2500 and would recommend it to anyone with a need for it.

Editor's note:

The field report is an exclusive **BE** feature for broadcasters. Each will be prepared by the staff of a broadcast station, production facility or consulting firm. The intent is to have the equipment tested on-site. The author is at liberty to discuss his research with industry leaders and to visit other broadcasters and/or the manufacturer to track down pertinent facts.

In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations – if any.

In essence, these field reports are prepared *by* the industry and *for* the industry. Manufacturer's support will be limited to providing loan equipment and to aiding the author if support is requested in some area.

It is the responsibility of **Broadcast Engineering** to publish the results of any piece tested, whether positive or negative. No report should be considered an endorsement by **Broadcast Engineering** for or against a product.

Arrangements for the equipment used in these tests were made between the author and MSI. More information on the equipment covered may be obtained by contacting Modulation Sciences, 99 Myrtle Ave., Brooklyn, NY 11201.

Affordable Random Access Video Cart Systems

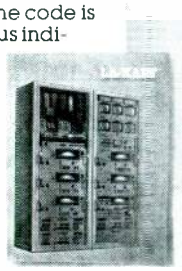
Cost effective, modular, and expandable

Component Switching and Processing

Modified ¾" U-Matic Players with Y-C/DOC outputs or ½" Type M with YIQ outputs are switched through our vertical interval Matrix Switcher into a component TBC.

Automatic Directory Reading

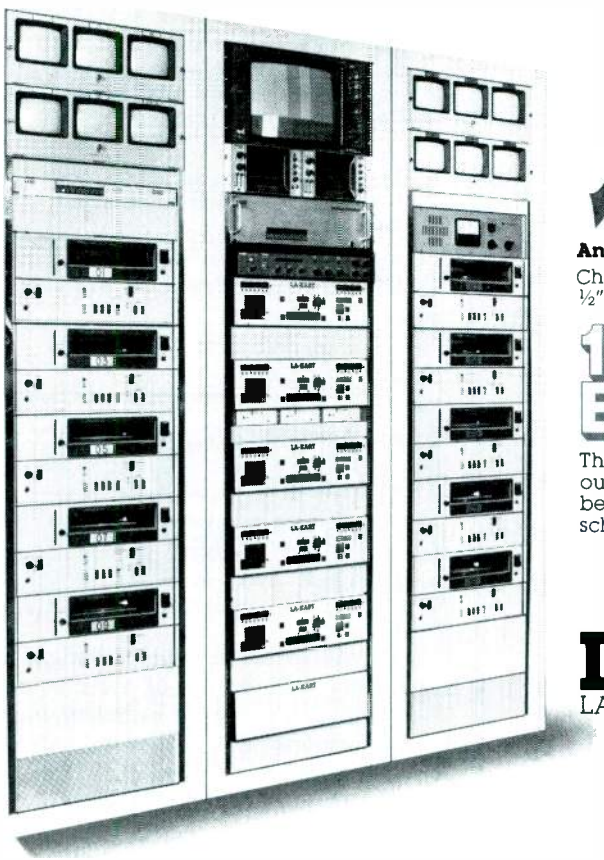
Cassettes are loaded randomly into any empty deck. They rewind automatically to the head and the directory, containing a 4-digit reel ID number with precise start and finish times of each segment according to their location with reference to SMPTE time code is read into memory. The status indicating ID found and VTR location is displayed on the terminal.



Send for Brochure

Lake Systems Corporation, 55 Chapel Street, Newton, MA 02160 617/244-6881

© Lake Systems Corp 1983



Any Tape Format

Choose from 1" Type C, ¾" U-Matic, ½" Type M, or any combination.

1000 EVENTS Or more with 68K Multi-Event Programmer and Disc Drive. The computer identifies, searches out, and activates tape segments to be cued and aired in the order scheduled.

Lease Plans Available

LA-KART™

LAKE SYSTEMS CORPORATION

Prices Start at $89,900

Circle (104) on Reply Card

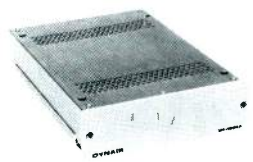
Switch, Distribute, Equalize

with DYNAIR'S SERIES 1500

- ★ 6 x 1 Video Switcher
- ★ 1 x 4 Video Distribution Amp
- ★ 1 x 4 Pulse Distribution Amp
- ★ Unbalanced Equalizing Amp
- ★ Balanced Equalizing Amp
- ★ Balanced Pre-Equalizing Amp
- ★ Rack Mounting Frame
- ★ Blank Modules
- ★ Desk Mount Kit
- ★ Switcher Lighting Kit

Convenience engineered for simple installation, the Series 1500 shares mounting accessories.

Rack Mounting Frame provides space for three Series 1500 modules in standard 19-inch equipment racks.



Blank module fills one unused space in Series 1500 Rack Mounting Frame and is a convenient housing for installer furnished customs.

Desk Mount Kit for one Series 1500 unit.

Video Switcher Lighting Kit. Calculator-style plug-in transformer with 6-foot cable.

DYNAIR

5275 Market St., San Diego, CA 92114
Phone 619/263-7711
TWX 910/335-2040

Circle (121) on Reply Card

1984 calendar

A brief show listing for the coming year

Jan. 14-18
Association of Independent Television Stations (INTV) 11th Annual Convention, Los Angeles, CA

Jan. 16-18
LPTV West, Anaheim, CA

Jan. 20-23
COMMTEX/NAVA, Dallas, TX

Jan. 29-Feb. 1
National Religious Broadcasters (NRB), Washington, DC

Feb. 10-11
SMPTE 18th Winter TV Conference, Montreal, Canada

Feb. 10-14
National Association of Television Programming Executives (NAPTE) 21st Annual Conference, San Francisco, 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 33nd Annual Convention, Chicago, IL

June 3-6
National Cable Television Association (NCTA) Annual Convention, Las Vegas, NV

June 10-15
Broadcasters Promotion Association (BPA) 27th Annual Seminar and Broadcast Association, Las Vegas, NV

June 24-27
CCBA Convention

Aug. 26-29
NAB Radio Programming Conference, Atlanta, GA

September/October
LPTV East

Sept. 6-8
Southern Cable TV Association, Atlanta, GA

Sept. 16-19
NRBA Annual Convention, Los Angeles, CA

Sept. 20-21
IEEE 34th Annual Broadcast Symposium, Washington, DC

Sept. 21-25
International Broadcasting Convention (IBC), Brighton, England

Oct. 8-11
AES 75th Technical Meeting & Exhibits, New York, NY

Oct. 27-Nov. 3
SMPTE 126th Annual Conference, New York, NY

Oct. 28-Nov. 1
Scientific-Atlanta Earth Station Seminar

Dec. 3-5
Radio Television News Directors Association (RTNDA) International Conference, San Antonio, TX

Dec. 5-7
Western Cable Show, Anaheim, CA

ARTICLE REPRINTS

Interested in reprints of an article out of this or another issue? Reprints of articles about your company or the industry can be valuable sales and marketing tools. For information, call or write Robyn Kahn, Intertec Publishing Corp., P.O. Box 12901, Overland Park, Kansas 66212; (913) 888-4664.

The new Saticon II camera tube. Clearly superior to lead oxide.

Compare the unretouched photos below and see for yourself how the new RCA Saticon* II camera tube reduces specular highlight memory, without red trail.

You no longer have to choose between lead oxide's good handling of highlights and Saticon's well known superiority in other critical performance factors. Now it's a whole new ball game.

Computer-aided deposition and advanced material purification technologies have given Saticon II a considerably improved photoconductor. Your benefits: less highlight trail, reduced highlight memory (as much as 75% less than that experienced with earlier Saticon tubes), improved resistance to image burn.

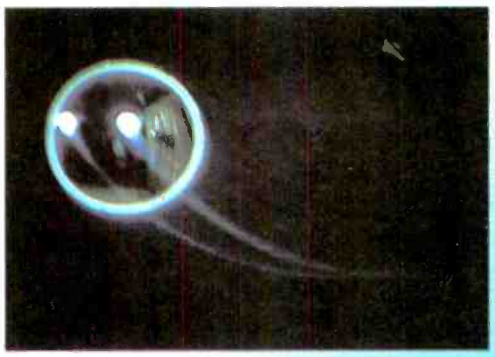
What's more, you still get all of the recognized advantages of Saticon: high resolution, distortion-free colors, very low lag, and extremely long tube life. And Saticon II is backed by a warranty that's second to none. RCA offers full replacement for any failure in normal use for six months, compared with only two months for Plumbicon™.

Your choice is now clear. For more information on the complete Saticon line, 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.

*Used by permission of trade mark owner.

Good. Plumbicon XQ1427.

Photograph of direct reflection of flood lamps, produced by camera with CTS circuitry. Note highlight memory with red trail.



Better. Saticon II BC4390.

Same subject and conditions as in photograph at left. Note reduced highlight memory without red trail.

RCA

Circle (106) on Reply Card

ELIMINATE GLARE.

BLACKWRAP™
FLEXIBLE MATTE BLACK ALUMINUM

·HEAVY DUTY
·FORM HOLDING
·COATED TWO SIDES

Mask light leaks, shape beams, cut glare, cover up loose ends...

Convenient 12" x 50' roll. Write or call for more info.

THE GREAT AMERICAN MARKET
826 N. COLE AVENUE HOLLYWOOD CA 90038
TELEPHONE 213 461-0200 · TWX 910 494 1233
© 1983 The Great American Market.

Circle (105) on Reply Card

new products

Brief case

Added to the Shok-Stop line, *Thermodyne Int'l.* offers a newly designed, rugged brief case. With an accordian file in the lid for papers, a choice of custom foam lining or plain interior and easily operated locking catches, the case is ideal for the engineer on the go.

Circle (300) on Reply Card

Power reducer

McMartin Industries' post-sunset power reducer enables AM daytimers to take advantage of pending FCC rules permitting operation after sunset at reduced power. The power reducer comes in two models. The PS-1K takes a daytimer from 1kW down to any lower power. The PS-5K takes a daytimer from 5kW down to any lower power. The power reducers automatically provide the proper power reduction and switching.

Circle (301) on Reply Card

Nicad battery packs

KAPCO's KN2001 and KL2001 nicad packs weigh 3¼ pounds and measure 2¾"x6¾"x2½". Both packs come with chargers, shoulder straps, stitched belt loops and a 1-year unconditional warranty.

Circle (302) on Reply Card

Monitor and printer

EECO's SM-9 video status monitor and SP-10 status printer are new accessories for the IVES system. The SM-9 9-inch monochromatic monitor displays complete status of editing functions during computer-assisted video post-production. The SP-10 printer offers 120 characters/s printing speed for rapid printouts of complete editing status information.

Circle (303) on Reply Card

Encoder/decoder

A system for sending time-of-day information and other cue and control data embedded in video has been demonstrated by *Torpey Controls & Engineering Ltd.* The system consists of an encoder that will insert up to 48 bits of data into the video signal on a line selected between 11 and 16, which then is transmitted or recorded with the normal picture. A decoder, placed in the video signal path and selected to that line, will deliver the 48 bits of data to the intended equipment. The data does not appear in the active video, and can be strapped to avoid other uses of the vertical interval.

Circle (304) on Reply Card

FCC update

Continued from page 6

may do so by simply notifying the commission of its plans. Such notification must be accomplished by letter filed within 10 days after the operation commences.

In the same proceeding, the commission relaxed its technical standards for STV transmissions. It said that all STV licensees operate at variance with FCC TV signal quality criteria, largely due to audio performance problems while stations are broadcasting in the scrambled mode. Correcting this variance, if technically feasible, would impose unreasonable costs on STV licensees and ultimately the public they serve. The commission found that the best remedy for any signal quality problems would be the marketplace, rather than regulation.

Satellite update

Continued from page 12

that medium power satellites, operating in the conventional Ku-Band (11.7-12.2GHz) may prove to be adequate in delivering programming to reasonably sized antennas in the 2m range, vs. the 1m size to be used in DBS systems. If this occurs, with three US companies and several Canadian companies testing the concept in 1984, the implementation of DBS systems could be delayed in many countries.

Interpretation of trends

C-Band satellites will continue to be the primary delivery systems for cable television and for some broadcasting services through the remainder of this decade, but an increasing number of medium power Ku-Band satellites will be launched to provide DBS-type services to regions too remote for cable and to provide new capabilities for the major broadcasting networks. An increasing amount of international programming will become available as deregulation continues on a global scale. This means that the proper planning of antenna and other facilities is mandatory to ensure adequate reception (and transmission) capabilities. C-Band antennas must conform to the new 2° spacing requirements, and new Ku-Band antennas must be installed consistent with possible transmit requirements. Also, if programming is to be received from foreign countries, antennas must be properly sized for the signal level available.

people

Whitaker

BE names Whitaker radio editor

Broadcasting is a rapidly moving field that requires a steady stream of information. The two main arms of broadcasting—radio and television—often have widely varying needs, and we at **Broadcast Engineering** have moved to give each discipline the attention it requires. Toward this end, we have expanded our editorial staff to include separate editors for radio and television.

The latest addition to the magazine is **Jerry Whitaker,** our new radio editor. He comes to **BE** with a mix of writing and hands-on engineering experience. Many readers will be familiar with his work. Within the last few years, Whitaker has written more than a dozen articles for this magazine and other national publications. His most recent credits include "Aural STL Systems," which appeared in the November 1983 **BE,** and two articles in the October issue ("Satellite Audio Distribution: RKO Digital Has Arrived" and "Field Report: Wilmore 1409-24 Uninterruptible Power Supply"). Whitaker is also editor of the Society of Broadcast Engineer's *SIGNAL* newsletter, and will be involved in the upcoming *SBE Journal*, scheduled for publication in mid-1984.

Whitaker brings to **BE** a new perspective on radio. For the past seven years, he has been chief engineer at KRED-AM/KPDJ-FM in Eureka, CA. In that capacity, Whitaker has dealt with problems that a working engineer faces every day. His work has involved station renovation, maintenance and new construction, including renovation of the entire KRED-AM plant and construction of the KPDJ-FM system from the ground up.

Whitaker's writing background also includes several years of news experience at KCRA-TV and KCRA-AM in Sacramento, CA, which involved producing and writing the 11 p.m. newscast and editing the morning news block on radio.

Whitaker attended California State University, Sacramento, where he studied electrical engineering. He loves radio and believes in its future. We welcome him to the **BE** staff.

If you would like to discuss radio topics, you may call Whitaker at 913-888-4664. Also, look forward to seeing him at the NAB-'84/Las Vegas Convention.

With Whitaker joining our staff, **Carl Bentz** has been reassigned to the position of television editor. Because most of Bentz's background has been in television, this new assignment strengthens **BE's** in-depth coverage of advances in television.

Our business is to serve broadcasters and the broadcasting industry. Do not hesitate to call any of us if we can help.

Bill Rhodes
Editorial Director

Perfect Timing

CLOCKS AND TIMERS

FROM $166

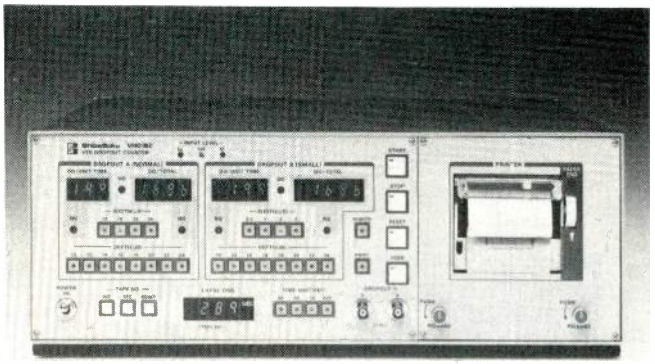
TO $471

ESE

(213) 322-2136
142 Sierra Street, El Segundo, CA 90245

Circle (113) 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 −10dB / −24 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

ASACA/SHIBASOKU CORP. OF AMERICA
12509 Beatrice Street, Los Angeles, California 90066
Sales, Service: (800) 423-6347 • (213) 827-7144

Circle (114) on Reply Card

Richard E. Clark, Jr., has been promoted to vice president at Smith & Myers Advertising in Santa Ana, CA. Formerly, he was an account executive. Clark handles account administration for agency clients including TASCAM/TEAC Corporation of America, Montebello, CA; JBL/UREI, Northridge, CA; United Media, Anaheim, CA; Grass Valley Group Modular Products Division, Grass Valley, CA; and Thermodyne Int'l., Long Beach, CA.

Joseph W. Hanf, formerly with MCI/Quantel, has joined Fortel as product assurance manager. He will be responsible for assuring product quality and reliability, and for service operations. In addition to Hanf, **Vince Torti,** formerly Eastern service manager for ADDA Corporation, has joined Fortel as Northeast regional service manager.

James E. (Jim) Hurley has been named vice president of engineering for the WTAE Division of the Hearst Corporation in Pittsburgh. In this new position, Hurley will be responsible for licensing and regulatory procedures for engineering and purchases of equipment for WTAE-TV, WTAE-AM and WHTX-FM. He also will handle corporate engineering matters as needed. Hurley, formerly director of engineering for WTAE-TV, has been replaced by **Jerry Kalke,** who was previously manager of ENG operations.

William G. Connolly has been named president and chief executive officer of Sony Broadcast Products Company. He succeeds **Neil R. Vander Dussen,** who recently was appointed president and chief executive officer of Sony Consumer Products Company. Connolly comes to Sony after a 23-year career with CBS, where he had been vice president and deputy director of engineering and development for the CBS Broadcast Group.

After a lengthy illness, **F. Howard Steele,** managing director of Sony Broadcast Ltd., died on Oct. 11.

During his career, Steele worked for the Marconi Company, Alpha Television Studios, ABC Television, the Independent Television Authority and Sony Broadcast Ltd.

In addition to acting as technical consultant to Ulster Television, Grampian Television, Westward Television and Channel Television, he also was closely concerned with color systems research at Teddington, including the early development of color systems transcoders. In May 1969, Steele was awarded a Montreux International TV Symposium citation for his work on TV systems.

For most of his professional life, Steele was deeply involved in the affairs of the Institution of Electrical Engineers. He also was a Fellow and past member of council of the Royal Television Society, an honorary Fellow of the British Kinematograph Sound and Television Society, a member of the Society of Motion Picture and Television Engineers and a member of various other national and international committees concerned with professional and industrial matters.

In May of this year, the Gold Medal of the Royal Television Society, the highest award that can be bestowed by the RTS, was presented to Steele. The Gold Medal, which is a gift of the chairman of the council of the society, was presented "for outstanding services to television over more than a quarter of a century. His particular contributions included the planning and design of TV studios, the introduction of the UHF color service to the ITV network and his role with national and international organizations on the formulation of technical standards."

Steele was educated at Mill Hill School and the Imperial College of Science and Technology, London University, graduating in 1952.

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

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

RADIO ENGINEERING CO.
CONSULTANTS
NORWOOD J. PATTERSON
BOX 420
SANTA YNEZ CA 93460
(805) 688-2333
Serving Broadcasters over 35 years

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 **266 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!

BROADCAST ENGINEERING

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

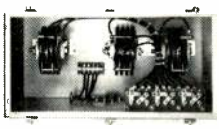
NORWOOD, AUSTRALIA
Hastwell, Williamson, Rouse Pty. Ltd.
P.O. Box 419
Norwood 5067, Australia
Phone: 332-3322
Telex: AA87113

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.
Room 801, Shinjuku Komuro-Heim
Shinjuku-ku Tokyo160, Japan
Cable: EMSINCPERIOD
Phone: (03) 350-5666
Telex: 2322520 EMSINCJ

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 (107) on Reply Card

FREE 32pg Catalog & 50 Audio/Video Applic.

OPAMP LABS INC (213) 934-3566
1033 N Sycamore Av LOS ANGELES CA, 90038

Circle (108) on Reply Card

Stik-up

COMPACT SINGLE SOURCE LUMINAIRE.
·Small, Light Weight
·Mounts in any Position
·Kit, Accessories

THE GREAT AMERICAN MARKET
826 N. COLE AVE HOLLYWOOD CA 90038 213/461-0200

Circle (109) 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 (110) on Reply Card

NEW

AUTONET CART-REEL CONTROLLER
performs every function needed to record net feeds and prepare them for playback . . . *AUTOMATICALLY!*

MEI MICROPROBE ELECTRONICS INC
Call Dave Collins (312) 295-2606
910 Sherwood Drive, Unit 19
Lake Bluff, Illinois 60044

Circle (111) on Reply Card

NOW SAFE AREA, SAFE TITLE AND CENTRE LINES ARE AFFORDABLE: $1095

8 independent loop thru video channels, each can have any combination with digitally derived stability

DATA SHEET ON REQUEST

Maric Industries Ltd., 2978 Pasture Circle
Port Coquitlam, B.C. V3C 2C2 Canada

Circle (112) on Reply Card

HEAD RE-CONTOURING

Standard 24 hour service. All Mfgr's & Trk formats: Audio, Video, & Still Storage. Full line of replacement heads & accessories are also available. **Send for FREE brochure.**

RESTORATION
15904 STRATHERN ST. #23 • VAN NUYS, CA 91406
(213) 994-6602

Circle (128) on Reply Card

ad index

Want more information on advertised products? Use the Reader Service Card.

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-tfn

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-tfn

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-tf

HELIAX-STYROFLEX. Large stock—bargain prices—tested and certified. Write for price and stock lists. Sierra Western Electric, Box 23872, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-tf

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-tfn

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-tfn

RENTAL EQUIPMENT

davidgreen

RENT broadcast test gear from the largest inventory in America. Potomac field strength meters and proof of performance systems, Delta operating impedence 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-tfn

Renew
your free subscription
today.

BROADCAST
engineering

MISCELLANEOUS FOR SALE

REFINE SILVER from electronics scrap! RALTEC, 25884B Highland, Cleveland, OH 44143. 11-83-2t

RAZOR BLADES, Single Edge, Tape Editing, RALTEC, 25884B Highland, Cleveland, OH 44143. 11-83-3t

PERSONAL STUDIO FOR SALE: MCI 8 track w/DBX Noise Reduction Quantum 12 in-8 out console, 2 DBX compressor/limiters, AKG BX 10 Reverb. Excellent condition. (316) 264-5210. 11-83-3t

FRAME SYNCHRONIZER/DIGITAL NOISE REDUCER/ TBC-Thompson/CSF-9100—New condition—Two units—$22,000 each. Field Synchronizer/TBC-DSF-2550 Quantel—Excellent condition—Two units—$8,500 each. 213-506-7470, Charlie Boster. 11-83-2t

BROADCAST CRYSTALS for AM, FM and TV transmitters, hundreds in stock. Vacuum types and special crystals available. Crystal and oven service. Eldson Electronic Co., Box 3751, Temple, Tx. 76501. (817) 773-3901. 12-83-eom

EQUIPMENT FOR SALE

2 EACH AMPEX BCC-4 color camera (Same as NEC NMC-61) with all spares, 2 each Ampex BCC-2 cameras with all spares, 3 each NEC 9207 ¾" players, 1 each Ampex VPR 8300 (JVC-8300) ¾" full elect. editing ¾" recorder, 1 each convergence ESC103B (Ampex HPE1C) editor exc. cond., 1 each convergence/Ampex SE100 spec. eff. exc. cond., 1 each convergence/Ampex TCR-100 TC reader exc. cond. Please call after 5:30 p.m., (408) 733-6404. 12-83-1t

SONY BVP 300 CAMERA, Fujinon 12 x 9 lens, Sony BVU 100 recorder, Sony fast charger & BP90 Batteries, Anvil cases included, $15,000.00. Gavin, (215) 238-9593 or (404) 436-7305. 12-83-1t

18-20 FT. SECTIONS Prodelin 6⅛" 75 ohm flanged transmission line. Harold Nash, KXTX-TV, 214-521-3900. 12-83-2t

¼ INCH PRESSURE (pinch) Rollers for Scully Model 270 and 280, $51.00 each, includes shipping. Send check to L. J. Scully Mfg., 138 Hurd Ave., Bridgeport, CT 06604. 12-83-2t

RCA TK-76 COLOR CAMERA with Angenieux 15 to 1 zoom. Equipped with auto iris and remote iris control, 3 battery belts, 1 fast charger, and A.C. power supply. Excellent condition. $15,000. Contact Jeff Kraemer, (513) 861-2555. 12-83-1t

SHIVELY 6810, 8-BAY FM ANTENNA, 90.1, Cost $12,000, new, $5,000, new Pirod 250' guyed tower, $5,900, (216) 493-7000, (216) 497-9000. 12-83-2t

1-1972 FORD F/700 Diesel Mobile Video Van complete. If interested call M. A. Morozovsky with C.I.T. Corporation, (213) 796-8881. 12-82-1t

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-tf

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-tfn

WANTED: STATION LIBRARIE'S 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-tfn

WILL PAY CASH for Sharp XC 701RP camera control unit. New or used. Call Arlee, 800/648-6966. 11-83-2t

WANTED: OLD RCA, Western Electric tubes, speakers, amplifiers. Also, McIntosh, Marantz tube amplifiers. Garrard, Throens, turntables. (713) 728-4343. Maury Corb, 11122 Atwell, Houston, Texas 77096. 11-83-3t

WANTED, USED 10 WATT, educational type FM transmitter. Ready to go, complete, or high powered FM exciter. Bud Sunkel, P.O.B. 15, Covington, Indiana 47932. 12-83-2t

WANTED: Turn your excess components inventory to cash—transmitting and camera tubes, lamps, solid state, etc. S & M ASSOCIATES, 105 Cedar Ave., Hewlett, N.Y. 11567, (516) 599-6434. 12-83-1t

EMPLOYMENT SERVICES

WE PLACE
TV and Video Engineers
[All Levels, But Not Operators]
COME TO THE SOURCE
Come To
KEY SYSTEMS
Westminster Road
Wilkes-Barre, PA 18702
Phone Alan Kornish at
(717) 655-1458

HELP WANTED

channel master satellite systems inc.

EXPANSION OF OUR MICRO-BEAM FACILITY
IMMEDIATE OPENINGS

Microwave Components Assembly Production Manager
Take charge of the manufacturing and testing of Microwave transmitting and receiving equipment.

Microwave Design Engineer
Must understand microwave theory, be capable of microwave system design using state-of-the-art commercially available components. 3-5 years experience required.

Send resume or call:
Richard Derrenbacher-Microwave Project Manager
Industry Drive Oxford, N.C. 27565
(919) 693-3141

Located near Research Triangle Park Area
Raleigh/Durham
EOE

HELP WANTED (CONT.)

BUILD A BETTER VOICE FOR AMERICA

There's no challenge like it in the world.

The Voice of America is offering you the challenge and the opportunity to put your engineering skills to practical use while updating and operating the VOA worldwide broadcast communications network. We need you to help us manage and operate our existing stations and new stations, both in the U.S. and overseas. There are opportunities to grow with a growing system.

Relay Station Directors

Experience required in the management and operation of radio transmitting stations either in the U.S. or overseas. VOA stations consist of high power shortwave and medium wave transmitting facilities, power plants and related telecommunications systems. Station Directors supervise large staffs of both American and foreign nationals; plan and administer financial resources; maintain public relations with the local community and with foreign goverments.

Field Engineers

Positions open for all levels of field engineers at U.S. and overseas locations. It's the Field Engineer who is responsible for keeping the VOA transmitters on the air seven days a week, twenty-four hours a day! Responsibilities cover all phases of operation and maintenance of high power (up to 1,000,000 watts) medium and shortwave transmitters and telecommunications subsystems. Duties include daily operations, routine and emergency maintenance and repair; testing and evaluating new electronic equipment and modification of existing equipment. Entry-level positions include "on the job" training.

Relay Station Plant Managers

Responsible for the supervision of all activities at either a transmitting plant, a receiving plant or a power plant at stations both in the U.S. and overseas. Responsibilities include supervising station personnel in the operation and maintenance of plant facilities, equipment and property. Additional duties will be to direct operations and maintenance, direct special project activities, develop budget estimates and financial plans, coordinate work effort of the plant, and serve as advisor and consultant to tne station director.

The wide ranging benefits of Federal employment are enjoyed by all Voice of America personnel. They include salaries commensurate with experience, liberal vacation and sick leave program, health and life insurance for you and your family, and a generous retirement plan.

We would like to hear from you. We invite qualified professionals to submit applications for these uniquely challenging and rewarding positions. Write to us. You can expect an early response.

For more information, please send your resume in confidence to:

Voice of America
Director of Engineering
Suite W
Post Office Box 1625
Washington, D.C. 20013

U.S. Citizenship required. A thorough background inquiry may be necessary. Voice of America is an equal opportunity employer.

VOA

The Voice of America is part of the U.S. Information Agency.

ENGINEER/TECHNICIAN—Progressive radio chain seeking Chief Engineer for modern FM operation. Experience with audio and transmitters required. Good benefits, salary commensurate with qualifications. Call Steven Bridges at (214) 757-2662. E.O.E. 12-83-1t

CHIEF ENGINEER FOR INDEPENDENT UHF STATION, and production facility. Five years experience in repair and maintenance of broadcast equipment required. Good knowledge of UHF transmitters, supervisory skills, FCC reporting, and budget management also required. EOE. Call for more information...Peter Parise, (915) 533-1414. 12-83-1t

BROADCAST TECHNICIAN. Leading broadcast and teleconferencing systems integrator in San Diego, California, needs broadcast technician with an A.A. degree or equivalent training and five years experience in maintenance of broadcast television and audio systems. Looking for sharp, self-motivated individual. Excellent benefits. Send resume to Centro Corporation, 9516 Chesapeake Drive, San Diego, CA 92123. 12-83-1t

CHIEF TELEVISION ENGINEER—An administrative position responsible for the area of television operation to include: installation, modification, inspection and maintenance of ¾" video, ENG and editing equipment; CCTV, CATV, local area network, microwave (including satellite), and color studio. Two years college or technical school, with computer and digital skills, and demonstrated experience in the set-up, operation and maintenance of the above systems. At least two years electronic television experience in an educational TV system and the possession of an FCC license. Starting salary range is $21,945 to $27,431 contingent upon relevant experience and training. The salary is enhanced by a competitive fringe benefits package. Send letter of interest, transcripts, resume and letters from three current professional references to: Gordon L. Fox, Coordinator, Audiovisual/Television Services, Lorain County Community College, 1005 N. Abbe Road, Elyria, Ohio 44035. INCOMPLETE FILES WILL NOT BE CONSIDERED! Deadline for receipt of application materials is January 15, 1983 (postmarked). An Affirmative Action/Equal Opportunity Employer. 12-83-1t

VIDEO SALES—Major N.J. video dealer offers a challenging opportunity for professional video sales people. Previous industrial and/or broadcast experience required. Salary commensurate with experience. Commission, car, excellent fringe benefits. Reply in confidence to: Video Corporation of America, 1913 Route 27, P.O. Box 697, Edison, N.J. 08818. 1-82-tfn

CHIEF ENGINEER—VHF CBS Affiliate seeking chief engineer. Must possess 1st or general class FCC license. Excellent pay and employee benefits. Resume should reflect personnel management, responsible television engineering achievements and FCC compliance ability. Send resume to Charles Woods, General Manager, WTVY-TV, P.O. Box 1089, Dothan, Alabama, 36302. EEO/AA Employer. 10-83-3t

EMPLOYMENT OPPORTUNITIES—KSBW-TV is seeking qualified applicants for the following positions: ENGINEERING OPERATOR—Two years experience necessary as master control operator, videotape & film operator, and news switching. Operate Ampex & Grass Valley switchers, Ampex VPR-2B, RCA TR-600 and TCR-100A, RCA film. Current wages—$435.74/wk. ENGINEERING OPERATOR/MAINTENANCE—Two years experience maintaining broadcast equipment including videotape, ENG, EFP, microwave, switchers, digital effects. State of the Art test equipment available. Current wages—$450.68/wk. KSBW-TV is a VHF facility located near the beautiful Monterey Bay in California and is presently constructing a new 35,000 sq. ft. facility. Excellent Benefits. Send resumes to: Eric Dausman, Chief Engineer, P.O. Box 81651, Salinas, CA 93912. Blair Broadcasting of California, Inc. is an Equal Opportunity Employer. 12-83-2t

TELEVISION AUDIO OPERATOR—The Christian Broadcasting Network, Inc., an evangelical Christian ministry, is seeking a professional audio operator/mixer with a proven track record and experience in the operation of many different professional audio consoles. Must have 3 years experience as audio operator for TV or recording studio, excellent hearing, knowledge of many musical instruments, and proficient in sweetening and music mixing. Knowledge of basic electronics with emphasis in audio engineering a must and advanced degrees a plus. If you feel led and wish to serve, send resume in confidence to: Employment Manager, Christian Broadcasting Network, Inc., CBN Center, Virginia Beach, VA 23463. CBN is an Equal Opportunity Employer. 12-83-1t

CMX EDITOR: Scene Three—Nashville seeks a post-production videotape editor for evening/night shift. Experience with ADO, SqueeZoom, CMX 340X and Chyron preferred. At least two years timecode editing experience in commercial and program production required. Send resume to Mike Arnold, 1813 Eighth Avenue South, Nashville, Tennessee 37203. 12-83-2t

TV MAINTENANCE ENGINEER: Scene Three—Nashville is expanding and seeks skilled maintenance engineers to join our fast growing production/post-production company. Experience in maintaining 1" VTR's, ADO, Vital and Ampex switchers, Ikegami cameras and related equipment preferred. Send resume to Mike Arnold, 1813 Eighth Avenue South, Nashville, Tennessee 37203. 12-83-2t

F & F PRODUCTIONS IS LOOKING FOR A Mobile Production Maintenance person. The applicant must be able to travel extensively and possess good client relations and management skills ability, under difficult field conditions. The position requires 3-5 years digital and solid state broadcast maintenance background. Totally familiar with cameras, video tape, switching equipment and audio. Weekend and holiday work essential. Competitive salary, liberal overtime and major company benefits. Call or send resume to Mr. Lawrence Nadler, Director of Engineering, F & F Productions, Inc., 10393 Gandy Blvd., St. Petersburg, Florida 33702, (813) 576-7676. A division of Hubbard Broadcasting, F & F Productions is an Equal Opportunity Employer, M/F. 12-83-1t

Reconfirm
your involvement in
the broadcast industry!
**Renew
your subscription
today.**

HELP WANTED (CONT.)

TELEVISION CAREER OPPORTUNITIES

Get in on the ground floor!
An exciting new TV station in Ontario, CA., will air January 1, 1984, to service the Los Angeles area.

Immediate openings for staff positions, including:

- General Manager
- Broadcast Engineers
- Production Manager
- Operations Manager
- Program Director
- Sales Representatives
- Clerical

Excellent salaries and comprehensive benefit package. Qualified applicants are invited to submit resume to:

HBI ACQUISITION CORPORATION
18103 Skypark South, Suite D
Irvine, CA 92714
Equal Opportuity Employer

CHRISTIAN TELEVISION STATION requires Chief Engineer. Strong UHF background required. Contact Ben Miller, Director of Engineering, Trinity Broadcasting Network, P.O. Box "A", Santa Ana, CA 92711. E.O.E. 11-83-2t

ASSISTANT CHIEF ENGINEER—OPERATIONS. Strong, people oriented person with 3 to 5 years management experience as Assistant Chief or Chief desired for this top 15 TV sunbelt market. Responsibilites include: scheduling, streamlining operations, special projects, and assist in maintenance of the station as time permits. Send resume to Chief Engineer, Dept. 599, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. E.O.E. 11-83-2t

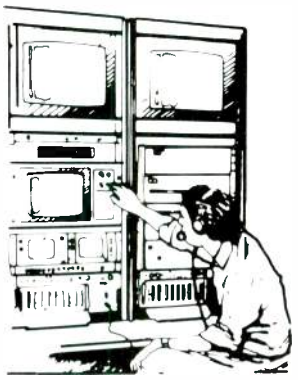
SPACE SHUTTLE TELEVISION: Opening for qualified engineer with established NASA Contractor • BSEE for design and documentation of process control and CCTV projects • Broadcast TV experience and FCC License desirable • Excellent wages and benefits. Send resumé to: Taft Broadcasting Corporation, 1022 Hercules Avenue, Houston, Texas 77058. Attn: Mary Kirkland. EOE M/F/H. 12-83-1t

ASST. CHIEF ENGINEER—Southern California's, UHF commercial independent, needs engineer with at least 5 years maintenance experience and a solid knowledge of modern electronics. Should also have UHF transmitter experience. Salary $25,000-$30,000. Send resume to: KDOC-TV 56, 1730 S. Clementine, Anaheim, California 92802, c/o Bill Welty, (714) 999-5000. 12-83-2t

VIDEO ENGINEER—We are an eastern production company seeking a video engineer who is proficient in the operation and maintenance of both old and new generation cameras. Experience or desire to operate and maintain a Rank Cintel Flying Spot Scanner. Strong production background preferred. Send resume and salary history to Dept. 601, Broadcast Engineering, P.O. Box 12901, Overland Park, KA 66212. 12-83-1t

MAINTENANCE ENGINEER—We need an experienced engineer who has worked in a sophisticated production environment. Your responsibilities will include the repair and maintenance of Ampex one-inch and two-inch videotape machines, Ampex and NEC digital video effects units, Grass Valley 300 and 1600 Switchers, Ampex ESS System, CMX Editing Systems, MCI and Ampex audio equipment, helical videotape equipment, Telemation compositor and Chyron IV, Ikegami and Phillips cameras, Strong knowledge of electronic theory and computer systems plus mechanical aptitude. Send resume to Dept. 600, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. 12-83-1t

HELP WANTED (CONT.)



video engineers

We're communications specialists with the expertise and experience to totally develop and maintain a communications system anywhere in the world. Our installations include television studios, multi-media audio/visual facilities, industrial and educational teleconference rooms, community-wide cable networks, and multi-building, broad-band signal-handling operations. Our growth has created these opportunities for highly competent, creative problem solvers who know how to roll up their sleeves and get the job done. Degrees are not as important as is at least 5 years' experience as outlined below.

These positions call for project-oriented individuals who are thoroughly familiar with television facility design and implementation. In addition, solid communications skills and the tact essential to maintaining good client relations are mandatory.

Responsibilities will include television and television control systems design, supervision of field installations, and client liaison.

These are great opportunities for professionally-oriented individuals who appreciate a real challenge and want to be rewarded handsomely with attractive salaries, generous project completion bonuses, and excellent benefits including health, life, dental coverages and actual equity participation in our employee-owned company.

So if you're looking for a position where you work on new and different problems and assignments and have what it takes to handle them, let's talk! Forward your resume with salary history, in strictest confidence to: **Director of Engineering, Avtec Industries, Inc., 39B Industrial Avenue, Teterboro, New Jersey 07608.**

avtec Industries, Inc.

—a world leader in custom-designed turnkey communications systems

WANTED—VIDEOTAPE EDITORS for top quality production company experiencing major growth in electronic publications. Must have considerable experience on CMX and ADO. Salary commensurate with experience. Send resume to Kartes Video Communications, 10 East 106th Street, Indianapolis, Indiana 46280, c/o Jim Kartes, 317-844-7403. 12-83-1t

TRANSMITTER SUPERVISOR—Present supervisor retiring after 20+ years service. This large market sunbelt TV station has a clean, modern RF plant and requires a conscientious engineer with 3-5 years transmitter maintenance experience to maintain it. Send resume to Dept. 600, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212. E.O.E. 11-83-2t

ENGINEERS: MAINTENANCE ENGINEERS NEEDED IMMEDIATELY. Studio E.N.G., and Transmitter Supervisors. Applicants must have a General Class license, and experience in their field. Please send resume and salary history to: Chief Engineer, WTVC-TV, Box 1150, Chattanooga, Tennessee 37401. 11-83-2t

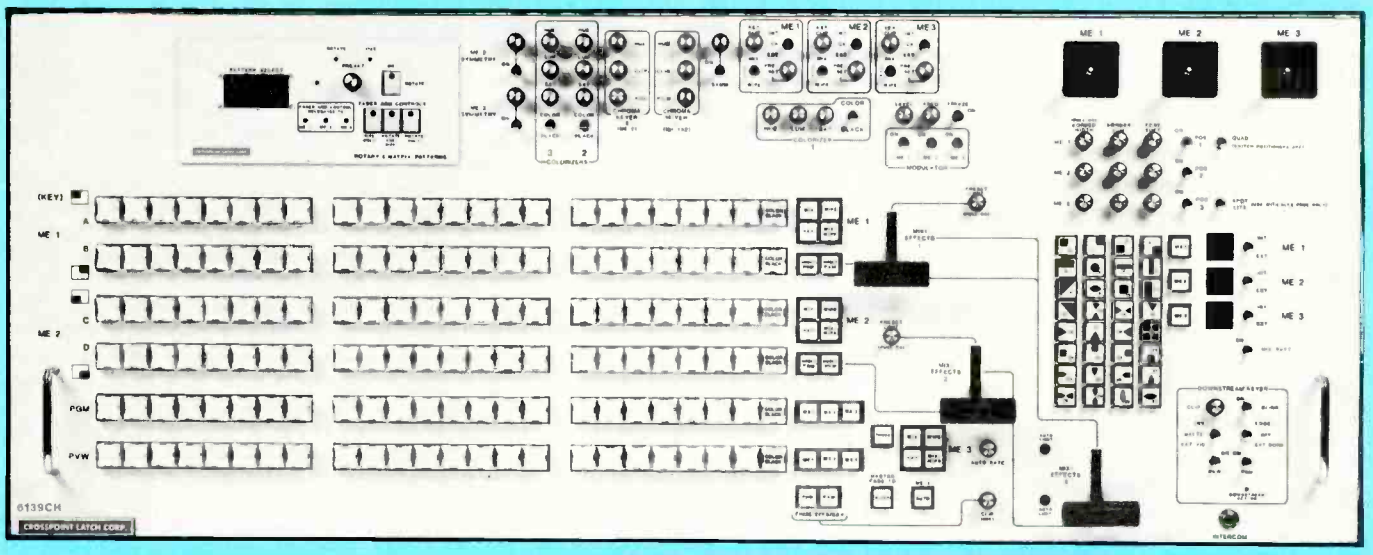
POSITION WANTED

BROADCAST ENGINEERING GRADUATE through correspondence seeks entry level position, 3½ years experience as Technical Director. FCC license. Call Mark, (701) 572-5777. 12-83-1t

Use BROADCAST ENGINEERING classified ads

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

POST PRODUCTION

THE 6139 INTERFACES WITH MOST EDITORS. It will accept commands directly from their keyboards, when 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.

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.

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**

CROSSPOINT LATCH CORP.

95 PROGRESS ST. • UNION, N.J. 07083
(201) 688-1510 • Telex 181160

Circle (115) 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.

INTRODUCING THE MODULAR

SS8824

McCURDY RADIO INDUSTRIES
Toronto (416) 751-6262
Chicago (312) 640-7077

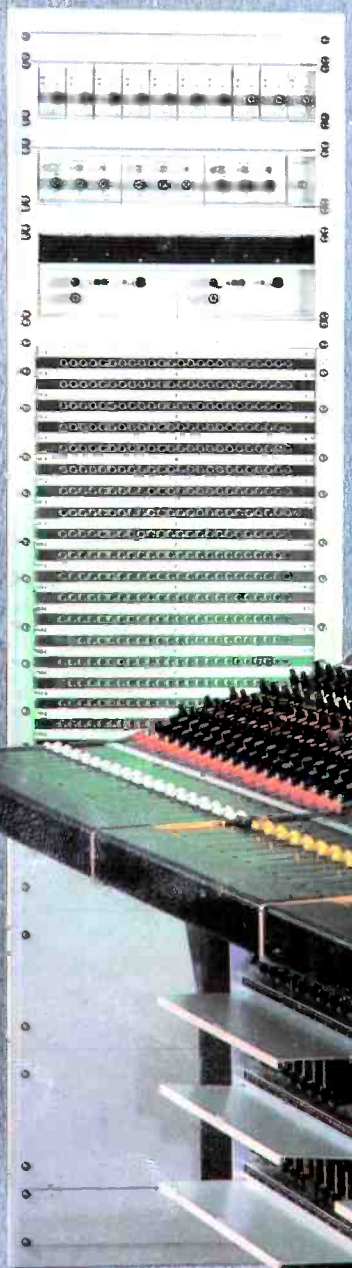
Circle (1) on Reply Card

Audio to go!

Increasing demand for compact comprehensive mobile production facilities has led to the introduction of the new Ward Beck 820401 Audio Console.

The design has been given a higher and narrower profile in order to accommodate its numerous features within a limited area, while permitting an unobstructed view into the production booth.

This unique console, with 38 input and 23 output channels, is already proving its versatility on major US network remote programming.



WBS

Input by Design

Ward-Beck Systems Ltd.
841 Progress Avenue, Scarborough,
Ontario, Canada M1H 2X4.
Tel: (416) 438-6550. Tlx: 065-25399