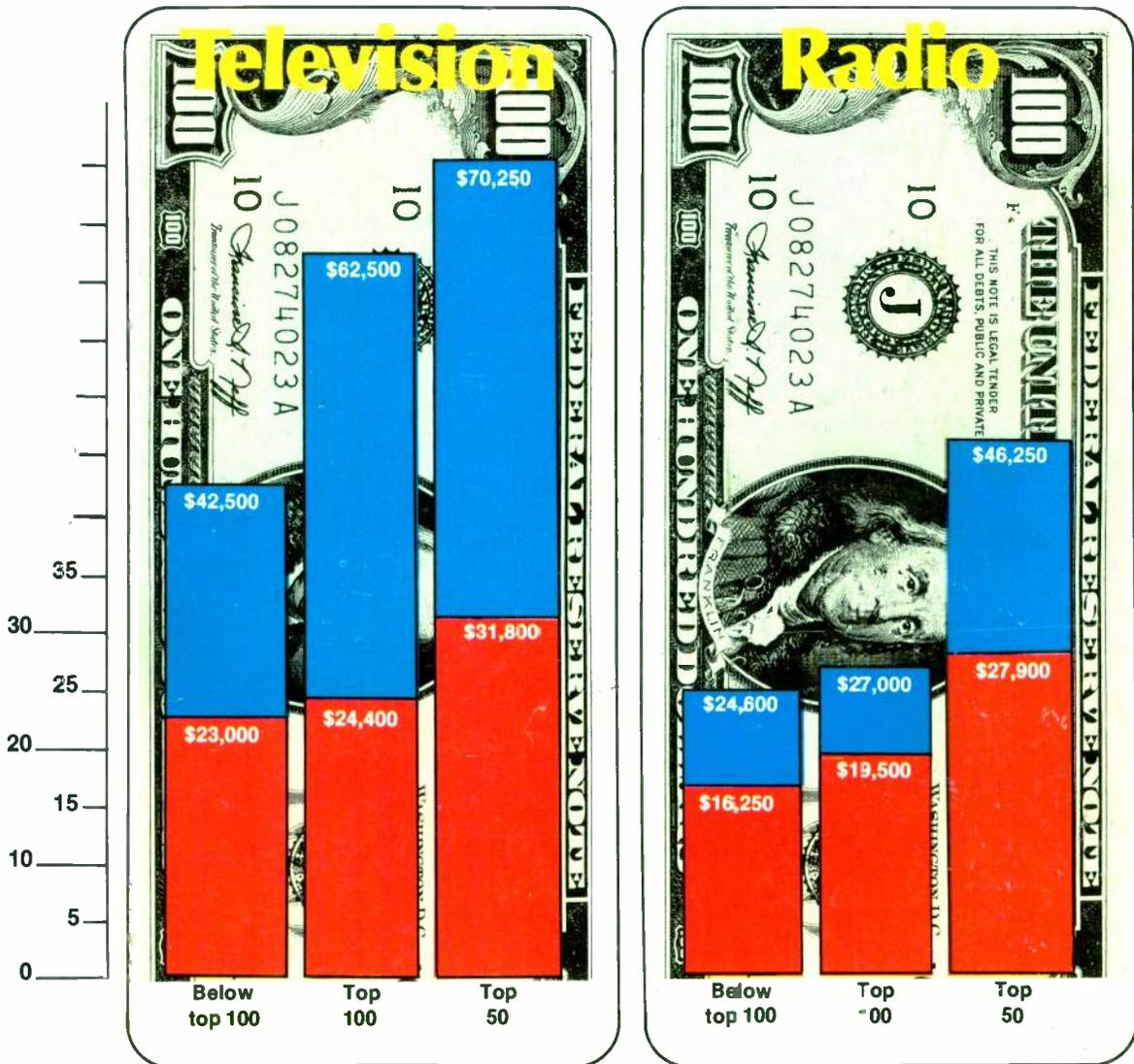


BROADCAST ENGINEERING

October 1982/\$3

Median salaries for broadcasters

■ Corporate management ■ Engineering and technical management



**Annual salary survey
Standards conversion**

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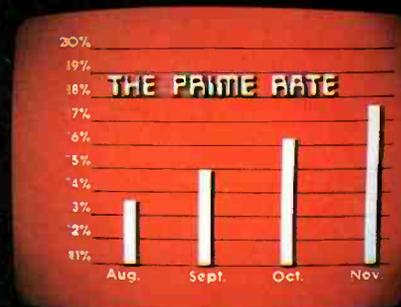
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Dual channel mix



Character Flip/Rotation



Charting capability

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New York	12	4	
Boston	10	5	
New Jersey	8	11	
Washington	7	11	

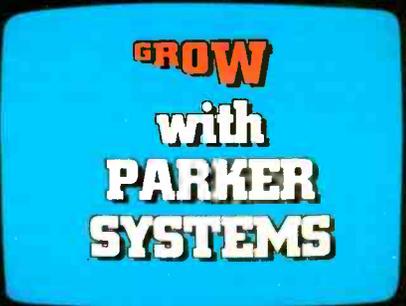
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WEZY-TV Channel 6

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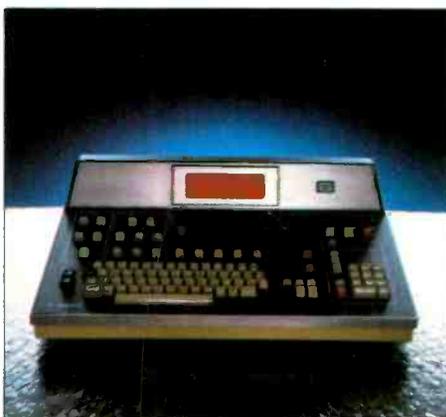
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BROADCAST engineering

The journal of broadcast technology

October 1982 • Volume 24 • No. 10

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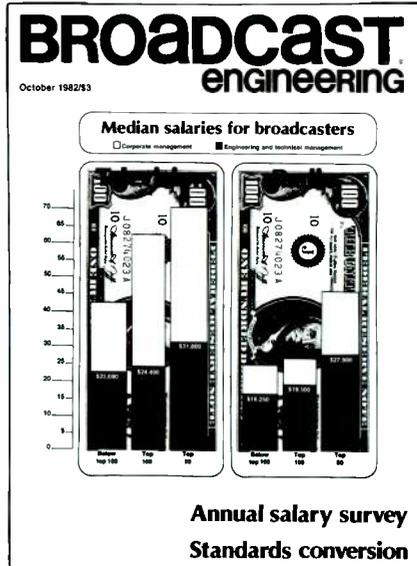
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THE COVER this month is a graphic portrayal of the results of our annual salary survey for broadcasters. The median salaries are plotted for corporate management and engineering and technical staffs of both radio and TV stations. Note the marked spread in the respective salaries within each field and across the different market sizes. Also note the salary differences between respective positions in radio and television. An article summarizing the scope of this year's salary survey begins on page 26. Cover design by Kim Nettie.

Computing for Broadcasters makes its debut in the department section of this issue. The growing presence of computers in the broadcast facility as well as an increasing interest in engineering-related applications have made us feel that programmable hand-held calculator and personal minicomputer programs would be valuable to you, our readers. This new department allows us to share with you various programs that are contributed by other engineers and consultants. Submitted programs should be for engineering uses, rather than for video games. Please address your ideas to Computing Editor, **Broadcast Engineering**, P.O. Box 12901, Overland Park, KS 66212.

NEXT MONTH:

- Radio and TV satellite technology
- Earth stations for satellite links
- IBC replay

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The SK-91 is an example of the lengths Hitachi will go to give you the camera your craft and courage demand. Though just 9.7 pounds, including its 1.5-inch viewfinder, this \$33,000 camera has been hailed as a bargain by perfectionists. And it's I.B.A. and C.B.C. accepted.

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October 23-27

The 72nd Annual Audio Engineering Society Convention will be held at the Disneyland Hotel in Anaheim, CA. Technical papers and exhibits will be featured at this convention, whose theme is "Audio in a Changing World." On Sept. 23, there will be no workshops or seminars. The exhibit hall will be open, however. For more information, contact AES at 60 E. 42nd St., Room 2520, New York, NY 10165; 1-212-661-8528 or 1-212-661-2355.

Oct. 26-28

The Third Annual Visual Communications Congress/West will be held at the Century Plaza Hotel in Los Angeles. Topics will include interactive video, videotex, teleconferencing and videodiscs. Seminars will deal with film and TV production, photography and audio-visual presentations. Concurrent meetings will be held by the International Television Association, the Information Film Producers of America, the Health Education Media Association, and the Association of Audio-Visual Technicians. For more program information, contact the VCC Conference Management Corporation, 17 Washington St., Norwalk, CT 06854; 1-203-852-0500.

Nov. 1-3

Atlanta's Marriott Hotel is the site of the Eighth Annual Satellite Communications Symposium. Sponsored by Scientific-Atlanta, the symposium will feature panel discussions led by SA personnel and outside industry leaders. Topics will include programming by satellite, teleconferencing, high speed digital transmission and earth station design. A technical book will be furnished to attendees. For more information, contact Scientific-Atlanta, 3845 Pleasantdale Road, Atlanta, GA 30340; 1-404-449-2000.

Nov. 6

Career opportunities in the field of cable television will be the focus of UCLA Extension's 1-day program titled "Careers in Cable: Breaking In," from 9 a.m. to 5 p.m.

The program will feature guest speakers from the world of cable television who will share their expertise in lectures and discussions with participants.

Topics will include: "Overview: What are the Jobs?"; "Marketing, Sales and Advertising"; "News and Information Programming;" and "Entertain-

ment: What is Cable Looking For?" A career workshop is planned during the afternoon session.

For more information, contact the extension at 1-213-825-0641.

Nov. 7-10

The 1982 National Telecommunications Conference, "Systems for the Eighties," will be held in Galveston, TX. The conference's technical program will focus on areas of telecommunications, radar, navigation and remote sensing. For more information, contact Dr. B. H. Batson, general chairman, Johnson Space Center (EE8), Houston, TX 77058; 1-713-483-4647.

Nov. 7-12

The 124th SMPTE Technical Conference and Equipment Exhibit will be held at the New York Hilton Hotel. The conference will have five days of sessions on the technical aspects of motion pictures and television. Also, there will be a 420-booth exhibit featuring the latest motion picture and TV equipment. More than 8000 attendees are expected. More information on the conference is available from SMPTE, 862 Scarsdale Ave., Scarsdale, NY 10583; 1-914-472-6606.

Nov. 13-15

The National Cable Television Association's National Cable Programming Conference will be held in Los Angeles. More than 2000 attendees are expected. Screening rooms will be provided for registered delegates who have programming to show. The Awards for Cablecasting Excellence will be telecast live nationwide during the conference. For more information, contact the NCTA National Cable Programming Conference, 1724 Massachusetts Ave. NW, Washington, DC 20036; 1-202-775-3611.

Jan. 16-19, 1983

PTC '83, the Fifth Annual Conference of the Pacific Telecommunications Council will be held at the Sheraton-Waikiki Hotel in Honolulu. The theme is "Telecommunications for Pacific Development." The focus will be on satellites and associated terrestrial systems, and on communication infrastructures. There will be exhibits, panels and papers, along with a satellite workshop and roundtable. For more information, contact PTC '83, 1110 University Ave., Suite 303, Honolulu, HI; 1-808-941-3789.

BROADCAST engineering

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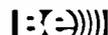
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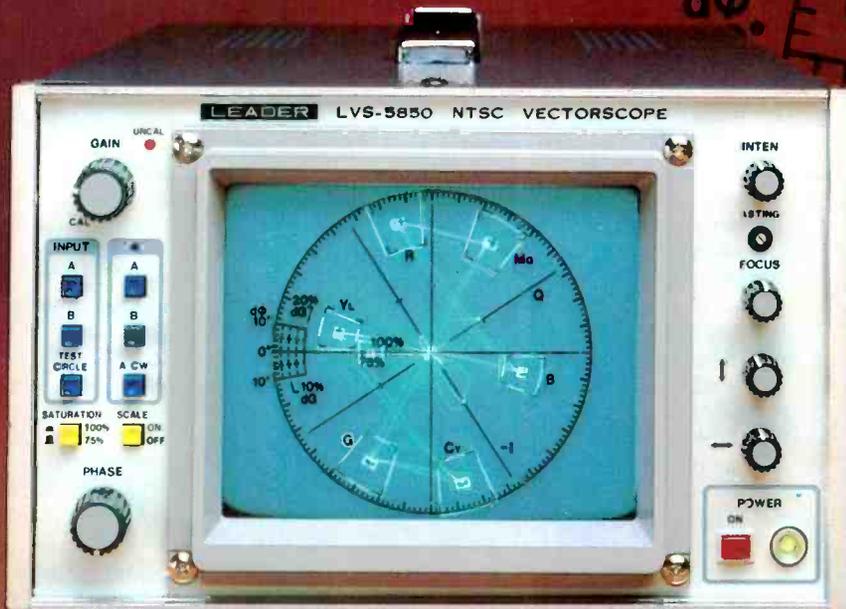


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FCC update

October 1982



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

Relaxation of daytime AM restrictions considered

The commission has adopted a Notice of Inquiry and Proposed Rulemaking in which it proposes to relax restrictions on daytime AM stations. The following rule changes have been proposed:

- removal of the barrier to pre-sunrise operations by Class II stations located east of co-channel Class I-A stations.
- allowing Class II stations located outside the 0.5mV/m 50% skywave contour of co-channel Class I-A stations east of them to commence pre-sunrise operations at 6 a.m. local time, regardless of the time of local sunrise at the co-channel Class I-A station.
- permitting Class II-D stations located outside the 0.5mV/m 50% skywave contour of co-channel Class I stations to operate past sunset until 6 p.m. local time, with a maximum power of 500W. Class II-D stations inside the 0.5mV/m 50% skywave contour of Class I stations west of them would be required to cease operations at 6 p.m. local time or sunset at the Class I station, whichever is earlier.
- permitting Class III daytime-only stations to operate past sunset until 6 p.m. local time using 500W of power, without protecting other Class III stations.
- use of daily curves for calculating protection requirements, both pre-sunrise and post-sunset.

Besides these proposed changes, the commission said it was interested in examining other options to aid daytime stations. The commission asked for comment on the following options:

- permitting daytimers to apply for unlimited time assignments on Class I-B clear channels and regional channels;
- granting a preference to daytime-only licensees seeking FM and unlimited AM assignments;
- expediting FM channel assignment proceedings initiated by petitions from daytime-only stations;
- allowing licensees of daytime AM

stations to apply for low power FM facilities;

- allowing licensees of daytime stations to operate their AM operations at low power (not to exceed 500W) at night, provided they protect other stations; and
- permitting daytime broadcasters to switch to local channels at sunset.

Expanded use of FM SCAs proposed

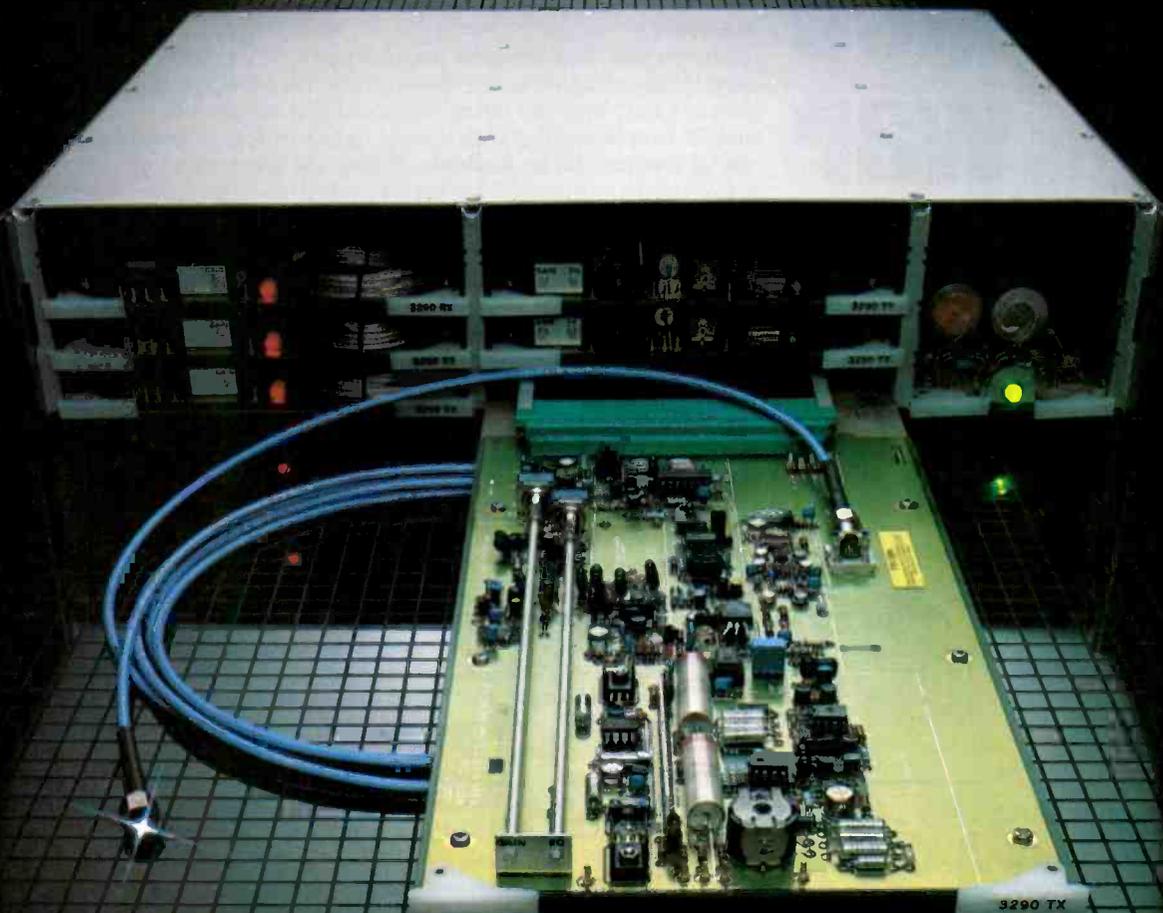
In another deregulatory move, the commission has proposed rule changes that would eliminate current restrictions on the use of subsidiary communications authorizations (SCAs) by FM broadcast stations. Presently, SCA subchannels may be used only for stereo or for broadcast-type services such as background music or reading for the blind. The proposed rule revisions would allow SCA use for paging services, electronic mail delivery, transmission of medical information, facsimile service, police communications, dispatching, traffic signal control and others currently prohibited.

The commission also said it would consider several technical rule changes that would expand the capacity for multiple SCA services and increase flexibility in the use of SCAs. These proposals include expansion of the SCA baseband and permissible injection levels to increase subcarrier capability, for subscriber services and for enhancement of main channel programming or reception. Also, the commission proposed the elimination of current application and program log requirements for SCAs.

Elimination of operating/maintenance logs proposed

The FCC has proposed eliminating detailed operating and maintenance logs for broadcast stations. The commission would rely instead on licensees' responsibility to operate within FCC technical standards. In proposing this action, the commission said that some of its technical logging requirements predate the FCC and that advances in technology and equipment have made some of these rules unnecessary. [:(-:))]]

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The space war

Several factions have emerged in the battle over spectrum assignments. The points of disagreement arising in this conflict do offer some merits, making the questions less easily resolved. Setting developing technologies such as DBS and HDTV aside because of their probable higher frequency requirements, the greatest argument focuses on the demands of radio/TV broadcasters, low power broadcasters, translator operators, land-mobile users and CATV system operators.

On one side, broadcasters (regular and LPTV proponents) maintain that they need all the channel space they can get, because only through radio and television can they keep the public informed and entertained. On the other side, land-mobile people suggest that a great conservation of energy is possible with the use of 2-way radio by business, if they are given more of the currently unused frequency bands assigned to broadcasting. Breathing over the shoulders of both are the CATV proponents, fearing that either service, if expanded, will interfere with operations on cable.

To the land-mobile people, we would like to make it clear that broadcasters provide more than just aural/visual program services. AM and FM stations are becoming involved in utility load management programs, using their carriers and subcarriers to improve efficient use of energy by consumers. The FM subcarriers are also being used for data services, not only conserving on spectrum, but also reducing the need for materials, construction costs and operational expenses of hard-wired data communications. TV remote crews may use a subcarrier of the TV aural carrier for intercommunication between the studio and the remote location, thus saving frequency space and perhaps some energy. STL systems employ highly directional equipment, as do many ENG microwave systems. Certainly the many cases of multiple services piggy-backed onto existing carriers show that broadcasters are trying to improve spectrum efficiency.

To the broadcasters, we would like to point out that 2-way radio services are narrowband FM. Although they are by nature omnidirectional, they are contained in much less channel space than regular broadcast transmissions. Voting systems and cellular radio plans are in use in some areas, making repeater equipment more spectrum conservative. Innovation has produced digital voice techniques, which have been approved for use on all private land-mobile services. Further, audio processing systems are available to keep transmitted bandwidths to a minimum. The reduced fossil fuel requirements for vehicles using 2-way radio might result in more energy available to keep broadcasters on the air. Also, 2-way radio can certainly improve customer services provided by many of the users. The number of users of mobile radio far outnumber broadcast stations, leaving their assigned spectrum quite crowded. Improvements in their operations, however, do result in less intra-service interference than can be claimed by radio and television.

To both through-the-air groups, we would need to confirm the confined nature of CATV signals. Signal leakage from cable operations sometimes occurs. As a result, the FCC has addressed that problem in several cases. CATV operators are monitored closely in cases in which leakage on specific frequencies might interfere with navigation signals for aircraft, for example, and consideration is being made regarding CATV and amateur radio interaction interference. CATV suffers from interference as well, some because of defective and ineffective shielding. CB, amateur radio, business radio and radio/TV broadcast services cause problems that impede consistent CATV signal excellence. LPTV and translator services threaten cable also.

Obviously there are problems. Many of them involve simple greed on the part of the three groups. Yet, a question remains as to the necessity of any particular service and the demands being made. Only a few minutes of listening to broadcasters or land-mobile users is needed to discover that spectrum usage is inefficient on the part of both groups.

There may be considerable support to charges that a great deal of broadcast time is uninformative and unentertaining to the majority of the public and that much of business communications fail to be business-like. Perhaps some improvements on both sides would be a smart move toward a resolution of the space war, with CATV having to live with the fact that, as the *new kid on the block*, concessions in demands will have to be made.

Communication is not unilateral. Each month **Broadcast Engineering** strives to bring you the information you want and need. As we assemble an issue, we draw on widely varying backgrounds in the journalism and broadcast spheres. Objectivity is a key to our work, but we do have opinions, and so do you. This editorial page is our soapbox to air opinions on current issues.

But the communication loop will not be complete without your participation. Give us your comments on our opinions, as well as your thoughts on other topics. Our *Feedback* column will include some of your responses. Through this interaction we will better serve you, perhaps even solve a problem or two with the discussions. Opinions that differ from our own are welcome, and so are confirmations on key issues.

Address comments to: The Editor, **Broadcast Engineering**, P.O. Box 12901, Overland Park, KS 66212.

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3-D TV

We congratulate those who have developed a method for transmission of 3-dimensional images to the home TV screen. Inventive ingenuity is the reason that communications arts have advanced to their present state. The stir has even affected the ratings game, increasing the ratings and shares of the transmitting stations.

Perhaps the best part of the 3-dimensional project is the sale of viewing glasses, because part of the cost has been channeled to charitable organizations. Perhaps the worst aspect of the project is that, for the majority of people, it does not work

successfully. Having had the privilege of witnessing part of the local premier effort, we noted that the effect of dimension was no better in the TV station's viewing room than it was at home. The *almost* effect was more of a distraction than it was an attraction to a Q-grade production.

As the station manager explained, the effect is there, but is not as pronounced as promotion would have it. As for a gimmick, it's selling. Enough said!

Sol Taishoff: 1904-1982

"...the best friend the industry ever had." Sol Taishoff died of cancer in

the Georgetown University Hospital on Aug. 15, 1982...and the industry lost another champion. We join his staff and the industry in mourning Sol's passing, and we applaud Broadcasting's tribute to his drive and accomplishments (See *Broadcasting*, pp. 27-34, Aug. 23, 1982.)

A memorial fund may be established in his honor. However, those desiring to make contributions at this time in Sol Taishoff's name may do so to the American Cancer Society, or to a charity of personal choice. [:(~:~)]]

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



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

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

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

It spots defects BEFORE it's too late.

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

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

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

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

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

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

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



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



SMPTE Booth 16-18

4700 Chase, Lincolnwood, Illinois 60646

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

news

House approves Radio Marti

The House recently gave the White House virtually everything it wanted to set up Radio Marti, a government-run radio station to broadcast news and information from the towers in the Florida Keys to the people of Cuba.

Opponents of H.R. 5427 said that it would result in an "electronic Bay of Pigs," and that Cuba's Fidel Castro already has towers under construction to jam Radio Marti's signal. Nevertheless, it passed despite efforts by those who felt the station would set off an international radio signal jamming war.

The House accepted an amendment by Rep. Jim Leach (R-IA) directly that the station broadcast only "responsible news...not propaganda." The House rejected amendments that would have required the station to broadcast on shortwave rather than AM or FM or would have limited the station to just one frequency. Another unsuccessful amendment called for the government not to operate the station, but to prepare programs for the Cuban audience and buy time for their broadcast on existing commercial US radio stations.

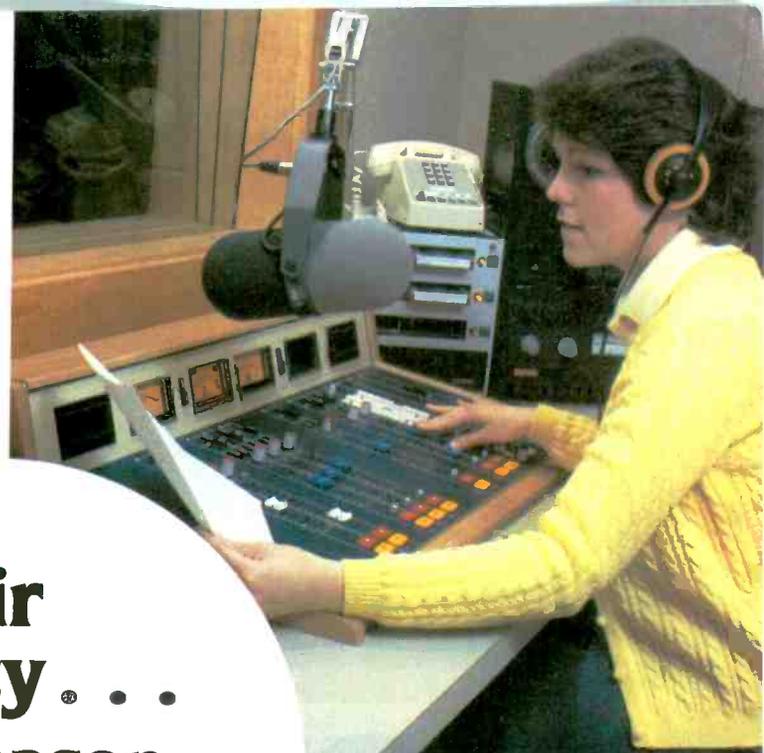
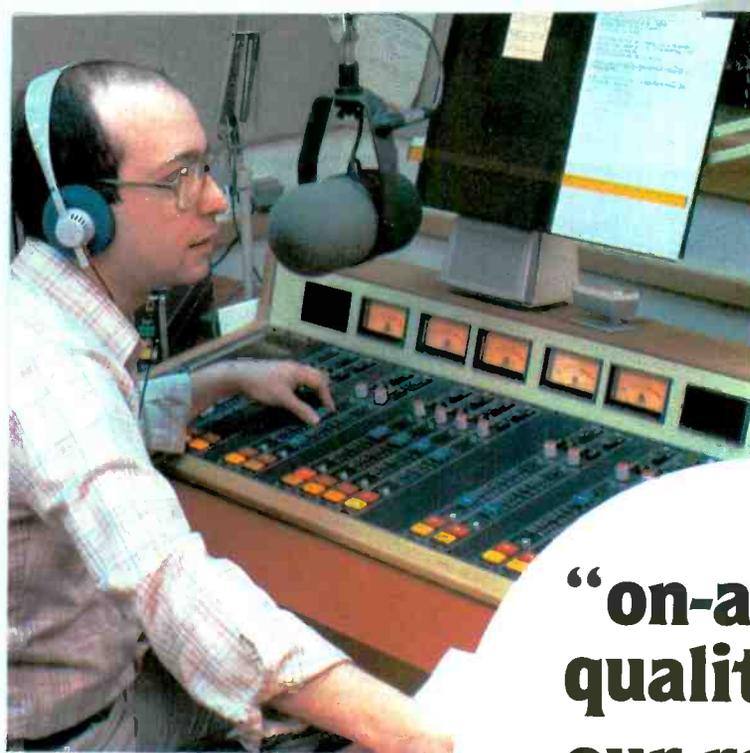
The bill authorizes \$7.5 million for Radio Marti, beginning in fiscal year 1983. The Senate Foreign Relations Committee is conducting hearings on the proposal.

Kihara receives David Sarnoff Award

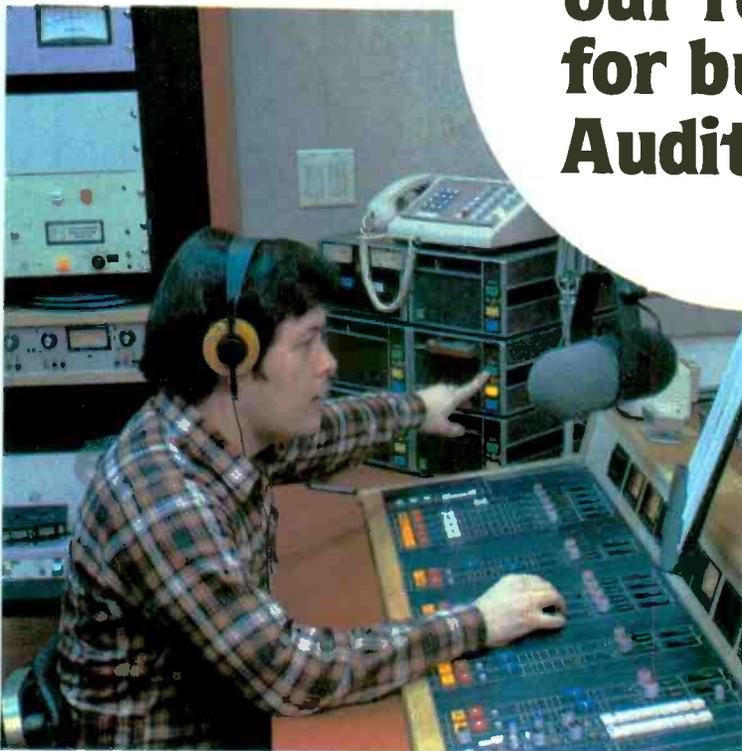
Nobutoshi Kihara, senior managing director of Sony Corporation, recently received the 1982 David Sarnoff Award for his major contributions to magnetic videotape recording. During his 35-year career at Sony, Kihara has contributed many developments to the consumer electronics industry, including the early development of the

Continued on page 14

Circle (82) on Reply Card



**“on-air
quality . . .
our reason
for buying
Auditrionics,”**



Bob Taylor, General Manager of Wilmington's WDEL-AM and WSTW-FM says, "We've had Auditrionics 200 Series consoles on-line for over six months and our sound's superiority is reflected in listener response. The psychological effect on our own on-air people was immediate and positive. They find the Auditrionics boards comfortable to work with, whether it's the 212 in the news booth, the 218s in the production rooms or the 224 in AM master control.

"Best of all, when it came to price, Auditrionics was affordable. I don't mean the cheapest; I mean cost/efficient. For a few extra dollars, we have future expansion capability and the customizing that we needed. To us, that's what affordable really means."

For complete product information and a report on why WDEL's Bob Taylor chose four Auditrionics 200 Series consoles for his new facilities, contact:



auditrionics, inc.

3750 Old Getwell Road
Memphis, Tennessee 38116 USA
(901) 362-1350 TELEX: 533356

Circle (7) on Reply Card

Junkie with candle and hypodermic needles.
Taped by Jon Alpert.

Western Afghanistan villagers, during Soviet invasion.
Taped by Jon Alpert.



NOW GROWN ARE NO AFRAID OF

For years, newsmen have suffered from the recurrent nightmare of shooting in the dark. They've struggled with low-light situations where artificial lighting was either too intrusive or too difficult to achieve.

But now, thanks to the Sony BVP 330, the cover of darkness no longer stops reporters from covering a story.

The BVP 330 is used consistently in low-light situations by award-winning video journalists and documentary producers like Jon Alpert, Frank Beacham, and Warren Jones. It enables them to shoot under the worst

Suspect in police custody.
Taped by Frank Beacham and Warren Jones.



Dade County Police questioning teenagers.
Taped by Frank Beacham and Warren Jones.



NEWSMEN LONGER THE DARK.

conditions, and capture elusive footage like the examples shown here.

The BVP 330 is so versatile in low-light situations, newsmen are surprised to learn that the camera is lightweight and sturdy enough to be taken into the jungles of Nicaragua. Or that its performance is good enough to enable it to be used as a studio camera.

But it makes sense that the BVP 330 should be this good. After all, when a reporter risks his life getting a story, the last thing he should have to worry about is losing it to darkness.



SONY
Broadcast



Now getting the hot story live is as easy as calling home. The SM82.

Sometimes a story breaks so fast there's practically no time to set up lines of communication. Knowing that, Shure has developed a microphone to keep both you and the story well covered.

The Shure SM82 Cardioid Condenser Microphone. It's the only line-level microphone tough enough for the rigors of day to day remote ENG broadcast assignments. And all your crew has to do is just patch it straight into the transmitter connection of the nearest telephone... call your station, and they're home free. Or, it can be connected directly across a dialed-up phone line. No separate amplifiers, limiters, or line-level adapters are necessary.

Just as important, the SM82 is ideal for assignments involving very long cable runs (up to one mile without equalization) typically encountered when covering sporting events, parades, and political rallies.

While electronic news journalists will appreciate the SM82's extended reach and exceptional balance in hand-held situations, you'll love its low mechanical handling noise, rugged construction and reliable operation over a

variety of temperature, humidity and wind conditions.

Its built-in limiter kicks in at 100 dB SPL, preventing overload of the microphone's internal line amplifiers.

The SM82 utilizes an internal battery or it can be externally powered by an optional PS1 power supply or equivalent. For added security, it automatically switches to battery power if its simplex source should ever fail.

If you're in the broadcast operations ENG/EFP business, you know there are lots of ways to get a live story—even more ways to miss one. Now, with the SM82 on the scene, it is simply a matter of calling home.

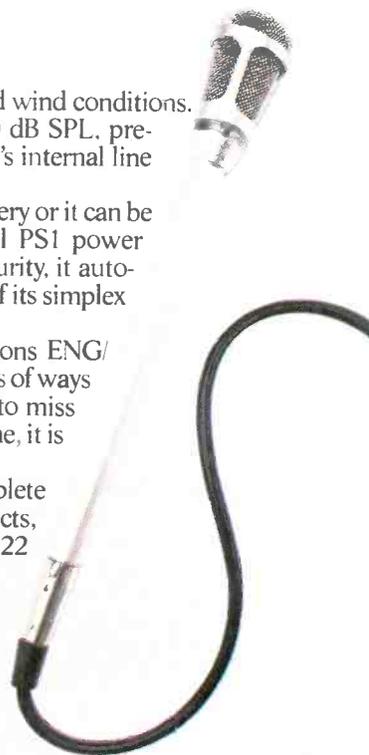
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Circle (8) on Reply Card



any policy that fails to recognize that fact is unrealistic. Commission policies should take account of the realities of the marketplace, according to the NRBA.

SMPTE

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Scarsdale, NY 10583
1-914-472-6606

Robinson named executive secretary

Lynette Robinson has been promoted recently to executive secretary of the SMPTE. Robinson will be in

charge of SMPTE headquarters with responsibility for supervising the staff and acting as liaison between SMPTE officers and headquarters. She will also be involved in coordinating SMPTE conference activities, including finances, registration and exhibits.

SMPTE and EBU discuss remote control

A joint meeting of the European Broadcasting Union (EBU) Ad Hoc Group on Remote Control and SMPTE Working Group T14-10 was held in London in July. The purpose of the meeting was to complete the

understanding of the respective published proposals of the two groups, and the details of any recent changes; to identify areas of incompatibility or disagreement; and to agree to means of reconciling these differences.

Discussion took place under the following main headings:

- the application of an already agreed upon international data communication scheme—the OSI model—to SMPTE requirements;
- the characteristics of the message architecture; and
- the characteristics of the transmission system.

As regards the first, complete agreement was found. Virtually complete agreement was reached in connection with the transmission system based on the use of the proposed ANSI electrical and mechanical characteristics and a combination of SMPTE and EBU proposals for the communication protocol. The characteristics of the message architecture were agreed in principle and the outline of a final document agreed.

More meetings are scheduled to continue joint work toward the preparation of a single recommended standard for submission to both bodies next spring.



SOCIETY OF BROADCAST ENGINEERS

P.O. Box 50844
Indianapolis, IN 46250
1-317-842-0836

Recertification deadline extended

SBE is still receiving requests for recertification material from engineers whose certification expired Jan. 1, 1982. Some of these engineers stated they were not aware that their certification had expired. SBE will extend the deadline for applying for recertification until Dec. 31. Anyone who has not applied by that date will be deleted from the certification records in the national office.

Certification exam dates

The SBE's certification exams will be given from Nov. 12-20. This exam session is for all levels of certification, including the new entry level, broadcast technologist. For a copy of the application and Program of Certification booklet, write to the Certification Secretary in care of SBE.

[:(=))]]

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VO-5850	\$5075	AVC-3450	\$576
VO-4800	\$2340	RSC-1050	\$1750
VP-2011	\$1314		
VO-2610	\$1548		
VO-2611	\$1692		

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		DXC-1800K	\$3007
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SLO-383	\$2625	VPK-720/100HG	\$8225
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SLO-323/RX-303	\$1379	KCA-60	\$26.70
SLO-323/RX-353	\$1415		
VP-5000/RX-303	\$1550		
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VRP-100	\$438	RM-420	\$96
VRD-100	\$175	RM-440	\$1239
PE-100	\$7.00	RM-444	\$875
		RM-500	\$138
		RM-580	\$455
		RM-555	\$1323
		RM-V5	\$161
		RMM-8	\$28
		RX-303	\$252
		RX-353	\$288

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		CVM-2150	\$1092
		CVM-3000	\$5460
		CKV-1900F	\$481
		CKV-1910	\$518
		PVM-4000	\$700
		PVM-5300	\$1610
		PVM-8000	\$557
		PVM-8200T	\$550
		PVM-8200MB	\$1113
		PVM-1211F	\$1085
		PVM-1900	\$700
		PVM-1850PS	\$1050
		MED-1900	\$980

JVC

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CP-5500U	\$1990
CR-6060U	\$1450
CR-6600U	\$2625
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CR6600U - RM88U - CR8200U	\$8400
CR8200U - RM88U - CR8200U	\$9700
CP5500U - VE90 - CR8200U	\$9200
CR6600U - VE90 - CR8200U	\$9800
CR8200U - VE90 - CR8200U	\$11,200

JVC U-VCR REMOTE/EDIT CONTROL UNITS	
RM-70U	\$260
RM-82U	\$1330
RM-88U	\$2240
VE-90	\$5AVE

JVC COLOR CAMERAS	
S100PS	\$1690
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JVC VHS PLAYER/RECORDERS	
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16 Broadcast Engineering October 1982

A VERY MOVING STILL STORY.

Introducing The Image Maker™ For Editors, Engineers, Animators, Producers, Special Effects Specialists, Station Managers, Training and News Directors.

In the beginning, all was stillness. A dark and cumbersome, costly and inefficient sort of stillness accentuated by the *kachunka-kachunka* of the slide chain machinery. Then came Echo's Electronic Frame-Stor™. And suddenly, all was stillness – and light.

But what excited the engineers at Echo wasn't stillness at all, but movement and, yes, re-movement. These were the challenging chapters to be written in the Still Story. How to make all of those electronically stored stills move around in all manner of ways. For this Still Story, a hero was needed. Thus was born The Image Maker.

The Image Maker. A Brief Definition.

Here's what The Image Maker is: A high-band color disc recording system that uses state-of-the-art electronics and an exclusive Discassette® recording medium to perform a versatile number of professional television production tasks from still frame storage to special animated effects.

Programmable Loops, Sequences, Special Effects.

The joy of The Image Maker – and the key to its success as a productivity tool – isn't just in its storage of still frames, but also in the manipulation of those stills to serve a variety of needs. In this regard, The Image Maker is a marvel of special effects wizardry, with variable speed operation all the way from freeze frame to real time, random access of as many as 512 frames on line and the ability to preset 64 locations. The convenient fingertip touch panel makes it just that much easier for the



operator to do animation sequences, generate backgrounds, superimpose effects or pre-program motion loops.

From Cold Fronts To Hot Switches: The Plot Thickens.

Because The Image Maker boasts variable speed in both directions, weather motion – or motion analysis of any kind is, well, a breeze. And because it also features two independent heads, the operator can preview upcoming video images, then "hot switch" to the next one without going to black.

Between the cold fronts and the hot switches are a full range of other capabilities. Instant replays. Logo and ID flashes. These are capabilities enhanced by the fact that The Image Maker will conveniently interface with today's modern character generators and titlers.

The Discassette. The Removing Part Of The Story.

Not all of The Image Maker's innovations are located exclusively within the confines of the machine itself. In fact, one of the key innovations – and one unique to Echo products – is our patented

Discassette, the removable recording medium that provides both operational and storage convenience. In this day and age, when space is at such a premium and ease of storage and retrievability are very real assets, a library of Discassettes sure beats drawers full of slides or closets stacked with disc packs.

Going Mobile With The Image Maker.

Because we deal with some mighty tough customers, we build The Image Maker to be a mighty tough television production tool on the move. The combination of the recording technology (one that eliminates the possibility of head crash), Echo craftsmanship, and a compact, road-rugged design makes The Image Maker as versatile on remote shoots as it is in the studio.

A Moving Conclusion. Buy One.

Perhaps the most moving part of The Image Maker story is the one you read on the bottom line. Because, ultimately, it's the cost efficiency of The Image Maker that will move you to take a closer look. Clearly, it doesn't make a lot of sense to tie up a 1-inch VTR to do routine or special effects work when the feature-rich but modestly priced Image Maker can do that – and more. There's a happy ending to our Very Moving Still Story. Call us today and we'll write it together.



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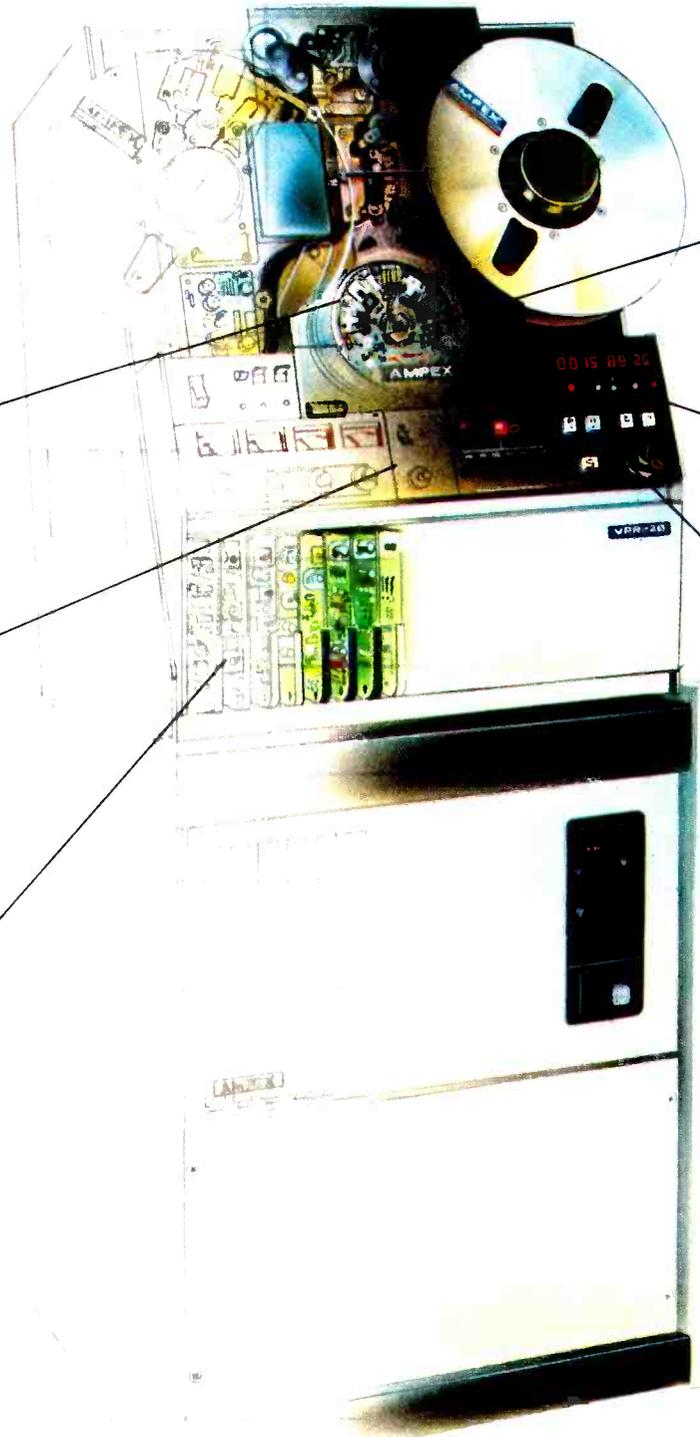
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With over 4000 machines in use, the Ampex VPR-2 Series is without question the most widely acclaimed line of VTRs in broadcasting history. Outstanding performance and simple operating features, backed by a global network of parts, service and training, are just a few of the reasons why.

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As Ampex leadership started with outstanding products, it continues with the strongest worldwide service

support. With Field Engineers on call and an extensive computerized parts network, you get immediate answers to all your video questions. And each year, more than 2000 students throughout the world go through comprehensive product training at Ampex centers. There are more people skilled on Ampex VTRs than on any other video recorder in the world.

But the VPR-2B is more than just the dominant force in the video

business. It's a part of the Ampex tradition. A tradition born of technical innovation, product reliability and proven product performance. And it's a name you can count on. Call your Ampex representative, or write Ampex Corporation, Audio-Video Systems Division, 401 Broadway, Redwood City, CA 94063 (415) 367-2011. Sales, spares and service worldwide.



AMPEX TOOLS FOR TOMORROW

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Operational Convenience
With continuously variable slow motion instantly available.

feedback

Oops! Bell, not Edison

The Japanese recently learned that the public does not like to have its history books rewritten. We had a similar experience with our August issue (page 16) wherein our contributing author erroneously credited Thomas Edison with the invention of the telephone. Everyone knows that the credit should go to Alexander Graham Bell. We know that, and it's obvious that our loyal readers do, too. We apologize for the goof in editing/proofing.

You may stop the deluge of mail now, but thanks for reading our articles, and thanks for caring about truth and honesty in communications.

Bill Rhodes
Editorial director

Camera setup

In reference to your *Tech Tip* that appeared in the August 1982 issue of **BE**, show me any number of "discriminating eyes," and I'll show you as many monitors that are inaccurate. As we all should know, color is a highly subjective quality, and we all see color differently. In order for a production or broadcast center to use its monitors as an exact reference instrument, especially with cameras and color correction systems, they must be set up as to the precise standards outlined by the manufacturers. This is why color analyzers are used and certainly will continue to be used by all video facilities that demand quality color pictures. "Discriminating eyes" just won't make it happen!

Alan R. Davis
Asaca/Shibasoku Corporation
Los Angeles, CA

AM stereo

Even before reading your July 1982 editorial, I had wondered whether the excitement over AM stereo was like the popular praise for the naked emperor's new clothes.

The only type of shot in the arm I've seen touted for AM stereo would enhance the profits of the broadcasting and consumer equipment manufacturers. This is hardly essential to the "public interest, convenience and necessity." The public, after all, will ultimately pay the bill through businesses whose advertising costs will rise.

When enough people with strong personal ethics enter the field of broadcasting, and work at the generation of income through truly serving

the public interest, then the emperor will have his new clothes.

Fred Portnoy
Soundworks
Concord, NH

Captioning

"Case Study: Captioning at WGBH" (**BE** July, page 18) quotes Dan Glisson, manager of WGBH's Caption Center/Los Angeles as saying, "I'm willing to say Line 21 captioning is obsolete...I'd advise people to hold off buying a Line 21 decoder right now. In a year or so, teletext decoders will be on the market." Such a statement is reprehensible on his part, and totally false.

The National Captioning Institute (NCI) finds it extremely underhanded for WGBH to call the Line 21 closed-captioning service obsolete when WGBH, at this time, is soliciting funds from corporations and foundations to caption programs using the Line 21 system. Are WGBH's motives in soliciting captioning funds truly honest and in the best interests of the hearing impaired?

Glisson also advises people to hold off buying a Line 21 decoder. What a glib statement for him, a hearing person, to make. But what about the deaf people, who before the advent of closed captioning in March 1980 never had access to television? Is he really suggesting that they should wait? Glisson clearly fails to realize what closed-captioned programming has meant to hearing-impaired people, who since the advent of the service, have received nearly 4000 hours of captioned programming, including comedies, dramas, sports events, presidential speeches, and as of November 1981, live news.

According to Glisson, teletext decoders will be on the market in a year or so. Is he suggesting that when teletext comes on board, ABC and the other participants in the closed-captioning service will automatically stop captioning on Line 21? And, when teletext decoders are available for purchase, what kind of closed-captioning service will the deaf community receive? Will it be better than what they can receive now? Will there be 40 hours of captioned programs each week as there are now on the Line 21 system? Or will there only be a few hours of programs offered by CBS?

Teletext proponents often argue that because the general public will want teletext, somehow the hearing im-

paired will benefit. But why won't a potential teletext captioning client look at an investment in captioning in the same way as it does now: Namely, how many teletext decoders are in the hands of hearing-impaired people? Hundreds of thousands of teletext decoders in the marketplace do not automatically mean more captioned programming.

The author mentions that real time captioning will become available in the future. Your readers should be made aware that NCI has been providing real time captioning now for several months. Last summer, NCI captioned the launch and landing of the space shuttle, Columbia; the first time a live special news program was captioned. Real time captioning of ABC's *World News Tonight* is now available nationwide.

The article also fails to state that the Line 21 and teletext systems can be made compatible, as was demonstrated by British Videotex/Teletext at Videotex '82. Compatibility, certainly, is in the best interest of the thousands of people who have invested millions of dollars in TeleCaption equipment.

Finally, I wish to make it clear that NCI exists to open up the world of television for millions of hearing-impaired people in this country. For the past 2½ years, NCI has provided the best closed-captioning service that is possible. This service has grown and expanded. We are performing, not merely promising.

Jane Edmondson
Director of Public Relations
National Captioning Institute
Falls Church, VA

UNITEL and teletext/videotex

In your May issue, there was an article reviewing some of the latest activities related to teletext/videotex and experiences to date.

In this long article, I was disappointed to see that UNITEL was just mentioned at the end and that the terms were not satisfying at all for our company, which is a leader in this technology.

You seem to forget that UNITEL is at the origin of Antiope and Teletel systems and that, particularly these last two years, many improvements have been made and our machines are more sophisticated and easy to use.

Videotex and teletext are representing more than 50% of UNITEL activities, and in this field, our subsidiary in California (UNITEX Video Graphic Systems) has already been in-



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- Tripods with spreader and dollies
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volved in Los Angeles, Louisville, KY, and New York experiments.

At the last NAB and NCTA conventions, UNITEL, still developing its products, had met wide success with an experiment of Dynamically Redefinable Character Set (DRCS). This will be presented for the third time at Videotex-'82 in New York.

Christine Rivalain
Press attaché

Thanks for your perspective on UNITEL's involvement in this field. We were updating our readers on activities in teletext at various stations. We had no intention of bringing all manufacturers' technology up-to-date, which would have been a formidable task. The modifications reported were those being made by stations in their effort to investigate and adapt this new technology into their operations. You may not agree with their directions, but the facts stand.

Predicting patterns

In the July 1982 issue of *BE*, there is a report titled "PRC-'82: Progress in Radio." In this report, my attention was focused on the session pertaining to the prediction of TV and FM coverage patterns. The prediction is based on a computer program that

could provide useful information to stations located in mountainous areas. Being associated with the planning and development of many TV and FM stations, my department is deeply interested in having more information on the subject. I would therefore be very grateful if you could provide additional information.

Paul-P. Doucet, ing.
Service Radio-Télévision
Quebec, Canada

The computer-based analysis service of station coverage provided by PBS is called AREAPOP. For information about the service and an input data form, contact: Sharon Asch, sales representative, PBS, 475 L'Enfant Plaza SW, Washington, DC 20024; 1-202-488-5220.

Correction

Environmental Satellite Data is not associated with Weatheration as listed in "Electronic Animation and Videographics," page 56, *BE* February 1982.

Environmental Satellite Data supplies broadcasters with digital weather satellite images. Hourly updates of the Continental United States and six regional sectors are available by telephone. Perfect registration for

loops or animation and precise color enhancement are possible with the 380X240 digital data.

Complete product and pricing information on this service is available directly from ESD, World Weather Building, 5200 Auth Road, Suitland, MD 20746; 1-302-423-2113.

Audio switching

I am writing to you as the technical editor of the magazine *Electronic News*, the only publication in Greece exclusively concerned with electronics.

Your article "Audio Switching Systems," (March 1982, page 202), has come to our notice as suitable material for reproduction in our magazine. We would therefore like to ask your permission to translate it into our language, with a reference for your magazine.

Panos Kaliontzopoulos
Athens, Greece

Electronic News has been granted permission to reprint the article in question. Others desiring to reprint material from *BE* must contact the publisher for permission prior to use of the material.

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business

VNN offers new content, switches duplication services

Video Newscasting Network (VNN), a TV trade publication distributed biweekly in video form, is now offering new content and using a new duplication and traffic service. The changes began in June.

The June cassettes were the first to be handled by TVSC, Group W Productions' Television Syndication Center in Pittsburgh, which was signed to assume full tape duplication and traffic activities for the service.

VNN, inaugurated last fall, has a subscription list including hundreds of broadcasters, cable operators and advertising agencies in the United States and Canada. Subscribers receive a 30-minute cassette featuring industry leaders with presentations of trends and developments. The tapes include paid *informercials* from software and hardware suppliers.

One of the June tapes was a 3-D demonstration of a horror feature. Other segments included:

- Julius Barnathan, president, ABC Broadcast Operations and Engineering, and David Hawthorne,

editorial director, *Millimeter* magazine, interviewing marketing heads of major recorder/camera manufacturers on the standards controversy;

- *Rep Roundtable* in which leading sales representatives gave their forecasts for syndicated products and sampled the new shows;
- Paul Klein reviewing the new fall series and picking the network winners and losers;
- Chuck Larsen reporting on the Broadcasters Promotion Association convention in San Francisco and showing examples of outstanding promotions; and
- Ted Turner discussing video highlights of the recent National Cable Television Association convention in Las Vegas, NV.

Logitek to build VOA equipment

Logitek Electronic Systems has been awarded a contract to manufacture custom audio distribution and monitoring equipment for the Voice of America (VOA). The equipment, valued at more than \$175,000, will be

installed in VOA's new master control facility in Washington, DC.

According to the contract, Logitek will manufacture more than 200 distribution/AGC amplifiers to meet VOA specifications, and will also build numerous one-of-a-kind items designed by VOA engineers. All equipment will be manufactured at Logitek's main plant in Houston.

EMCEE expands capabilities, services and facilities

EMCEE Broadcast Products recently acquired an in-house tower construction company; organized a Systems Group to provide RF transmission site construction services and equipment installation; and bought a 47,000-square-foot facility to house manufacturing and engineering operations.

The in-house tower service allows EMCEE to provide construction, painting, inspection, lighting and other tower-related services. In a related development, the EMCEE Applications and Field Engineering

Continued on page 134

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digital effects with IRIS II's exclusive DIGIKEY and Compressor/Positioner. Key in an external source for even more visual excitement, or create your own still from live video.

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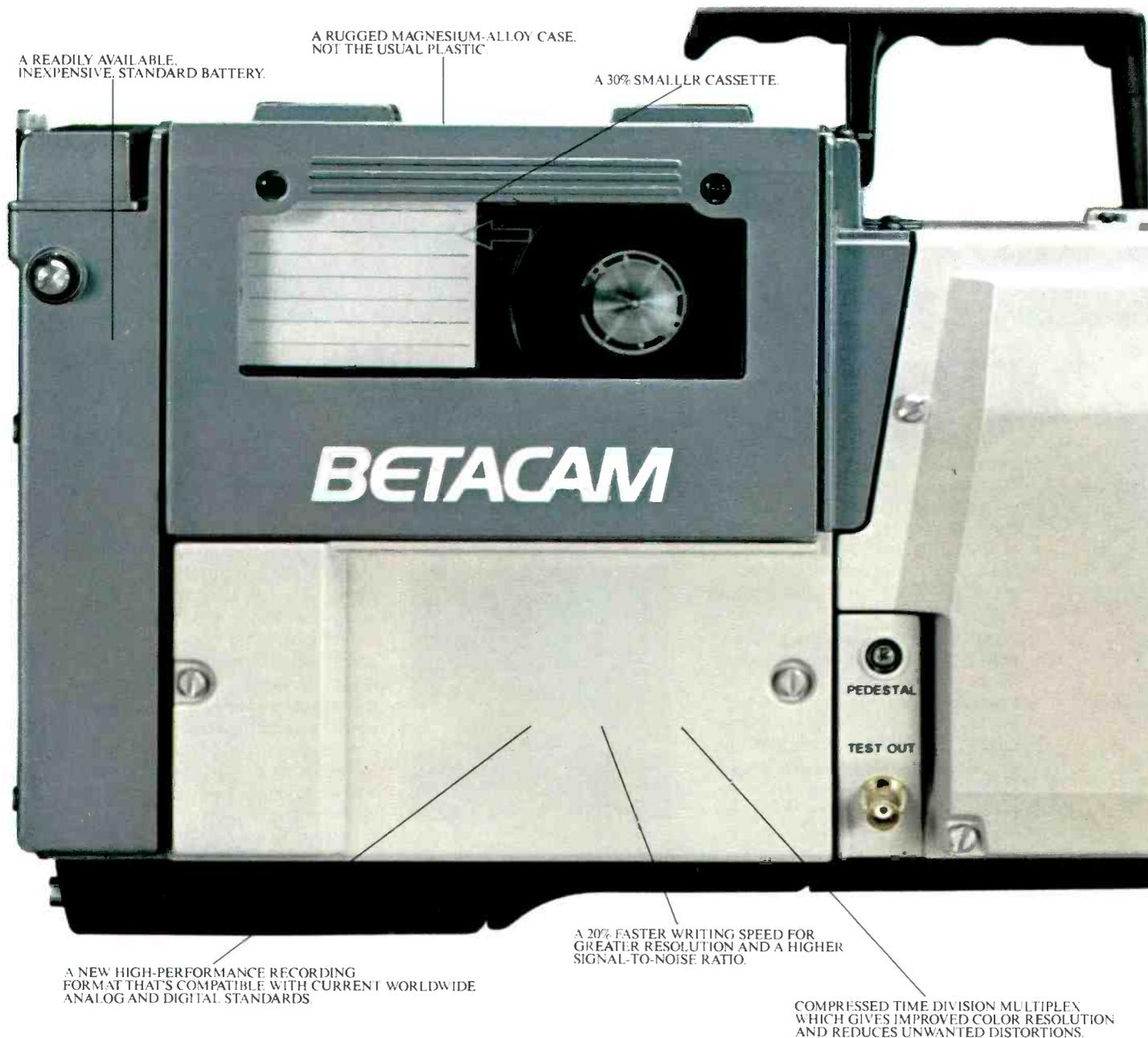


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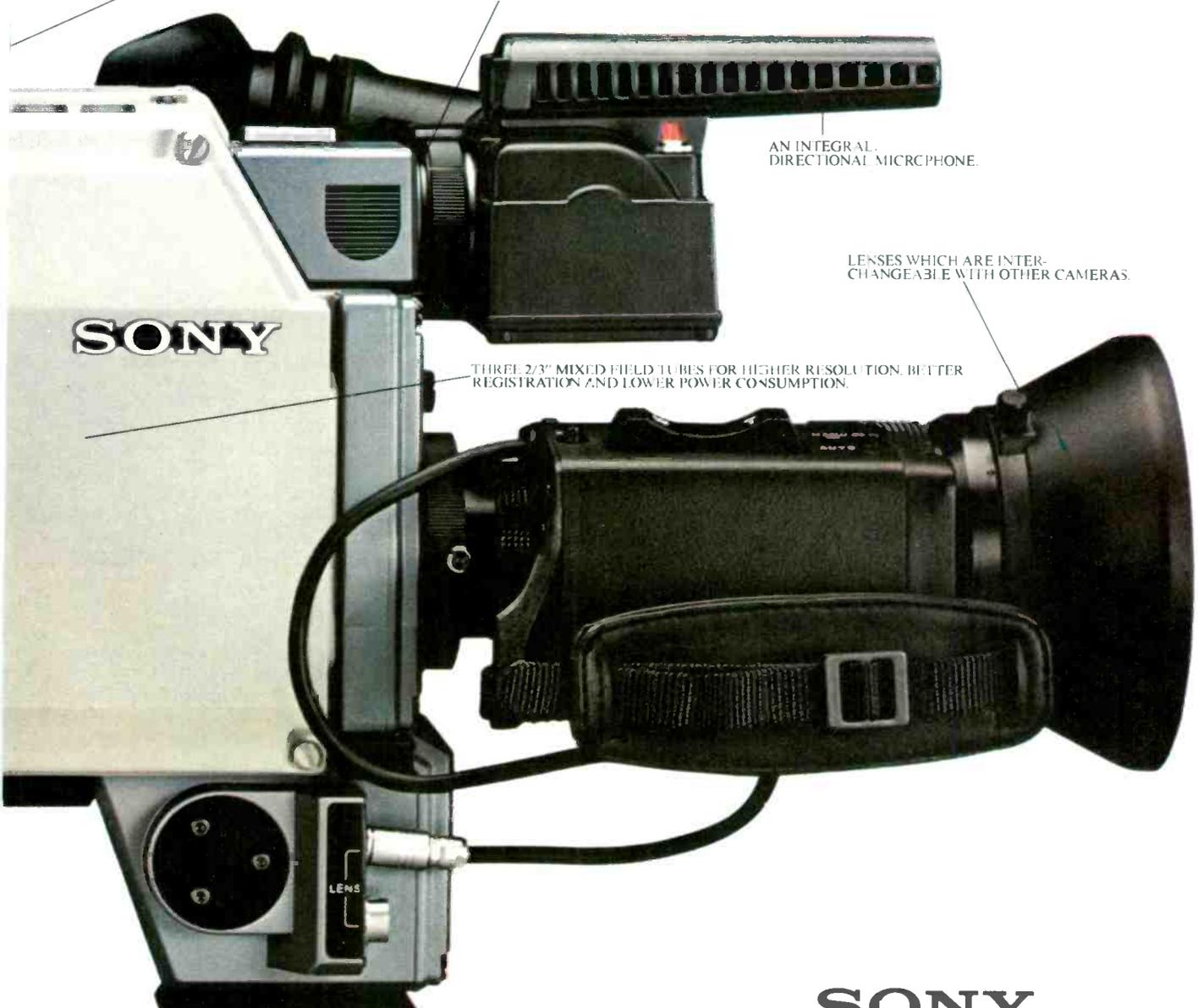
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Broadcasters' salaries:

A national survey

By Bill Rhodes, editorial director

Three years ago, BE began its annual coverage of industry salary levels and compensation packages. This pioneering effort, the annual salary survey, has become one of the year's most anticipated reports. This year we received many calls requesting pre-publication figures, but we refused to release them before publishing our survey.

The main thrust of this year's survey has remained the salary levels, rates of salary increases, and trends in fringe benefit packages. However, this year, data also were requested on the number of years spent in the present job, licenses held, part-time or freelance work undertaken, respondent's age and educational background. All data were requested separately for the radio and TV segments of broadcasting so that individual trends could be pinpointed.

Our survey was again conducted scientifically under the direction of Kate Smith, market researcher, Intertec Publishing Corporation. In an accompanying sidebar, she explains the methodology followed and the statistical basis of this survey. The balance of this report will deal with the results compiled from our readers' response for specific data.

Tabular results

Complete details of this year's survey are compiled in three tables for separate broadcaster profiles. Table I (page 27) covers the management corporate staff; Table II (page 28), the engineering and technical staffs; and Table III (page 32), the operations staff. Although these tables are most easily understood by studying the data, a few trends are worthy of mention.

Salary levels

The salaries received for services rendered have remained the key question of the survey. The level of direct compensation can be seen by scanning the top rows of all three tables. The median salaries for the industry (radio and television combined) are as follows: management, \$33,900; engineering and technical, \$25,300; and operations, \$21,250.

Several trends are evident across the industry, as may be seen by comparing the three tables and by looking at our issue cover, where data for corporate management and engineering and technical management are plotted. First, salaries for workers in television are significantly higher than for those in radio. Second, top cor-

porate management staff salaries remain considerably higher than those for engineering and technical staffs and operations staffs. Third, there is a considerable range of salaries across both radio and TV broadcasting, when you look at the market served. As anticipated, the larger markets pay higher salaries.

A final point on salaries is obtained by comparing the 1982 data with that of 1981. (See BE, October 1981, pp. 53-66.) Without exception, the median salaries for managers and for engineering/technical staffs increased in that year across all markets, for both radio and TV. However, the surprise came in that salaries for the operations staff dropped during the same period.

For managers, the median salary increases were as follows: television, from \$47,150 to \$52,000; and radio, from \$25,800 to \$26,900. For the engineering and technical staffs, the median salary increases were: television, from \$25,800 to \$29,000; and radio, from \$19,900 to \$20,700. However, for the operations staff, the median salaries decreased as follows: television, from \$25,650 to \$23,800; and radio, from \$19,100 to \$18,650. This was especially surprising

TABLE I—MANAGEMENT STAFF PROFILE*

	TV + RADIO	TELEVISION				RADIO			
	Total %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %
Salary Level									
Less than \$15,000	7.7	1.8	.....	.....	3.7	10.8	5.9	7.4	12.6
\$15,000 to \$24,999	23.3	4.6	3.3	.....	7.4	33.3	17.7	33.3	37.0
\$25,000 to \$34,999	19.2	13.8	10.0	.....	22.2	22.1	8.8	37.1	22.4
\$35,000 to \$49,999	18.5	25.7	13.3	36.0	27.8	14.7	23.5	7.4	14.0
\$50,000 to \$74,999	15.7	23.8	26.7	24.0	22.2	11.3	29.4	7.4	7.7
\$75,000 or more	11.8	25.7	43.4	36.0	11.1	4.4	14.7	3.7	2.1
Not given	3.8	4.6	3.3	4.0	5.6	3.4	.....	3.7	4.2
Median =	\$33,900	\$52,000	\$70,250	\$62,500	\$42,500	\$26,900	\$46,250	\$27,000	\$24,600
Received Salary Increase During Past Year									
Percentage of increase	54.6	69.7	86.7	72.0	59.3	46.6	70.6	40.7	42.0
Less than 5%									
Less than 5%	1.6	1.8	3.3	.....	1.9	1.5	.....	.....	2.1
5% to 9%									
5% to 9%	14.4	20.2	26.8	28.0	13.0	11.3	14.7	11.1	10.5
10% to 14%									
10% to 14%	14.9	21.1	23.3	16.0	22.2	11.7	20.5	14.8	9.1
15% or more									
15% or more	14.4	17.4	23.3	16.0	14.8	12.8	17.7	7.4	12.6
Not given	9.3	9.2	10.0	12.0	7.4	9.3	17.7	7.4	7.7
Median =	12.3%	12.0%	11.8%	10.7%	12.5%	12.5%	12.9%	11.9%	12.5%
Fringe Benefits									
Medical insurance (paid)	78.3	85.3	90.0	84.0	83.3	74.5	73.5	81.5	73.4
Dental insurance (paid)	25.6	38.5	66.7	24.0	29.6	18.6	35.3	33.3	11.9
Life insurance (paid)	61.4	70.6	73.3	84.0	63.0	56.4	70.6	63.0	51.8
Sick leave	67.4	83.5	90.0	92.0	76.0	58.8	64.7	70.4	55.2
Vacation	85.6	89.9	96.7	92.0	85.2	83.3	85.3	85.2	82.5
Stock purchase plan	11.2	16.5	33.3	4.0	13.0	8.3	8.8	7.4	8.4
Profit sharing plan	23.0	29.4	26.7	28.0	31.5	19.6	29.4	22.2	16.8
Savings plan	9.3	14.7	30.0	8.0	9.3	6.4	11.8	22.2	2.1
Pension plan	24.6	44.0	53.3	56.0	33.3	14.2	26.5	22.2	9.8
Bonus	42.8	54.1	56.7	64.0	48.2	36.8	41.2	29.6	37.1
Tuition refund plan	8.6	11.0	26.7	4.0	5.6	7.4	17.7	18.5	2.8
Automobile furnished	54.6	66.1	73.3	64.0	63.0	48.5	47.1	48.2	49.0
Years in Present Job									
1 or 2	19.2	27.5	33.3	20.0	27.7	14.7	20.6	14.8	13.3
3 or 4	22.0	13.8	16.8	12.0	13.0	26.5	11.7	18.5	31.4
5 to 9	19.8	21.1	13.3	24.0	24.1	19.1	26.5	29.7	15.4
10 to 14	14.4	14.7	13.3	24.0	11.1	14.2	5.9	14.8	16.1
15 to 24	14.1	11.9	10.0	12.0	13.0	15.2	26.5	7.4	14.0
25 or more	10.5	11.0	13.3	8.0	11.1	10.3	8.8	14.8	9.8
Not given	.....	.....	.....	.....	.....	.....	.....	.....	.....
Median =	7.2	7.1	5.0	8.8	6.9	7.3	8.4	7.8	6.7
Years in Broadcast Industry									
Less than 5	5.1	4.6	6.7	4.0	3.7	5.4	8.8	3.7	4.9
5 to 9	12.1	6.4	6.7	8.0	5.6	15.2	5.9	29.7	14.7
10 to 14	14.7	10.1	23.3	8.0	9.3	17.2	29.4	14.8	14.7
15 to 24	30.4	31.2	23.3	28.0	31.4	29.9	32.4	14.8	32.1
25 or more	36.4	47.7	40.0	52.0	50.0	30.3	23.5	33.3	31.5
Not given	1.3	.....	.....	.....	.....	2.0	.....	3.7	2.1
Median =	21.4	24.4	22.9	25.5	25.0	19.8	17.0	15.0	20.6
Do Part-time or Free-lance Work									
	25.2	13.8	10.0	20.0	13.0	31.4	26.5	33.3	32.2
Licenses Held									
First phone	33.2	28.4	20.0	28.0	33.3	35.8	47.1	25.9	35.0
SBE Certificate	8.6	4.6	.....	4.0	7.4	10.8	5.9	14.8	11.2
Education									
High school	14.7	9.2	3.3	4.0	14.8	17.7	8.8	22.2	18.9
Two years of college	22.0	25.7	16.7	28.0	29.6	20.1	29.4	11.1	19.6
Four years of college	36.7	32.1	23.3	36.0	35.2	39.2	29.4	40.7	41.3
Postgraduate college	24.6	31.2	53.4	32.0	18.5	21.1	23.5	25.9	19.6
Voc/tech school	11.2	13.8	3.3	16.0	18.5	9.8	17.7	7.4	8.4
Age, Years									
Under 25	3.5	0.9	.....	.....	1.9	4.9	8.8	7.4	3.5
25 to 34	16.9	7.3	3.3	8.0	9.3	22.1	23.5	25.9	21.0
35 to 44	31.4	33.1	43.3	32.0	27.7	30.4	35.3	25.9	30.1
45 to 54	22.0	28.4	30.0	24.0	29.6	18.6	5.9	22.2	21.0
55 or over	25.6	29.4	23.4	36.0	29.6	23.5	26.5	18.6	23.7
Not given	0.6	0.9	.....	.....	1.9	0.5	.....	.....	0.7
Median =	44.3	47.9	46.1	49.2	48.4	42.5	40.0	41.4	43.4
Base =	313	109	30	25	54	204	34	27	143

*Management staff: president, owner, partner, vice president, general manager.

TABLE II – ENGINEERING AND TECHNICAL STAFF PROFILE*

	TV + RADIO	TELEVISION				RADIO			
	Total %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %
Salary Level									
Less than \$15,000	13.1	3.4	2.0	4.6	6.8	24.6	8.2	23.5	42.5
\$15,000 to \$24,999	35.5	29.9	18.1	47.6	52.3	42.2	29.4	55.9	50.0
\$25,000 to \$34,999	31.8	39.6	43.6	27.3	38.6	22.6	38.8	17.7	7.5
\$35,000 to \$49,999	15.4	20.7	27.5	15.9	2.3	9.1	21.2	.....	.....
\$50,000 to \$74,999	3.0	5.1	8.1	.....	.....	0.5	.....	2.9	.....
\$75,000 or more	.....	.....	.....	.....	.....	.....	.....	.....	.....
Not given	1.2	1.3	0.7	4.6	.....	1.0	2.4	.....	.....
Median =	\$25,300	\$29,000	\$31,800	\$24,400	\$23,000	\$20,700	\$27,900	\$19,500	\$16,250
Received Salary Increase During Past Year									
	79.8	92.0	93.9	88.6	88.6	65.3	78.8	58.8	53.8
Percentage of Increase									
Less than 5%	4.4	3.8	1.3	4.6	11.4	5.0	4.7	.....	7.5
5% to 9%	43.7	54.1	57.7	52.2	43.1	31.7	36.5	41.2	23.7
10% to 14%	17.9	19.8	22.2	13.6	18.1	15.6	23.5	11.8	8.8
15% or more	5.5	5.9	6.0	6.8	4.6	5.0	5.9	2.9	5.0
Not given	8.3	8.4	6.7	11.4	11.4	8.0	8.2	2.9	8.8
Median =	8.7%	8.8%	9.1%	8.6%	7.4%	8.5%	9.2%	7.8%	8.1%
Fringe Benefits									
Medical insurance (paid)	83.9	90.3	94.0	86.4	81.8	76.4	90.6	73.5	62.5
Dental insurance (paid)	39.7	49.8	56.4	38.6	38.6	27.6	41.2	26.5	13.8
Life insurance (paid)	67.7	77.6	83.9	61.4	72.7	55.8	68.2	58.8	41.3
Sick leave	81.0	90.3	92.0	90.9	84.1	69.9	72.9	79.4	62.5
Vacation	95.0	98.7	98.7	100.0	97.7	90.5	95.3	91.2	85.0
Stock purchase plan	19.3	28.3	36.2	15.9	13.6	8.5	16.5	8.8	.....
Profit sharing plan	18.6	19.8	18.8	9.1	34.1	17.1	21.2	14.7	13.8
Savings plan	21.6	28.7	38.3	6.8	18.2	13.1	21.2	14.7	3.8
Pension plan	52.1	67.5	73.8	63.6	50.0	33.7	51.8	38.2	12.5
Bonus	20.6	19.0	18.1	20.5	20.5	22.6	23.5	23.5	21.3
Tuition refund plan	30.3	39.2	47.7	22.7	27.3	19.6	32.9	14.7	7.5
Automobile furnished	13.8	11.8	6.0	11.4	31.8	16.1	22.4	11.8	11.3
Years in Present Job									
1 or 2	23.4	19.9	17.5	27.3	20.5	27.5	27.1	23.4	29.9
3 or 4	17.2	13.5	12.8	11.4	18.2	21.6	23.5	17.7	21.2
5 to 9	17.0	18.1	20.7	13.6	13.6	15.6	18.8	11.8	13.8
10 to 14	14.7	15.6	16.1	18.1	13.6	13.6	10.6	17.7	15.0
15 to 24	13.3	13.9	15.4	2.3	18.2	12.6	10.6	20.6	11.3
25 or more	14.2	18.6	16.8	27.3	15.9	9.1	9.4	8.8	8.8
Not given	0.2	0.4	0.7	.....	.....	.....	.....	.....	.....
Median =	7.8	9.6	9.7	9.2	9.2	5.3	5.0	8.8	4.9
Years in Broadcast Industry									
Less than 5	7.1	5.1	6.0	6.8	.....	9.6	7.1	8.8	12.5
5 to 9	14.5	13.5	13.4	13.6	13.6	15.6	12.9	11.8	19.9
10 to 14	18.6	16.5	19.5	9.1	13.6	21.1	27.1	11.8	18.8
15 to 24	26.6	24.5	21.5	22.7	36.4	29.1	27.1	35.3	28.7
25 or more	32.0	40.0	38.9	47.8	36.4	22.6	25.8	29.4	16.3
Not given	1.2	0.4	0.7	.....	.....	2.0	.....	2.9	3.8
Median =	18.3	21.2	20.6	23.8	21.3	15.9	15.9	19.0	14.2
Do Part-time or Free-lance Work									
	48.2	34.6	30.9	34.1	47.7	64.3	63.5	58.8	67.5
Licenses Held									
First phone	88.3	86.9	82.6	93.2	95.5	90.0	92.9	91.2	86.3
SBE Certificate	16.7	16.9	17.5	22.7	9.1	16.6	20.0	20.6	11.3
Education									
High school	29.6	27.0	24.8	25.0	36.4	32.7	29.4	35.3	35.0
Two years of college	33.7	35.4	34.2	34.1	40.9	31.7	34.1	41.2	25.0
Four years of college	24.8	24.1	28.2	25.0	9.1	25.6	28.2	17.7	26.3
Postgraduate college	4.6	4.6	4.7	2.3	6.8	4.5	4.7	2.9	5.0
Voc/tech school	42.7	45.2	43.6	40.9	54.6	39.7	40.0	38.2	40.0
Age, Years									
Under 25	4.8	2.1	3.4	.....	.....	8.0	5.9	5.9	11.3
25 to 34	29.4	23.2	24.8	22.7	18.2	36.7	40.0	32.3	35.0
35 to 44	23.6	24.5	24.2	18.2	31.8	22.6	21.1	32.3	20.0
45 to 54	19.5	23.6	22.2	27.3	25.0	14.6	16.5	11.8	13.7
55 or over	22.5	26.2	25.4	31.8	22.7	18.1	16.5	17.7	20.0
Not given	0.2	0.4	.....	.....	2.3	.....	.....	.....	.....
Median =	41.7	45.0	44.0	48.3	44.6	37.3	36.9	38.6	36.9
Base =	436	237	149	44	44	199	85	34	80

*Engineering and technical staff: technical manager, chief engineer, engineer.

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because all market profiles reported median salary increases during the last year ranging from 8.5% to 12.5%. The explanation for the drop in operations staff salaries may lie in their service profile and, in part, in small variations in statistical sampling. According to the responses to the fourth question on the survey, this group showed the shortest time on the job (nearly 41% at two years or less) and a high educational level (56.6% with full college and post-graduate work).

The comparison of data suggests that, within the operations staff, young college graduates are filling these positions. The lower median salary could be a reflection of the fewer years of service of these workers, compared to the other categories.

However, another factor is evident in the data for this group. In television, median income was down only in the *below top 100* market; for radio it was down only in the *top 100* market. All other market categories were up.

Salary increases

All markets and positions in both radio and TV broadcasting reported salary increases during the past year.

The management staff claimed the highest increases with a median of 12.3%; the operations staff were second with 10.2%; and the engineering and technical staffs were lowest with 8.7%. Furthermore, the radio

managers edged out their TV colleagues with a 12.5% increase compared to 12%.

Fringe benefits

A tremendous range of fringe

BE salary survey methodology

By Kate Smith, market researcher

This study was designed to enable readers to compare their job compensation packages with those of their colleagues in similar jobs within comparably sized markets. Separate graphics illustrate returns for television and radio, showing job title (management, production and engineering) and market size (top 50, top 100 and below top 100

markets). They also report broadcast category, length of time in broadcasting, salary levels, fringe benefits, salary increases in the past year, and other factors.

On June 14, 1982, 2915 questionnaires were mailed to recipients of **Broadcast Engineering** on an "nth" name basis. On Aug. 28, 1982, the cut-off date for this report, 1072 (37%) questionnaires had been returned. The data in this article are based on those responses.

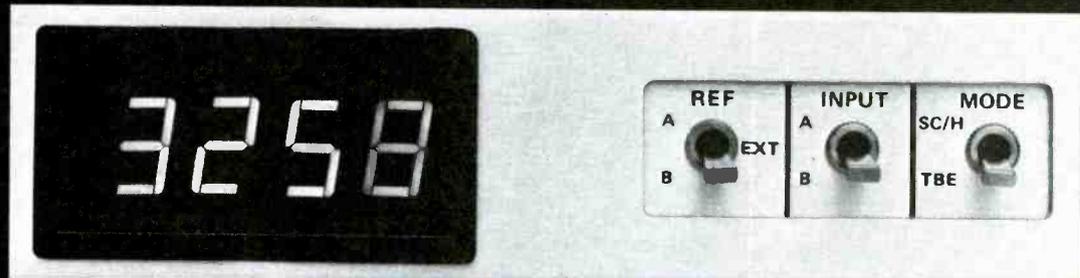
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benefit packages were reported by broadcasters. The engineers and technical staffs placed first in the highest number of fringe benefit categories, with the biggest leadership being in *pension plans*. This implies that this group is expected to provide long-term, devoted service and retire from these positions. Managers showed leadership in *profit-sharing plans, bonuses and furnished automobiles*. These are up-front, immediate fringe benefits often used to entice and keep experienced, creative management people in key positions. It is interesting to note that managers placed lowest in the *pension plans and tuition refund* categories.

The operations staff led in none of the categories, but they placed ahead of engineering in terms of *profit-sharing plans and bonuses*, and ahead of managers in terms of *tuition refunds and pension plans*.

Years of service

In decreasing order, the median years of service in their present positions were 7.8 years for engineering and technical; 7.2 years for managers; and 3.5 years for operations staffs. In terms of the industry segment, the median years on the job for radio and TV

managers were nearly the same across the board. This was also true for the operations staff. However, a wide margin was shown in engineering: 9.6 years in television vs. 5.3 years in radio. This probably indicates that good radio engineers move on to higher paying positions in broadcasting, or leave the business, more readily than do TV engineers.

In terms of years in broadcasting, all TV staffs reported more years in the business than did their radio counterparts. This may be explained, in part, by the higher compensation levels in television that help this market keep its staffs for longer periods.

Consulting

We were interested to see how much free-lancing, consulting and part-time activities broadcasters were performing. The tables show these percentages: 51.7% for operations; 48.2% for engineers; and 25.2% for managers. Across the industry, the radio staffs were much more active in free-lancing than were their TV colleagues. This, in part, may be a reflection of their lower salaries.

Licenses held

As expected, the engineers clearly

won out in the category of holders of First Phone licenses and SBE certification credentials, but more than one-third of the managers also reported having such achievements. Across the industry, the radio broadcasting staffs led those of television in numbers of personnel holding these honors.

Education

This is an interesting category if you compare the full college plus graduate level education reported by the various groups. Managers led at 61.3%; operations personnel were a close second at 56.6%; and engineers were lowest at 29.5%. The data were consistent across the radio and TV industries, except for the operations staffs. Here, the TV staffs reported significantly higher education levels than did their radio counterparts.

Age

We hesitated to include age questions in our survey, but did so to round out our profile of broadcasters. The median ages reported were 44.3 years for managers, 41.7 years for engineers, and 33.8 years for the operations staffs. Without exception, the median ages in television were older than in radio.

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TABLE III – OPERATIONS STAFF PROFILE*

Salary Level	TV + RADIO	TELEVISION				RADIO			
	Total %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %	All Markets %	Top 50 %	Top 100 %	Below Top 100 %
Less than \$15,000	21.1	12.2	5.0	6.1	30.2	29.3	19.6	20.0	36.5
\$15,000 to \$24,999	44.8	43.6	37.5	51.5	48.9	46.1	30.3	66.0	47.9
\$25,000 to \$34,999	22.0	24.4	23.7	33.3	18.6	19.8	37.0	12.0	13.5
\$35,000 to \$49,999	8.7	14.1	23.7	6.1	2.3	3.6	8.7	.....	2.1
\$50,000 to \$74,999	2.8	4.5	7.5	3.0	.....	1.2	4.4	.....	.....
\$75,000 or more	0.3	0.6	1.3	.....	.....	.....	.....	.....	.....
Not given	0.3	0.6	1.3	.....	.....	.....	.....	.....	.....
Median =	\$21,250	\$23,800	\$27,900	\$24,050	\$18,250	\$18,650	\$25,000	\$18,750	\$17,150
Received Salary Increase During Past Year	74.9	85.3	92.5	84.9	72.1	65.3	82.6	68.0	56.3
Percentage of Increase									
Less than 5%	4.3	5.8	.....	6.1	16.3	3.0	2.2	8.0	2.1
5% to 9%	29.7	32.7	32.5	33.3	32.5	27.0	23.9	28.0	28.1
10% to 14%	24.5	30.1	40.0	24.2	16.3	19.1	30.4	16.0	14.6
15% or more	10.8	10.9	12.5	15.2	4.7	10.8	21.7	8.0	6.3
Not given	5.6	5.8	7.5	6.1	2.3	5.4	4.4	8.0	5.2
Median =	10.2%	10.2%	11.3%	10.0%	8.3%	10.0%	12.2%	8.5%	8.6%
Fringe Benefits									
Medical insurance (paid)	80.8	84.6	88.8	84.9	76.7	77.3	76.1	76.0	78.1
Dental insurance (paid)	31.3	38.5	41.3	51.5	23.3	24.6	32.6	24.0	20.8
Life insurance (paid)	65.3	72.4	75.0	78.8	62.8	58.7	69.6	60.0	53.1
Sick leave	80.8	87.2	90.0	81.8	86.1	74.9	73.9	80.1	74.0
Vacation	94.4	98.1	97.5	100.0	97.7	91.0	39.1	96.0	90.6
Stock purchase plan	15.8	28.2	37.5	24.2	14.0	4.2	10.9	4.0	1.0
Profit sharing plan	20.1	24.4	20.0	30.3	27.9	16.2	17.4	8.0	17.7
Savings plan	15.5	25.0	30.0	24.2	16.3	6.6	17.4	4.0	2.1
Pension plan	43.7	59.0	68.8	63.6	37.2	29.3	43.5	36.0	20.8
Bonus	21.4	17.3	16.3	27.3	11.6	25.2	17.4	20.0	30.2
Tuition refund plan	22.6	31.4	40.0	33.3	14.0	14.4	10.9	24.0	13.5
Automobile furnished	11.5	9.0	8.8	9.1	9.3	13.8	8.7	16.0	15.6
Years in Present Job									
1 or 2	40.8	41.0	40.0	39.4	44.2	40.6	41.3	48.0	38.6
3 or 4	18.0	21.2	16.2	21.2	30.2	15.0	17.4	16.0	13.5
5 to 9	20.4	17.3	18.7	21.2	11.6	23.4	17.4	32.0	24.0
10 to 14	11.2	10.3	13.8	9.1	4.7	12.0	15.2	.....	13.5
15 to 24	7.4	7.7	8.8	6.1	7.0	7.2	8.7	.....	8.3
25 or more	1.9	1.9	2.5	3.0	.....	1.8	.....	4.0	2.1
Not given	0.3	0.6	.....	.....	2.3	.....	.....	.....	.....
Median =	3.5	3.4	3.6	3.5	3.2	3.6	3.5	3.1	3.9
Years in Broadcast Industry									
Less than 5	8.4	9.6	5.0	9.1	18.6	7.2	4.4	4.0	9.4
5 to 9	24.2	21.8	23.8	12.1	25.6	26.4	26.1	32.0	25.0
10 to 14	28.8	29.6	21.3	51.5	27.9	28.0	26.1	28.0	29.2
15 to 24	23.5	23.7	32.4	9.1	18.6	23.4	32.5	16.0	20.8
25 or more	13.9	14.7	17.5	18.2	7.0	13.2	10.9	20.0	12.5
Not given	1.2	0.6	.....	.....	2.3	1.8	.....	.....	3.1
Median =	13.0	13.1	15.0	12.8	10.9	12.8	13.8	12.5	12.4
Do Part-time or Free-lance Work	51.7	46.8	52.4	36.4	44.2	56.3	63.0	48.0	55.2
Licenses Held									
First phone	24.8	19.2	20.0	21.2	16.3	29.9	21.7	48.0	29.2
SBE Certificate	9.0	3.2	3.8	3.0	2.3	14.4	8.7	.....	20.8
Education									
High school	14.2	12.2	8.8	12.1	18.6	16.2	6.5	16.0	20.8
Two years of college	27.9	21.8	22.5	18.2	23.3	33.5	30.4	36.0	34.4
Four years of college	36.8	41.0	40.0	48.5	37.2	32.9	45.7	28.0	28.1
Postgraduate college	19.8	23.7	28.8	15.2	20.9	16.2	17.4	20.0	14.6
Voc/tech school	13.9	12.8	11.3	21.2	9.3	15.0	8.7	20.0	16.7
Age, Years									
Under 25	9.0	5.8	5.0	.....	11.6	12.0	8.7	16.0	12.5
25 to 34	47.6	48.6	41.2	48.4	62.8	46.7	45.5	52.0	45.9
35 to 44	28.2	28.9	35.0	36.4	11.6	27.5	37.0	16.0	26.0
45 to 54	9.9	13.5	16.3	6.1	14.0	6.6	4.4	8.0	7.3
55 or over	5.0	3.2	2.5	9.1	.....	6.6	4.4	8.0	7.3
Not given	0.3	.....	.....	.....	.....	0.6	.....	.....	1.0
Median =	33.6	33.8	35.7	35.4	31.1	33.1	34.0	31.5	33.1
Base =	323	156	80	33	43	167	46	25	96

*Operations staff: operations manager, station manager, production/program manager.

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Survey respondents' comments

Introduction by Bill Rhodes, editoria director

One of the most exciting parts of our annual salary survey is the write-in section for comments about industry trends and conditions. When typed, these comments cover 67 pages. Obviously, not all of them could be included here, but we have printed selected entries to share with our readers.

Overall, a few general observations can be drawn from these comments:

- In terms of compensation, managers recognize their benefits of higher pay and better fringe benefit packages. But they also realize that competition for the limited positions is strong. Engineers are still striving for higher pay, but express appreciation for recognition of their vital role in broadcasting. At the operations level, many expressed pressures of stiff competition for available jobs and a general improvement in pay and benefits. However, the bottom line is money, and all broadcasters would like to see more of it for jobs well-performed.
- In the topics of trends, problems and opportunities, broadcasters had a lot to say. A good deal of anxiety was expressed about the splitting of the market by CATV, DBS and STV and the fact that traditional broadcasters were leaving for higher pay in the cable industry. Another overriding concern was the scarcity of qualified maintenance people and management-oriented chiefs.
- In terms of free-lancing, nearly every type of job in engineering/consulting/production services, maintenance within the industry was mentioned along with most jobs in industry and personal services. It is apparent that the BE readers who responded to this survey have a wealth of talent, both in professional broadcasting and in their private lives.

Compensation tendencies

TV management: Top 50

- Competitive factors and bottom-line realities will slow rates of increase.
- Getting better, but still lags well behind programming, news and sales.

TV management: Top 100

- Excellent benefits overall—great variation from company to company.
- Salaries and benefits have improved greatly in the past five or six years.
- Better at top, slow at bottom.

TV management: Below top 100

- Still not keeping up with inflation and increasing costs. It is Catch 22 with utilities, phone company, etc., having a guaranteed rate of return.
- Salary and benefits favorable, but supply is greater than demand for employment.

Radio management: Top 50

- Our company is becoming more "perk" oriented than "cash raise" oriented—reasons: tax bracket and economy.
- Improving nicely, but only if your operations are profitable.
- Still very lacking in incentive-type compensation.
- Has increased at all levels relative to economic trends over the past two decades.

Radio management: Top 100

- Good trend.
- Seem to be more benefits based on trade deals—less actual "cash out" benefits.

Radio management: Below top 100

- Getting better.
- Depends on the area of country. South and West are better than North and East.

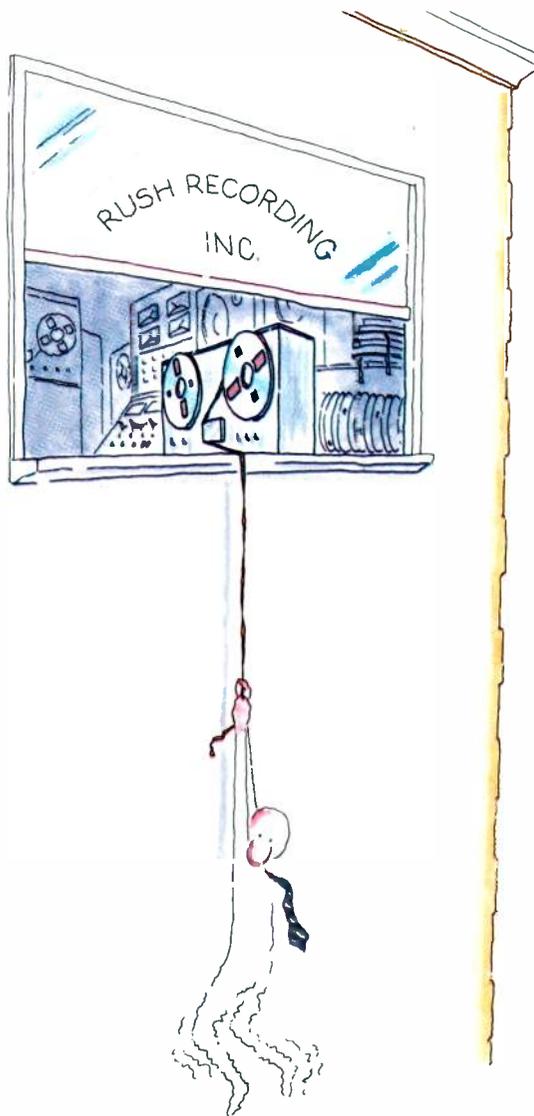
- Still behind as compared to other industries.
- Do not believe that compensation will keep up with inflation.
- Stations are finally beginning to realize that they must provide more than just salary to lure talented, qualified individuals to the industry—fringe benefits.
- Undoubtedly will be downward with elimination of First Phone (in technical area). Otherwise, static.

TV engineering: Top 50

- Way below electronics industry as a whole.
- Trend toward more fringe in lieu of additional wages.
- I expect wages in broadcast engineering to drop as the First Class License becomes more and more worthless.
- Are better now than in the past—could still be better.
- Eliminate the "equal pay for everybody" concept. Start with fair compensation, then reward hard work, ability and productivity.
- The broadcast industry has continued to see good profits, but has not seen fit to compensate its employees accordingly.
- It seems that the need for "qualified" technicians is slowly being recognized by the industry—which is slowly increasing its pay scale to match.
- Pay too low to attract trained maintenance personnel. A surplus of operations personnel keeps their wages low.

TV engineering: Top 100

- Lagging far behind cost of living.
- Very stable, few layoffs.
- Definite improving trend in engineering in the last 10 to 15 years.



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October 1982 *Broadcast Engineering* 35

- Going up rapidly for qualified maintenance people as they become more and more scarce.

**TV engineering:
Below top 100**

- Need a pension plan for broadcasters organized by NAB, SBE, etc.

Radio engineering: Top 50

- Stations are cutting back and their engineering departments are getting hit first. The quality of sound is getting bad.
- It seems to me that broadcasting, so far, is one of the industries least affected by current economic conditions.
- Engineering is finally being recognized in the major markets and in the smaller ones.
- At our station, we seem to get a larger percentage salary increase each year. Dental insurance was just added in the last six months.
- Increasing compensation for "real" qualified technicians, who are in short supply.
- Relating to engineers—I believe smaller stations are going to rely more on contract engineers to cut back expense of full-time engineers. Larger stations will, for the most part, continue as in the past.
- Good chiefs are still in demand and compensation follows accordingly.
- Not enough money for the hours required to do a first-rate job.

Radio engineering: Top 100

- Fringe benefit packages in this market are generally much lower.
- The trends are down. What is worse, competency is becoming non-existent as a compensation factor.
- Radio has a minimum of compensation to offer the engineer. Everything is *cut expenses* and *cut staff*, with emphasis on profit to the stations.
- Compensation trends will drop because management can hire less experienced people, due to deregulation by the FCC.

**Radio engineering:
Below top 100**

- Low pay is one of the main reasons they can't keep enough good engineers in the broadcast industry. In most cases, a person can work in a mill and make more money, without any skill or training.
- As the technology involved becomes more complex, management should (and does) recognize the value of good engineers.
- Compensation has failed to keep pace with technology.

- Most engineers are underpaid.
- Small market pay rotten.
- Broadcasting is lagging behind in pension plans for retirement. There should be more opportunity for stock purchase plans and/or profit-sharing plans.
- Pay tends to be low, but work is steady.
- Small station compensation poor, but local engineers work on own time and are able to make outside income.

TV operations: Top 50

- Increasing demand for quality people is forcing salaries up.
- We are trending toward a reduction in fringe benefits.
- Maintenance engineers own the business.
- More profit-sharing plans needed.
- Based on performance—high achievers receive top salaries and increases.
- Strong increases for right jobs.

TV operations: Top 100

- Future looks great.
- Production salaries going up.
- They seem to be below average, but the work is steady.

**TV operations:
Below top 100**

- Has come a long way in the past 20 years.
- Low compensation and benefits.
- Compensation is low in terms of cash—too many people are after our jobs, and we have nothing to bargain with.
- Slowly improving.

Radio operations: Top 50

- Broadcasting still fails to maintain compensation levels equal

to other industries.

- Economy is keeping increases to minimum.
- Getting better. Have never had these benefits before now.
- One of the reasons we need the ERA in Illinois.

Radio operations: Top 100

- The industry needs an *industry-wide* retirement plan. Individual corporate plans just won't cut it.
- Need more compensation for *quality* work.
- Due to the economy, compensation appears to be holding "as is"...lower starting salaries...slower increases.
- Compared to television, radio employees are very much underpaid.

**Radio operations:
Below top 100**

- Appear to be improving for middle and upper management.
- Not keeping up with other industries.
- Fringe benefits on the decrease. Salaries holding even.
- Radio not keeping up with other media.
- Terrible.
- It is not as good as it could be, but it is getting better.
- Not improving as quickly as they should. And salaries much lower than other industries.
- DJs are still getting a raw deal. Sales continue to be the big money.
- Smaller markets upward. Large markets downward. \$50,000 to \$60,000 DJs are becoming fewer except in extremely large markets.
- Generally fringes increasing in number—however, insurance coverage less. Salary increases less than the cost of living.

Trends, problems and opportunities

TV management: Top 50

- Future competition from cable.
- People come and go too fast. Don't feel loyalty.
- FCC FM modulation rules need changing; replace peak limits with average limits.
- Very difficult to find qualified maintenance people and management-oriented chiefs. Cable is attracting best people with higher salaries.

TV management: Top 100

- See more opportunities for maintenance-skilled employees, particularly in digital.
- Broadcasting is facing its greatest challenge ever because of the new technologies. One must be constantly ready to take advantage of the opportunities that the new meth-

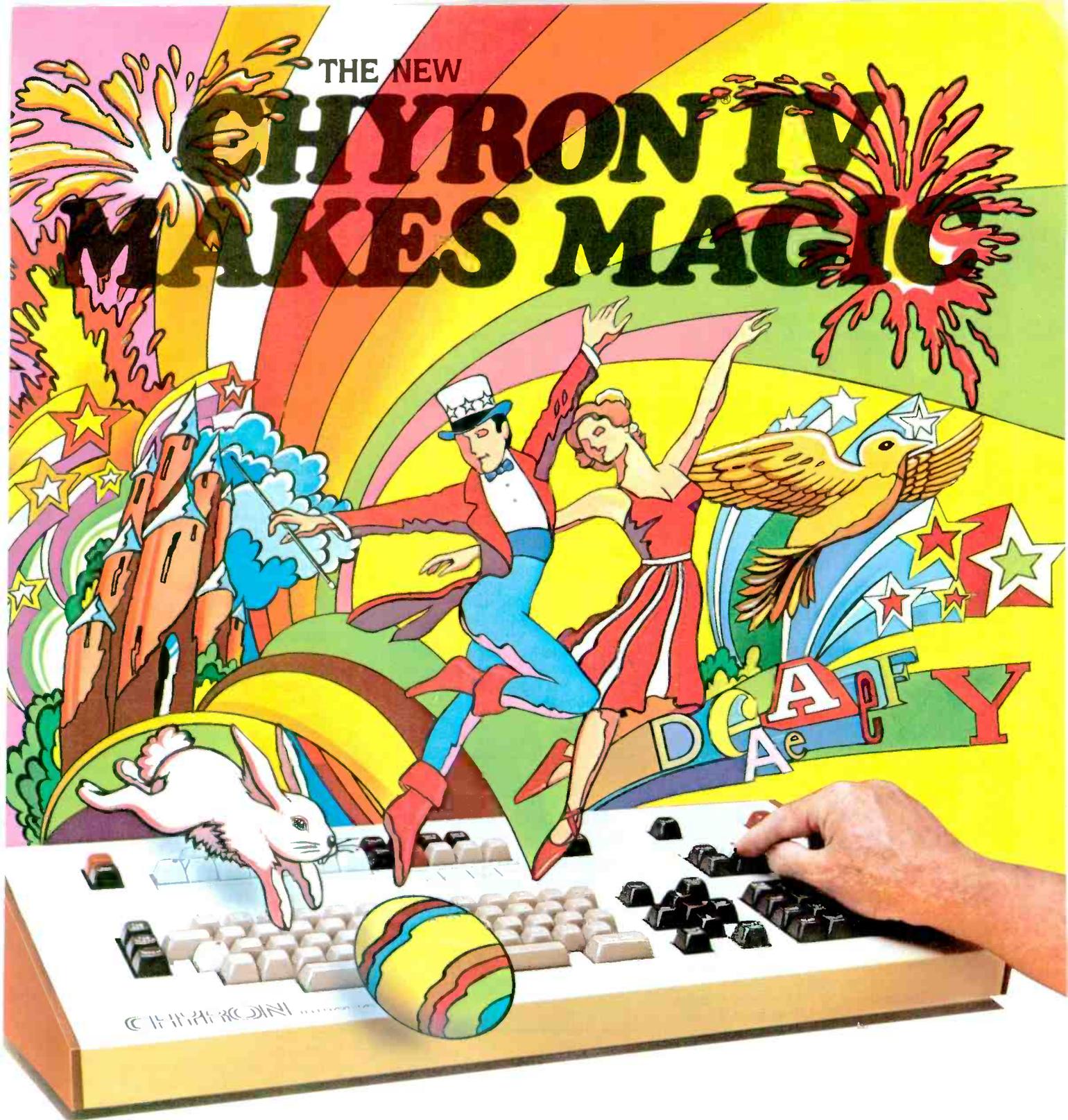
ods present. More than ever a station must strive to be the best in order to grow and survive in the face of new competition.

**TV management:
Below top 100**

- Cost increases in operating are going up as fast as sales increases.
- Serious need for a facility to train maintenance personnel.
- Small markets still have problems attracting qualified people (even trainable personnel). Large markets simply check-book us out of people. Employees who really care are getting few and far between.
- Small market problems get little or no attention from NAB or FCC.

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- Technology moving rapidly, equipment improvements, people problems, CATV and PAYVEE system will cut into small market audiences and revenues. DBS and LPTV will splinter markets.
- Cable penetration is a problem; rising costs are a problem; present economy is a problem.
- Trends toward more and more competition with job opportunities wide open for talented people.

Radio management: Top 50

- Manufacturers gutting the electronic components of AM radios, causing an accelerated roll-over to FM by the listeners.
- Death of AM—can be saved by having a standard AM stereo format (mode), and enlightening the receiver manufacturers on the benefits of high fidelity AM reception. We had it many years ago, and we can have it again!
- Trends toward much higher technology with less people—but they must be more highly qualified. High quality network transmission could force some local operations to clean up their act, thereby generating some jobs.
- Radio doing okay but leveling off unless Reagonomics begins to work—which we think it will.
- Best industry to be in, and I wouldn't want to be anywhere else.

Radio management: Top 100

- Too many new radio stations. Poor ratings available from Arbitron. Satellite program delivery has tremendous potential.
- Fewer qualified people are coming into the business—not enough compensation—new technologies drawing good people away from traditional radio and television. All forms of technology will find a niche and survive. This is an exciting time to be in the media.
- Opportunity for making good money has shifted from the talent side to the management side.

Radio management: Below top 100

- The FCC is becoming too lax in its rules and regulations. Broadcasters need better training for news reporting, more understanding of history, economics, politics and sociology.
- We need to be kept informed on AM stereo, changes in FM allocation rules, digital audio and computers (hardware and software).
- Broadcasting is a small business, with very few fringe benefits. Opportunities are good for sharp people willing to sacrifice and sell—sell ideas.

- The AM stereo situation is disappointing...it'll go the same way as FM Quad.
- Technological revolution—can't keep up with it. What is next? How can we plan for the future, when it is just a day or two away? And yet, what an exhilarating time we are going through right now.
- Good personnel continue to be a problem in a small market because, basically, the pay scale is lower than for larger markets.
- This places pressure on suitable programming, with the station forced to be poor in this department, or forced to look at automation and satellite feed alternatives. This, in turn, places pressure on the local effort to serve the community with local announcements and other immediate services, because a part of the programming would thus be delegated to outside sources. It will be more difficult for the small market marginal station to survive in the coming years.
- Today...collections slowest in our history. Expenses and income are about the same. It is tough. Opportunities in AM radio are rather bleak.
- I think there are great opportunities in radio in the '80s and that there will be increasing advertising revenues.

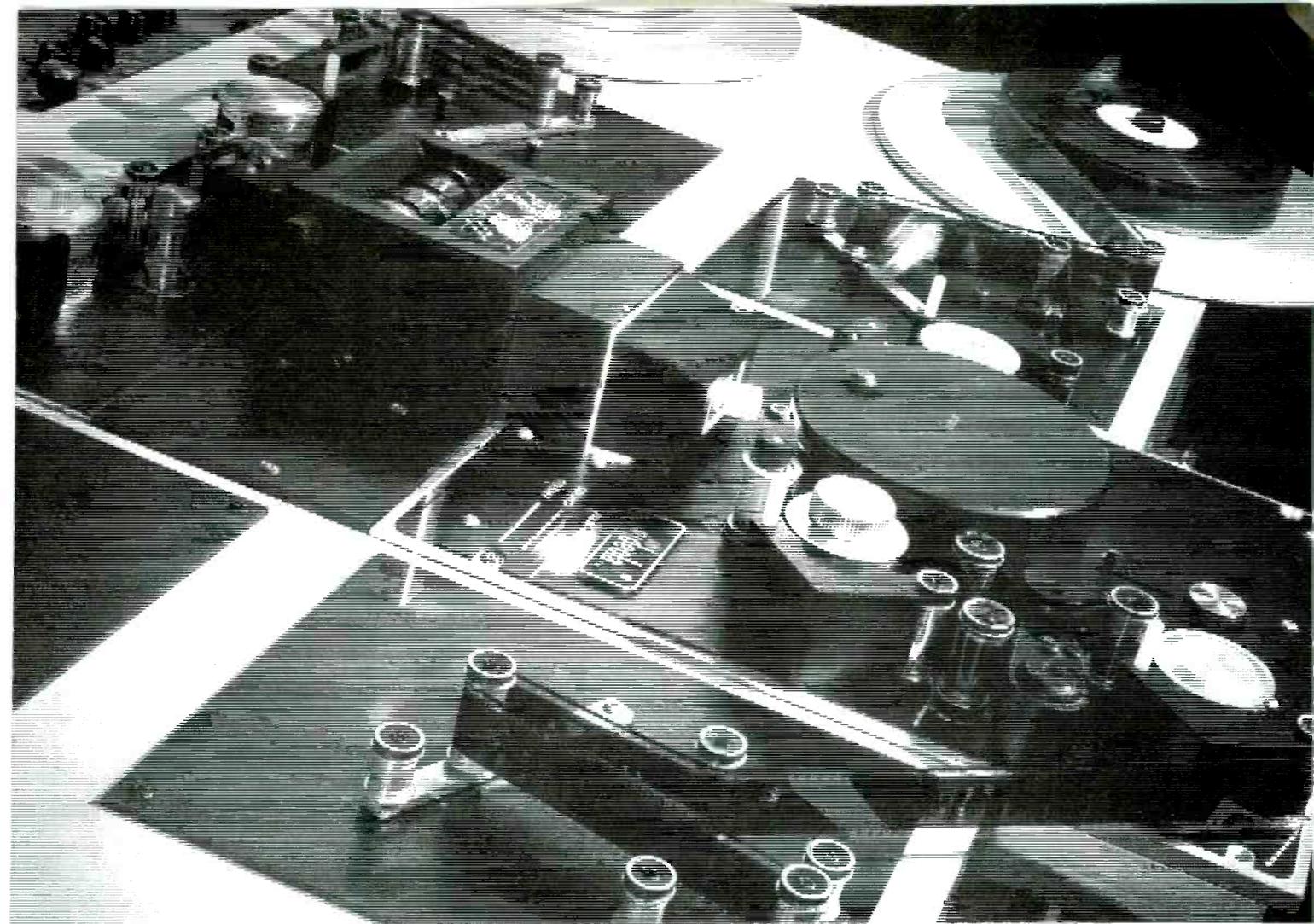
Managers recognize their benefits of higher pay and better fringe benefit packages. But they also realize that competition for the limited positions is strong.

TV engineering: Top 50

- Cable seems to be exploding with opportunities. It seems that a major trend is not what you know but who, especially in television.
- Big opportunities in program production as software will be in great demand.
- Compensation will need to be increased to attract new talent. I see more and more young people going into other electronic fields because broadcasting pays so little.
- In my years, circuits have given way to systems. Publications like **BE** are essential in link-

ing the engineer with current developments and the very pulse of the industry itself.

- It is a very interesting field, and I look forward to the next decade of changes.
- Not enough blacks in good paying, ENG camera work positions for network news teams.
- Insufficient/no maintenance training for new equipment.
- Trends—more sophistication and automation. Computer and microprocessors becoming more prevalent. Digital well under way and satellite program delivery is here. Big problem—we need more skilled technicians and equipment designed with a high degree of diagnostic ability.
- I am very disappointed with the FCC's decision to change the First Class License. It leads to unskilled, minimum-wage workers in the industry.
- There is an increasing need for competent maintenance people who understand digital technology. Also ¾-inch news editors are needed.
- RF-experienced people scarce.
- The acquisition of technical knowledge, technicians and standards have become the sole responsibility of the individual.
- It seems to be more and more difficult to keep up with state-of-the-art technology at a maintenance level at the local stations.
- Trends to more computer operations—especially transmitter.
- I think one of the biggest problems facing the broadcast industry is the lack of well-qualified technical personnel, especially maintenance personnel. I feel that this is due to the lack of interest upper management has placed upon maintaining a competent educational program for their technical personnel.
- Great opportunities for technically oriented people.
- A trend toward increased use of satellites for signal distribution.
- Finding tech help is our worst problem. Cable, computer, other technologies are taking the best people. Broadcast no longer has the edge to attract people.
- More toward automation. Fewer people.
- Hard to do regular job and also keep up with new technology and equipment. Broadcasting is not the "glamour" job it was once and not as attractive. There are *engineering* opportunities.
- Reduced license requirements at stations will increase opportunities for consultants.
- Computer systems knowledge



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and finding competent maintenance people are two of the most difficult problems now.

- Equipment increasingly difficult to service and maintain. Problems—getting qualified *experienced* broadcast engineers, especially in the RF area.
- It is difficult to keep up with the many fast-paced changes in technology.

TV engineering: Top 100

- Elimination of entry-level engineers is creating shortage of maintenance engineers.
- FCC deregulation is a problem.
- Increasing problem is finding *competent* personnel, particularly with skills or common sense to service increasingly complex equipment.
- Opportunities are beginning to narrow, but technology explosion helps the opportunities. Retention of qualified and technically capable people continues to be a vexing problem.

TV engineering: Below top 100

- Moving from studio to field production and ENG. Opportunities available for trained personnel.
- Major problem is unionization in most states. Unions are detrimental to initiative and progress.
- Money is in the major markets, but you are channelized. Wide diversity available in small markets, but the pay is usually the lowest amount possible to keep position filled.
- With the current deregulation, entry-level positions may be harder to find because stations may find more than one engineer unnecessary.
- There is still a lack of qualified technicians and a lack of any method of determining qualification.

Radio engineering: Top 50

- I am a member of SBE but do not believe their certification program is the answer. Thus I will not take their exams. I am working on grad school.
- Technical employment opportunities are decreasing because most stations seem to be reducing personnel to bare minimum or less.
- Deregulation and reduction of FCC requirements of personnel operating station equipment has had a very pronounced effect.
- A major problem is management's reluctance to upgrade or replace old or obsolete equipment.
- The current drive for deregulation will be, I believe, more detrimental than beneficial to the industry. *Some* regulation is essential.

- Finding qualified engineers is a problem. Salaries are not enough to draw technical people.
- Problems—too many chiefs and not enough Indians. Every member of management seems to be an expert in all phases of broadcasting. Hence, complete confusion.
- Problem—lack of young qualified technically competent persons with ability to handle large transmitter plants for maintenance purposes.
- As a chief engineer of an AM/FM, finding qualified operators/engineers for our union operation is difficult.

Radio engineering: Top 100

- Trends—microprocessor and computer expansion taking place.
- Advancements in technology tend to outrun most stations' capability to keep up. Not enough emphasis on technical excellence.
- Management has gotten it wishes with deregulation of the FCC rules. They can hire and use just about anyone for engineering jobs where licensed people were required earlier.

**Engineers are still
striving for higher pay,
but express appreciation
for recognition of
their vital role
in broadcasting.**

- New crop of engineers have lots of education and no actual experience. Future for engineers will move to cable leaving AM/FM/TV to the new crop of engineers.

Radio engineering: Below top 100

- With all the new, more reliable equipment coming out, it is going to take smarter, well-trained engineers, to keep it running. But they are going to expect more money as well.
- I think the FCC's deregulation is a good thing. Competitive interests will keep most stations as good or better without unnecessary rules.
- Number one problem is the current politicized FCC. No engineering expertise; the dropping of the First Class License was

politically expedient, not defensible technically.

- Opportunities in satellite communications show great prospects for the broadcasting industry.
- The opportunities are endless for the young electronics educated engineer. The industry is mushrooming with new technology.
- The high cost for test gear is a problem for my station.
- Need much better engineers—then much better relationship between engineering and other management.
- Deregulation could pose problems unless everyone exercises discretion.
- Resent discontinuation of First Phone. Need better pay/fringe benefits.
- One of the major problems is managers trying to become engineers.

TV operations: Top 50

- Increasing demand for software should increase jobs.
- Sophistication of equipment has shifted emphasis of production from in-studio to in-field remotes—digital effects and CMP editing techniques have led to further use of post-production assembly and sweetening of programming.
- One of my worries is the new camera/recorder combo unit. Let's get a standard before we end up with three or four of them.
- Rapid technological advances strain the ability of local facilities to keep up. At the same time, improvements are so impressive that stations cannot *afford* to remain complacent.
- Need more minorities in policy-making positions.
- At our facility, all systems go. However, cable systems seem to be the road of the future along with satellite reception for homes being on the increase.
- The technology is changing so fast it is hard to keep up with it. The company is not always willing to give proper training.

TV operations: Top 100

- Problems—personalities play too important a role in deciding one's future. Opportunities—new advances in technology offer challenge.
- FCC is deregulating only for broadcast corporations and big money. Quality of broadcasting is getting very bad, due to minimum-wage engineers and unqualified persons for professional broadcasting positions.
- Trends are more toward computer-oriented equipment,

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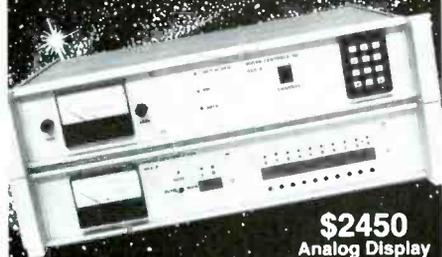
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which is more difficult to maintain in full operating order.

TV operations:

Below top 100

- Colleges and universities doing a lousy job of preparing graduates for future employment.
- The new technology is fantastic.
- Jobs are hard to find for 4-year graduates. People are not allowed to use their artistic abilities in the broadcast industry.
- There seems to always be a need for qualified technicians.
- Trends—technology boom, particularly computers. Problems—commitment, keeping up with tech and costs. Opportunities—unlimited.

Radio operations: Top 50

- Opportunities are decreasing for general radio personnel. Increasing for cable, DBS, etc.
- Despite the recession, broadcasting is doing well and will continue to do so. People want and need to be entertained and informed.
- One of the big problems is finding young people who want to start at the bottom and work their way up.
- Faster implementation of state-of-the-art technology is ahead.

At the operations level, many expressed pressures of stiff competition for available jobs and a general improvement in pay and benefits.

Radio operations: Top 100

- Trending toward new technology will bring many new opportunities.
- Failure of management to involve staff in goals and planning.
- Great day for radio as cable, DBS and videodisc reduce the glamour and success of network TV.

Radio operations:

Below top 100

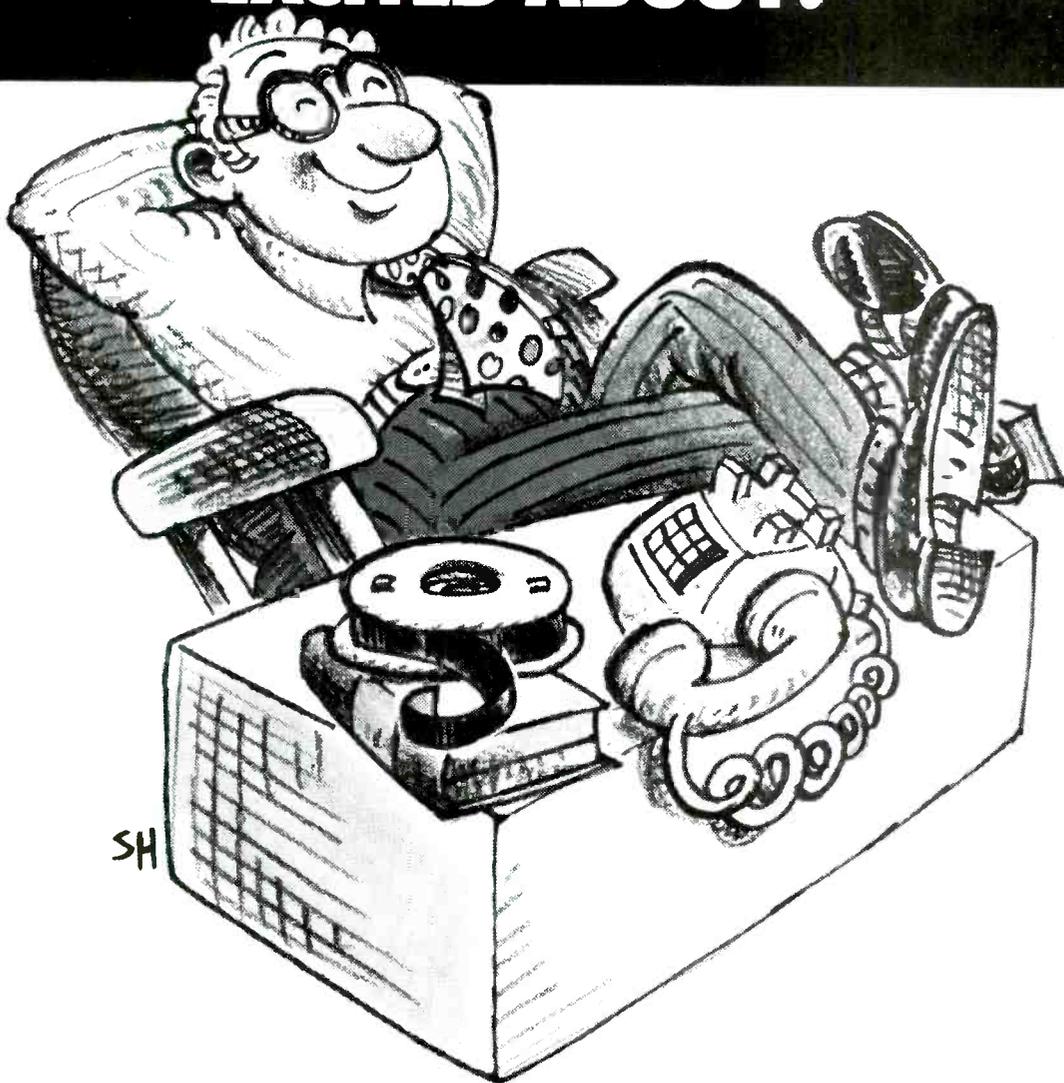
- Opportunities are increasing, especially for women in sales and on the air.
- We have terrible interference problems from a marginal over-modulating local station. It is

apparently too inconvenient for the FCC to investigate small market problems. The idea that the marketplace will ensure even marginal quality in smaller markets is a myth. We have stations here that have not run a proof in 20 years. With deregulation, I see this type of problem as getting worse.

- Stations must have a better training program as qualified personnel are scarce for the smaller market stations.
- Not enough competent new people. Young announcers cannot program to an adult contemporary audience.
- Opportunities are expanding phenomenally fast, particularly because of cable and UHF. There have been trends toward "tightening the belt" in operations budgets; this will continue as long as economic factors continue to fluctuate.
- Low salary. Poor benefits. Only a gifted few can make a decent living in broadcasting.
- Opportunities unlimited, but you must stay ahead of the technology.
- Industry is slowly making skills an important factor and "paper qualification" less important.
- The FCC responded poorly on AM stereo; when the technical snafus are finally sorted out, it will certainly revitalize the AM spectrum, but will not be a magic savior—programming will still be what makes people listen, not whether or not it is in stereo.
- Technology is changing too fast.
- Not enough information on career opportunities for administrators. Insufficient training programs. Growth of our industry is encouraging. There seems to be no end to the technological improvements.
- Increasingly competitive, but industry is responsive and tackles problems as they come.
- Opportunities—vast; problems—enormous and daily; trends—onward and upward.
- A trend that is rapidly developing in this area is to hire experienced people from larger markets and pay them competitively. This is greatly improving the quality of radio in small markets.
- Opportunities are excellent for well-trained and qualified persons.
- Competitive nature requires modern facilities and good wages to keep qualified personnel.
- Automation replacing a lot of people.
- With the economy as it is, jobs are very scarce, and it is frightening.

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TV standards conversion

By Blair Benson, TV technology consultant, Norwalk, CT

The introduction of the Eurovision TV network in the early 1950s created the first need by broadcasters for conversion of picture signals among the British 405-line and the continental European 625- and 819-line monochrome transmission standards¹. Before that time, program interchange had been handled exclusively by the universal medium of motion picture film, either with direct photography or kinescope recording.

However, in order to broadcast news events and programs produced from electronic TV cameras, and to transmit them over the Eurovision network, conversion to the local standard was required. To cope with this problem, broadcasters and manufacturers in Britain, France and Germany concurrently and independently developed the necessary equipment in 1953 and 1954. The BBC, in England, and the RTF, in France, installed monochrome optical conversion systems of their own designs using a picture monitor and camera. In Germany, the post office installed a similar optical system made by Fernseh to feed programs to parts of Belgium, using 819-line standards.

Program exchange with North America continued on film for several years until, in the late 1950s, two events occurred that changed future techniques for coverage of news and special events. The first was the introduction and worldwide use of videotape, a medium that provided immediacy, but that required conversion for distribution in countries on different standards than that of the recording. The second was in 1959 when a royal wedding in England, and an international summit conference in Paris attended by President Eisenhower, created a demand for ex-

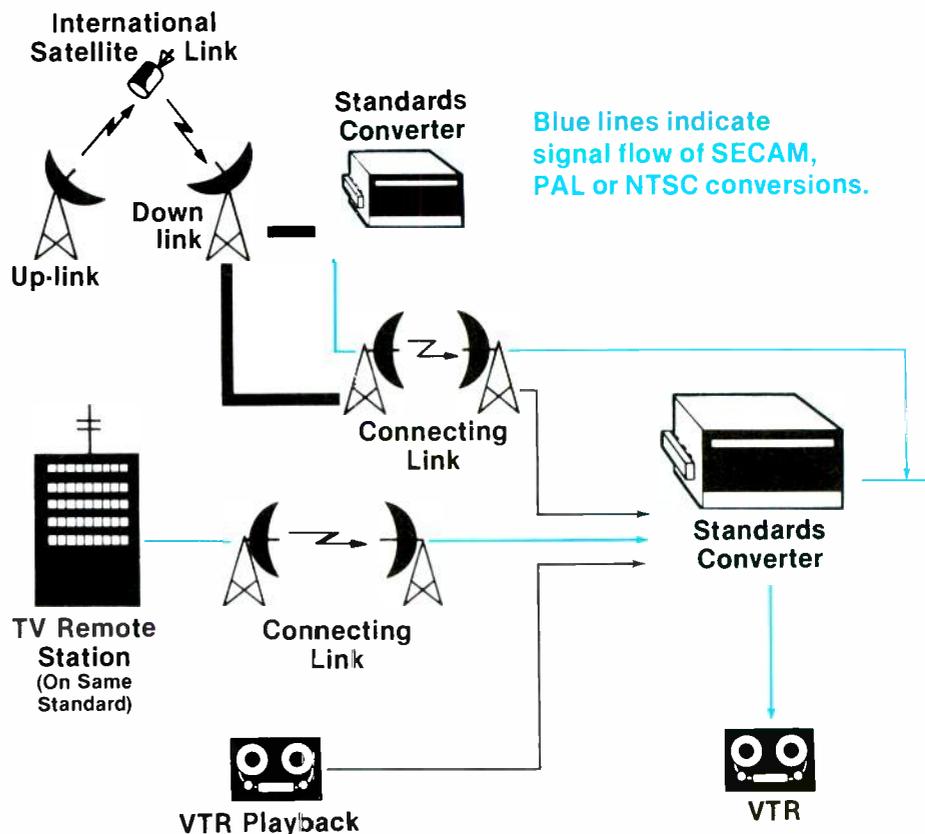
tensive coverage for audiences in Canada and the United States. Thus, 405-/525-line conversion equipment was needed by the networks.

This posed a technical problem not encountered in the line-conversion equipment used in Europe, because of the different field rates of 50Hz and 60Hz, and the resultant 10Hz flicker. This was first solved by Granada Television in 1959 in its 405-/525-line

converter by a manually adjusted waveform generator, the output of which modulated the gain of a video amplifier at the flicker rate. A similar manual system was used by CBS in New York for the summit conference news coverage.

Subsequently, Fernseh in Germany introduced a field-conversion modification of its line converter that automatically corrected for the 10Hz flicker by detection of level variations in a pulse inserted on the back porch of the input signal. This equipment was used by CBS for coverage of the 1960 Olympic Games in Rome, using a program on 625-line standards fed from RAI.

Although the optical converters provided signal quality acceptable for news and special events, by present-day standards, the performance was less than marginal. For example, the signal-to-noise ratio was no better than 40dB. The center resolution and corner resolution at 320 lines were down 2dB and 4dB, respectively. And particularly annoying was the fixed phosphor-grain pattern of the monitor screen. Thus, it was not until the introduction of all-electronic, digital



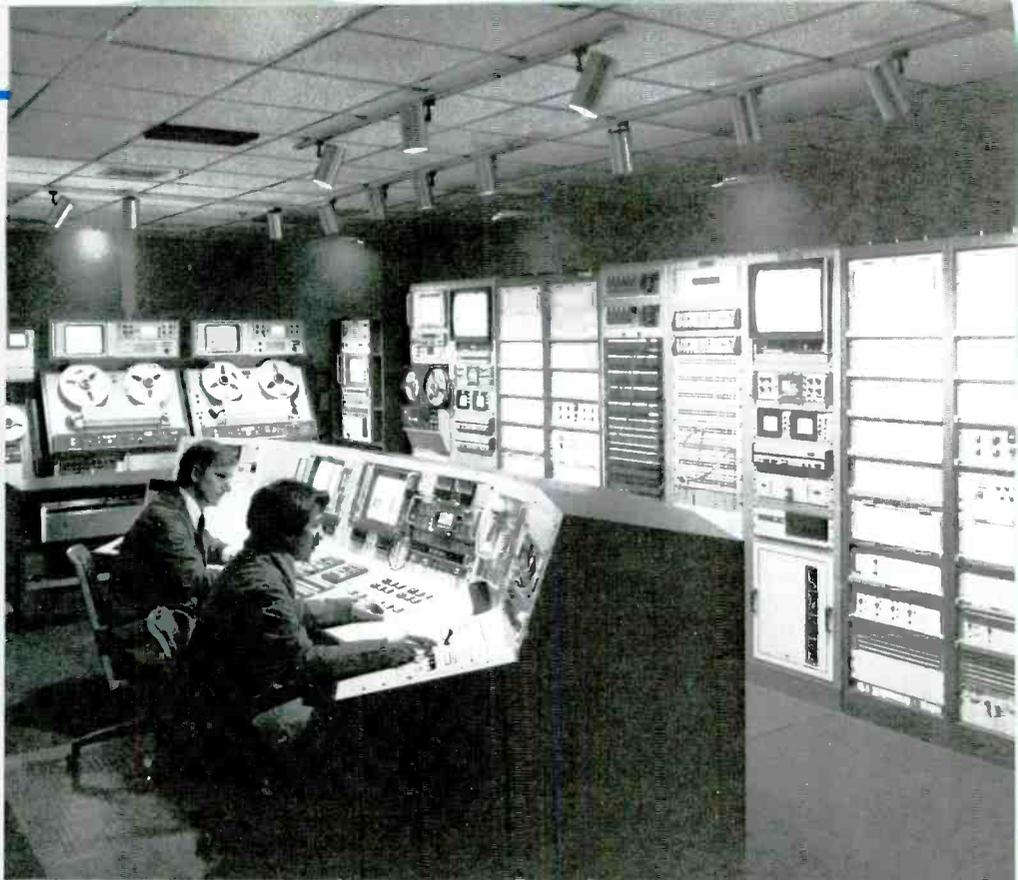
An illustration of various uses within the TV system of standards conversion equipment.

systems that truly transparent conversion became possible.

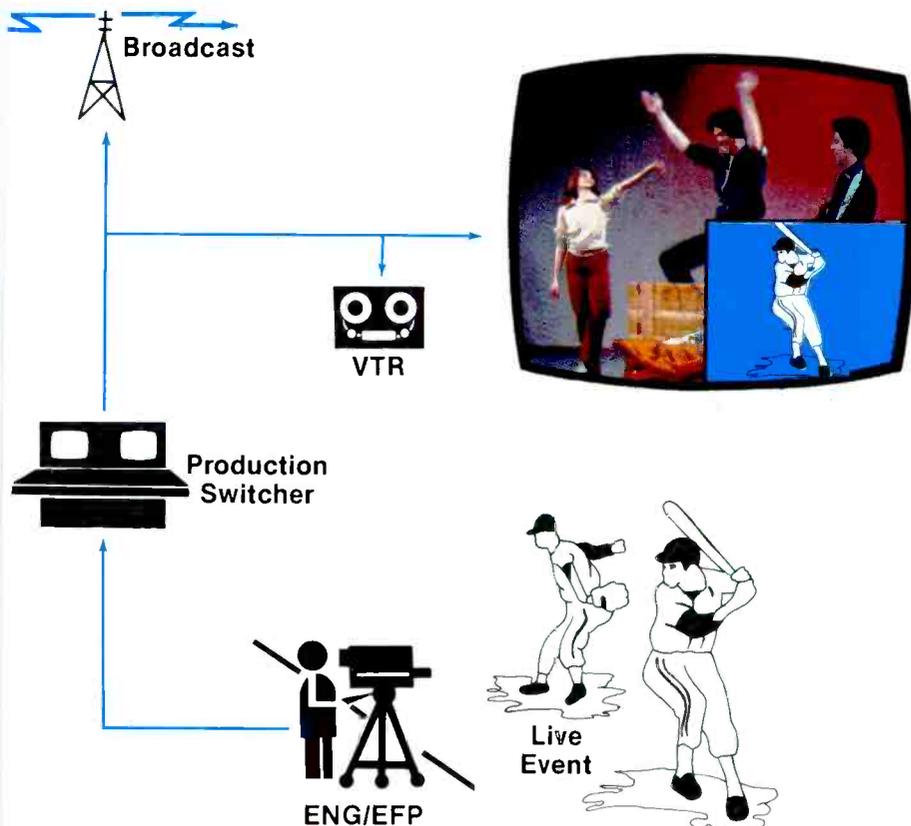
Digital conversion developments

It has been more than 15 years since the first all-digital color standards converter, designed by the BBC, was put into regular program service in London². In recognition of this technical achievement, the National Academy of Television Arts and Sciences awarded the BBC an Emmy in 1968. Since that time, in part as a result of the great strides made in digital solid-state technology, several other organizations in England and Japan have developed, and are now manufacturing, converters.

The Independent Broadcasting Authority (IBA) in England demonstrated its first Digital Intercontinental Conversion Equipment (DICE) to the European Broadcasting Union (EBU) Technical Committee in March of 1971. Subsequently, it was used to serve the IBA's viewers in the London area, replacing the analog line-store converter. This was followed by the development of a field-store converter in 1972 for the use of the Independent Television News



Audio Plus Video tape and standards conversion facilities in Montvale, NJ. The Marconi DICE converters are in the two racks at the right, and the two at the left of the jack fields.



(ITN) in London, for news events received and transmitted overseas by satellite and videotape. Subsequently, Marconi was licensed to manufacture the DICE converter³.

At the same time, Quantel in England began manufacturing its DSC 4002. Several of the Quantel converters, as well as the Marconi DICE, have been sold in the United States. More recently, a new, more sophisticated BBC design, the Advanced Conversion Equipment (ACE), has been offered by McMichael Ltd., in England. And, in Japan, OKI has announced its compact LT1200 portable unit, and the larger LT1015 model intended for fixed installations.

All of the various systems follow the same basic design principles. A minimum of two consecutive fields are converted from analog signals to binary digits (bits) and are stored in a solid-state memory. The stored bits are read out at the rates of the converted standard, with complex interpolation among lines and fields to reduce, or avoid completely, uneven reproduction of vertical and diagonal lines and motion in the output picture.

Interpolation

Two types of interpolation are employed in all four manufacturers'

converters. Vertical or spatial interpolation is used to eliminate discontinuities in picture image lines resulting from the difference in number of scanning lines. The simplest method of vertical interpolation generates the output signal by combining picture information from the nearest two or three lines in a ratio determined by their proximity to the output line.

Field or temporal interpolation is used to reduce the uneven motion of moving objects that results from the different field-scanning rates. The process of interpolation between fields in time is similar to that of vertical interpolation between lines. The contribution from each input field to the output picture is determined by the proximity in time of the output field to the input fields.

IBA Marconi DICE converter. The DICE system is housed in two equipment racks, along with picture and waveform monitoring and test facilities. The digital storage capacity is two fields, and the spatial interpolation is five lines. Field or temporal interpolation is obtained by mixing the simultaneously available outputs of the two stores in varying proportions so that the output velocity of moving objects equals the input velocity. In other words, the proportions are varied according to the timing of the input and output fields. For a 525-/625-line conversion, five coefficients are used: 90%, 70%, 50%, 30% and 10%. This method of interpolation is reported by the IBA to be better in terms of movement judder than that of a conventional telecine.

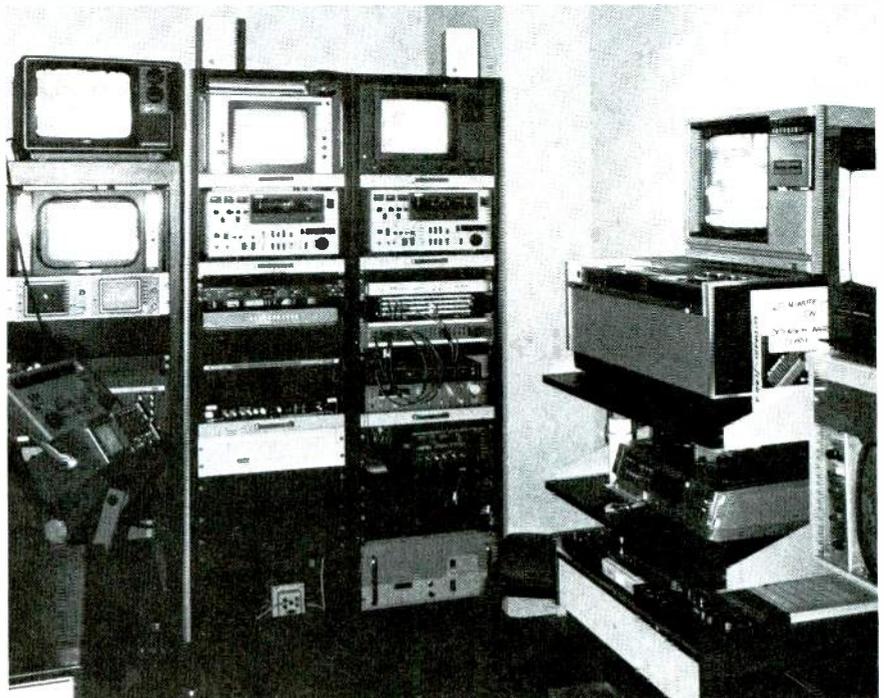
MCI/Quantel converter. The 12¼-inch high Quantel also uses a 2-field store, and provides both spatial and temporal interpolation. An operating control is provided for adjustment of the degree of temporal interpolation or judder reduction to best suit the type of action in the picture.

BBC/McMichael ACE converter. ACE is contained in two equipment racks, one housing all of the digital circuitry, and the other continuing the analog circuits and monitoring facilities. Four fields of storage permit an extremely smooth temporal interpolation. Spatial interpolation is more than ± 2 lines, or a total of five lines.

OKI Electric Industry Company. The OKI converter is made in two models, the LT1015 with three fields of storage, and the LT1200, with two fields. The LT1015, with its monitoring equipment, occupies one equipment rack. The LT1200 is the most compact converter available at this time, occupying only 10½ inches of



Quantel's DSC 4002 portable digital standards converter.



BBC-designed McMichael ACE standards converter with test and monitoring equipment.

rack height. It is essentially a single-standard converter, because the appropriate decoder and coder modules must be inserted for the desired input and output standards.

US conversion services

A number of production companies in the United States provide standards conversion services. The first of these

was Intercontinental Televideo in New York, formed in 1974 to represent the ITN Marconi/DICE conversion service in London. In 1976, in order to provide a lower cost service and faster turnaround than ITN, Intercontinental put into operation an optical system, of its own design, using a color monitor and a single-tube color Saticon camera. In March of this year,

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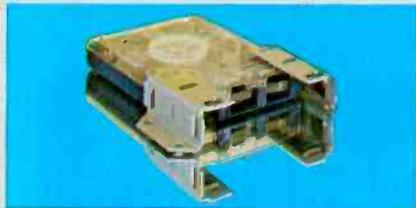
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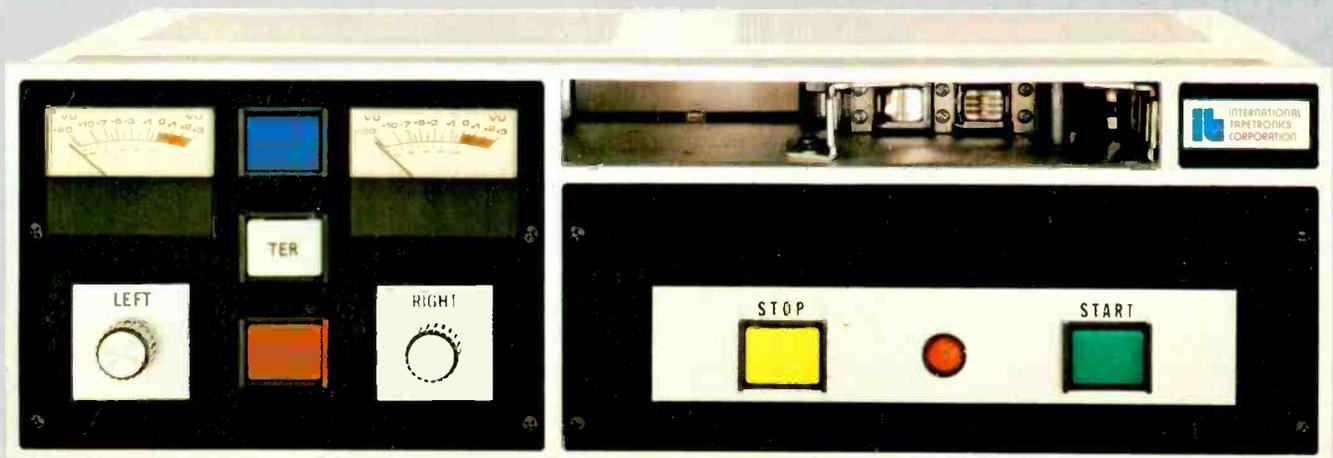
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The OKI LT1200 standards converter.

this was supplemented with a Quantel digital unit. Quantel conversion service is available also in New York from Devlin and ABC, and a number of companies throughout the United States.

Five DICE converters are in use in the United States, three at Audio Plus Video in New Jersey, and two at Global Video, based in Orlando, FL.

One ACE system has been delivered to Image Transform in California, and one to Televisa/Protelle in Mexico. Two of the ACE converters built by the BBC have been in use in London for more than 1½ years. Recently, two ACE converters were used by Television Espagna in its worldwide coverage of the World Cup Football Games played in Spain.

Prediction

In a little more than a decade, the use of digital techniques for frame store in TV equipment has become commonplace, albeit still relatively expensive. In the next decade, however, we can expect a drastic reduction in the cost and size of solid-state storage components, which will permit a wider use of standards conversion systems to a degree that the variety of standards will no longer be a restriction on program exchange among countries. In fact, it has been predicted by Dr. Kern Powers, vice president of research and engineering for RCA's David Sarnoff Laboratories, that the future TV frame store will be manufactured on a single chip costing no more than \$54. Thus, a myriad of new applications will open up for system design engineers.

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- ¹SMPTÉ Journal, August 1961, p. 628.
- ²"Developments in Standard Conversion," Proceedings of the International Broadcasting Convention, 1978.
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- ⁴"SMPTÉ Panel Examines HDTV," *Broadcast Engineering*, November 1981, p. 114.



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... created in response to industry demand for a compact production switcher with many of the features and reliability of the acclaimed Ross 500 series.

The 524 does it all and is still priced to be within reach of every TV station and production house.

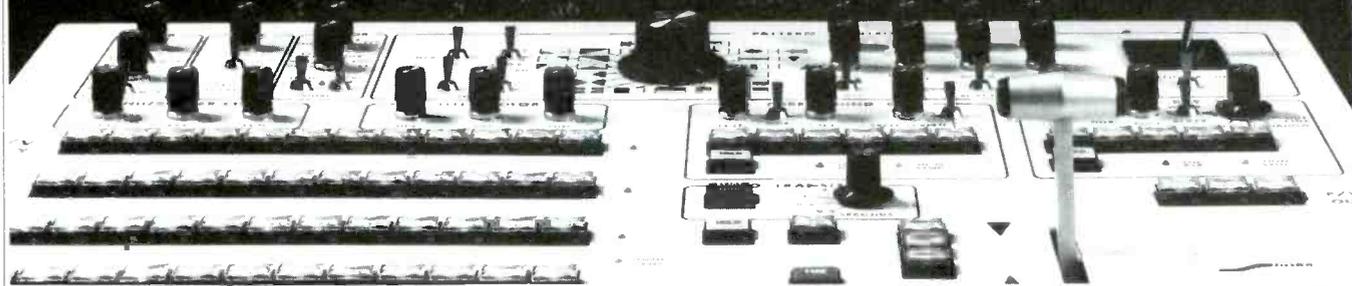
Available with either 12 or 20 inputs, the 524 offers

the full production capability of the Multi-Level Effects system and Transition Preview, along with the clean panel layout and simplicity of operation that have made Ross switchers favourites around the world.

Options such as rotary wipes, RGB and encoded chroma keyers, auto transition, analog borders and interfaces for editing systems and digital effects ensure that the 524 will be at home in small studios,

mobile vans and editing suites. The Ross Scene Store memory system offers the added dimension of memory at a reasonable price.

Ross Video Limited
9 Plaza Drive, P.O. Box 220
Iroquois, Ont. Canada
613 652-4889



Circle (24) on Reply Card



Panasonic adds a new perspective to prism optics performance. Introducing the WV-777.

You expect great performance from a three-tube prism optics camera and that's just what you get with the Panasonic WV-777. But Panasonic knows it takes more than a great picture to make a great camera.

Take the WV-777's sleek, low-profile design and unique side-mounted hand grip. They give the cameraman a clear, unobstructed view that makes staying with the action easy.

The WV-777 is also easy to set up and operate because all critical controls are behind an easy-open side panel. You'll find hori-

zontal and vertical linearity, skew, centering, red and blue registration and more. For added precision, there are digital auto white and black circuits with memory.

The 1.5" di-optic electronic viewfinder is not only fully adjustable, it also includes indicators for battery warning, VTR tally and other key operating conditions.

With its magnesium die-cast chassis, the WV-777 combines light weight with strength to ensure a high level of performance over a long period of time. Its three Saticon® pickup tubes and middle index prism

produce 550 lines horizontal resolution and a S/N ratio of 55 dB at recommended illumination. And for easy serviceability, the WV-777 has modular plug-in fiberglass circuit boards.

The WV-777 has a -72dB mic input, a -20dB line input, 2 audio output levels, a snap-on AC adapter and battery case. And for studio use, there's also an optional 5" (meas diag) studio viewfinder, studio lens package and remote control unit.

But perhaps the Panasonic WV-777's most surprising element is its price, \$7,650*. So broaden your perspec-

tive and get the prism optics camera designed with the cameraman in mind. The Panasonic WV-777.

Saticon is a registered trademark of NHK (Japan Broadcasting Corp.)

*Manufacturer's suggested price

Panasonic
VIDEO SYSTEMS DIVISION

For additional information on the new WV-777 mail to:
Panasonic Industrial Company
Video Systems Division
One Panasonic Way
Secaucus, N.J. 07094

Name _____
(Please Print)
Company _____
Address _____
City _____
State _____ Zip _____
Phone (____) _____

BE-1082

Equipment survey: Wireless and professional mics

By Bill Rhodes, editorial director; and Carl Bentz, technical editor

Sound engineers make it their job to thoroughly understand acoustics and the audio reproduction chain, which includes microphones, wireless mic systems, low frequency extenders and other supporting equipment. Sound engineers must know what to select to get the job done, whether audio pickup is in the studio or in a dynamic news coverage environment. They must also understand the critical factor of placement in using many microphones to best cover an event.

To help audio experts keep their information files up-to-date and thus better fulfill their roles, **BE** periodically runs a survey of available wireless and professional mics and asks manufacturers to provide supporting information. The last time we presented a roundup on this topic was in our February 1979 issue. Much of that information is still valid, but there have been many advances since that issue was published. This month's survey may be used to fill any information gaps.

Survey technique

In preparing this year's survey, we mailed a special form to manufacturers who provide wireless and professional microphones, as listed in our September *Buyers' Guide* and corporate files. We have made an effort to be complete in the data presentation, but manufacturers that chose not to supply the material that we requested may have been left out.

The results of this year's survey are presented in Tables I, II and III. As a special service, we have made it possible to obtain data directly from manufacturers (or their exclusive representatives) or from distributors. To obtain update material for your files, use our Reader Service Card and the numbers listed in the tables.

Table I breaks most microphone types into four categories. *Lavalier* includes miniature and subminiature models, suitable for attachment to clothing, etc., for relatively unnoticeable microphone uses. The *studio* category combines hand-held and table-type units. *Special purpose*

indicates models suitable for shotgun, studio-boom and instrument pickup purposes. Small boom-mounted mics, used in wireless intercom and sports-casting applications and in wireless intercom systems, are listed under *headset*. The country of manufacture has been indicated, as well as ex-

clusive US distributors (according to **BE** records) whose names differ from that of the manufacturer. Starred (*) companies have no US distributors, according to our files.

Table II treats wireless microphone systems for performers, not remote pickup systems. Double starred (**)

Table I.
Professional microphone sources

Company (country)	Equipment type				Reader Service Number
	Lavalier	Studio	Special purpose	Headset	
AKG Acoustics (Austria)	X	X	X		(201)
Altec (USA)	X				(202)
Astatic (USA)	X	X			(203)
AudioSears (USA)				X	(204)
Audio-Technica (Japan)	X	X	X		(205)
Beyer Dynamics (West Germany)	X	X	X		(206)
Bruel & Kjaer (Denmark)		X	X		(207)
Calrec (UK)/Audio & Design Recording		X			(208)
Clear-Com (USA)				X	(209)
Coherent Communications (USA)	X				(210)
Countryman Associates (USA)	X				(211)
Crown Int'l. (USA)	X				(212)
DI Tapes (UK)*			X		(213)
EPM (Canada)			X		(214)
Eagle (Japan)*	X	X	X		(215)
Electro-Voice (USA)	X	X	X	X	(216)
HM Electronics (USA)				X	(217)
Image Devices (USA)	X				(218)
Keith Monks (UK)		X			(219)
Melodium (France)*	X	X			(220)
Milab (Sweden)/Cara Int'l.	X	X	X		(221)
Neumann (West Germany)/Gotham Audio	X	X	X		(222)
Panasonic (Japan)		X	X		(223)
Paso (Italy)*		X	X		(224)
Philips (Netherlands)	X	X	X		(225)
R-Columbia (USA)				X	(226)
RWO (Japan)/Fostex		X			(227)
Racal (UK)/Television Equipment Associates				X	(228)
Schoeps (West Germany)/ Posthorn Recordings	X	X	X		(229)
Sennheiser (West Germany)	X	X	X	X	(230)
Shure Brothers (USA)	X	X	X		(231)
Solidyne (Argentina)*				X	(232)
Sony (Japan)	X	X	X		(233)
Sunn (USA)		X			(234)
Superscope (USA)	X		X		(235)
Swintek (USA)				X	(236)
TASCAM/TEAC (Japan)		X			(237)
Telex/Turner (USA)	X	X	X	X	(238)
Vidair Electronics (USA)	X	X			(239)
Wright (USA)	X				(240)

Brilliant performer.

**NEW
WIRELESS**

Model 82 Wireless Condenser Hand-Held

The Model 82 condenser wireless microphone has been added to Cetec Vega's professional hand-held line. The Model 82 incorporates the popular Shure SM85 condenser element and attractive black windscreen to provide:

- Minimal handling noise, reduced mechanical vibration, and virtually no "boominess" (by means of controlled low-frequency rolloff).
- Clean reproduction of close-up vocals with moderate proximity effect.
- "Crispness" and presence with high-definition midrange.
- Clear, scintillating highs with crisp upper register.
- Cardioid pickup pattern for effective rejection of off-axis sounds.

All Cetec Vega hand-held wireless microphones (including the Model 80 with the Electro-Voice EV-671 dynamic element and the Model 81

with the Shure SM58 dynamic element) have an attractively contoured black case with internal antenna.

Used with Cetec Vega professional wireless receivers, the FM systems operate on any crystal-controlled frequency between 150 to 216 MHz, at a range up to 1000 feet or more. Transmit-to-receive frequency response is almost perfectly flat from 100 Hz to 12 kHz with gentle rolloffs to 40 Hz and 15 kHz. Total harmonic distortion is typically 1/2 percent. System dynamic range is 90 dB when "Dynex" (transmit compression and receive expansion) is incorporated, with a resulting low noise floor.

Cetec Vega hand-held wireless microphones are newly redesigned for 20 to 30 percent additional battery life, using a commonly available 9-volt alkaline battery (Duracell recommended). Microphone sensitivity is easily adjustable with an audio

gain control on the bottom, with an adjacent LED indicator to verify optimum setup. Power and audio on/off switches are also conveniently located on the bottom.

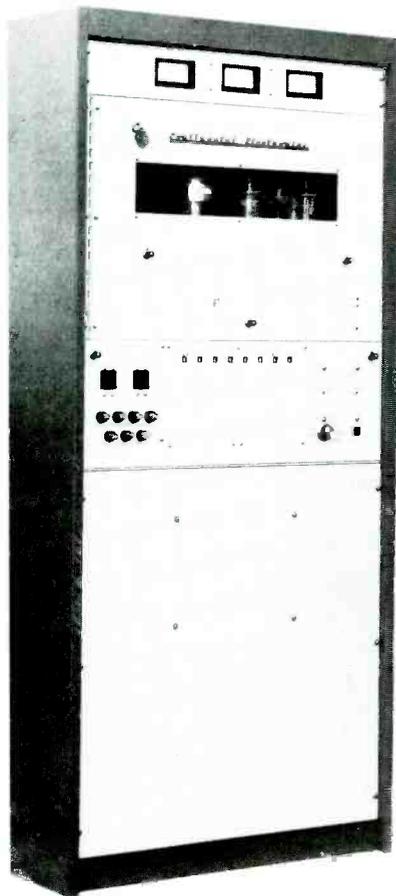
Write or call for further information and location of your nearest dealer: Cetec Vega, P.O. Box 5348, El Monte, CA 91731. (213) 442-0782 TWX: 910-587-3539

in Canada: A.C. Simmonds & Sons Ltd.

 **Cetec Vega**
Division of Cetec Corporation



Circle (26) on Reply Card



Continental's 1 kW AM Power Rock: a sound winner that's ready for AM stereo.

Tough market or not, the Power Rock is designed to give you the best signal around. Listen to the loud, clear signal, and you know you have a winner. The Power Rock is ready for AM Stereo and accepts sophisticated audio. Conservatively-rated components give you an extra margin of safety for steady and reliable on-air performance.

For information, call 214/381-7161
Continental Electronics Mfg. Co.
Box 270879 Dallas, TX 75227

Continental 
Electronics

Send me 1 kW AM Power Rock brochure

Name _____

Station _____

Address _____

City _____

State/Zip _____

Phone (____) _____

© 1982 Continental Electronics Mfg. Co./4966

Circle (27) on Reply Card

Table II.
Wireless microphones

Company	Frequency			Reader Service Number
	High VHF	Low VHF	UHF	
Beyer Dynamics				(241)
Cetec Vega	X			(242)
Coherent Communications	X			(243)
Comrex			X	(244)
Edcor	X	X		(245)
Ercona		X		(246)
HM Electronics	X			(247)
Micron				(248)
Panasonic			X	(250)
RF Technology**			X	(251)
Schaffer-Vega	X			(252)
Sennheiser**	X	X		(253)
Sony			X	(254)
Swintek	X			(255)
Telex	X			(256)

Table III.
Distributors of microphones

The following list includes *some* of the many distributors offering a wide range of microphone products. Many provide rental agreements for your microphone needs.

Allied Broadcast Equipment (257)	Glentronix Ltd. (272)
Alpha Audio (258)	Alan Gordon (273)
Audio-Video (259)	David Green Broadcast Consultants (274)
Audiocon (260)	H.M. Holzberg Associates (275)
Audiotechniques (261)	Landy Associates (276)
Broadcast Equipment & Supply (262)	Lerro Electrical (277)
Broadcast Systems (263)	Lines Video Systems (278)
Camera Mart (264)	MZB & Associates (279)
Cinema Products (*)	Marcom (280)
Comex Corporation (265)	Midwest (281)
Comprehensive Video (266)	Pierce Phelps (282)
Victor Duncan (267)	Singer Products Company (283)
H.M. Dyer Electronics (268)	Gene Sudduth Company (284)
Dyma Engineering (269)	Systems Wireless (285)
Film/Video Equipment Services (270)	Television Engineering (286)
Fitzco Sound (271)	Western Broadcast Systems (287)

*For information, write: Cinema Products, 2037 Granville Ave., Los Angeles, CA 90025.

companies provide systems in which multiple frequencies may be received simultaneously by one receiving unit.

Table III lists some major distributors of microphone equipment.

Additional literature

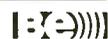
As part of our survey, we requested that manufacturers provide us with copies of available application notes on wireless and professional mics. Four sources did so. If you would like to obtain copies of those notes, write directly to the manufacturers as follows:

- "A Telex Primer for Wireless Microphones," (22 pages) Pro Audio Dept., Telex Communications, 9600 Aldrich Ave. S., Minneapolis, MN 55420.
- "An Introduction to Diversity Sys-

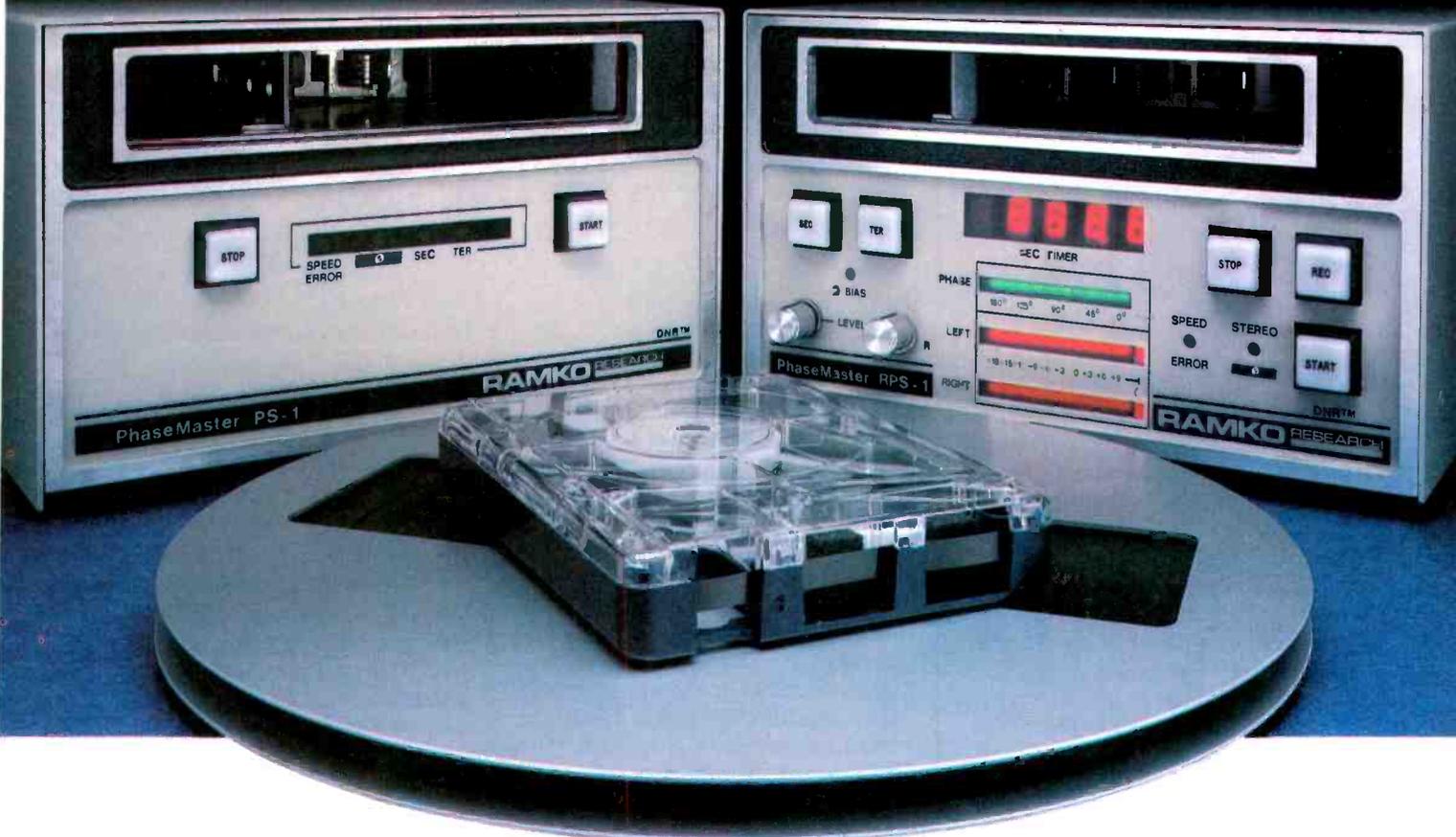
tems," (3 pages) AN80-1, HM Electronics, 6151 Fairmount Ave., San Diego, CA 92120

- "Microphones For Professional and Semi-Professional Applications," by Gerhart Bore/translation by Stephen Temmer, (74 pages) available from Gotham Audio Corporation, 741 Washington St., New York, NY 10014. Price is \$2.
- "Condenser Microphones and Microphone Preamplifiers," (a 132-page handbook available free) B&K Instruments*, 185 Forest St., Marlborough, MA 01752.

*The B&K Instruments equipment is widely known in the acoustical measurement field, and the company's supporting literature offers a wealth of outstanding technical data.



The Performance of an Open-Reel Recorder.



At Half the Price of Its Nearest Competitor.

Let's face it, the secret to better cart machine performance isn't in the cartridge, it's in the machine.

The new generation of improved cartridges and tapes alone can't solve the serious phase stability and noise problems. The plastic cart and its guiding system are highly imprecise, at best. The new "hot" tapes bring a slight decrease in audible noise, which is not terribly significant considering the noise base. The maintenance of precise machine-to-machine head phase alignment has been practically impossible in even the best installations.

The solution to the problem? PhaseMaster. The industry's most advanced broadcast reproduction system. In the stereo units, our exclusive electronic solution utilizes variable delays in each of the output channels. A sample of the left program channel is encoded on the cue track (without interfering with the cue information), and upon decoding in the playback cycle is compared to its upper track (left program) mate. Thus, an apples-to-apples comparison which is used to correct for the time (phasing) differences due to head misalignment, tape skewing and jitter. It works flawlessly with any cartridge. It eliminates the compromise of unreliable and inconsistent electromechanical schemes; the tradeoffs imposed by noise-inducing and non-compatible matrixing approaches; the complex and inexact cross-correlation methods.

PhaseMaster gives you compatibility with all your present, previously recorded carts too. An easy transition can be made at your own pace without having to immediately rerecord your

station's entire library. Interestingly, even these carts will sound better due to our new noise-reduction circuitry.

Add to this the performance specifications that rival open-reel recorders and the best mechanical design you've ever seen in a cart machine.

Here's the best news yet: PhaseMaster can be performing in your studios for as little as \$1,091.* At \$2,600, our Stereo R/P is about half the price of the ITC/3M Series 99B. And the margin's even wider with Tomcat.** If you've given thought to adding the Phasechaser, you're now up to, or over the price of a new PhaseMaster with all of its inherent advantages.

Feature for feature, spec' to spec', dollar for dollar—the Phasemaster comes out on top.

The only way to fully appreciate a PhaseMaster is to get your hands (and ears) on one. To prove to yourself that PhaseMaster really has the performance of an open-reel recorder, that once and for all phase stability, noise and fidelity problems are a thing of the past, that there's a cart machine truly ready for FM & AM Mono or Stereo—write or call us now. We'll loan you a PhaseMaster at no obligation. Free, for two weeks.

Like we said, try it with anybody's cart. You'll discover performance of an open-reel recorder, at half the price of its nearest competitor.

*Model PM-1 mono playback.

**All prices are introductory and subject to change without notice.

Based upon manufacturer's suggested professional prices 7/82. ITC/3M, trademark 3M Corp. Tomcat, trademark of Pacific Recorders & Engineering. Phasechaser, trademark of Howe Audio, Inc.

Engineered For Your Bottom Line.

RAMKO

Ramko Research, 11355-A Folsom Blvd.
Rancho Cordova, California 95670 (916) 635-3600

PhaseMaster's Numbers

Wow & Flutter:	0.095% max. DIN weighted (0.04 to 0.07% typical)
Signal-To-Noise Ratio: (Playback)	-68dB, @ 160 nWb/m (A weighted) -72dB, @ 250 nWb/m (A weighted)
Frequency Response:	Amplifier: +0.25 dB (NAB Curve) System: 50 Hz to 16k Hz ± 1.5 dB
Phase Correction: (Stereo)	±738° correction range @ 16k Hz
Separation (Stereo):	50 dB
Output Level:	+25 dBm
Distortion:	0.3% max. (amplifier)
Price:	\$1,091 Model PM-1 Mono Playback \$2,600 Model RPS-1 Stereo—Record/Play \$2,000 Model RPM-1 Mono Record/Play \$1,399 Model PS-1 Stereo Playback

Prime Time

For information on the products or services mentioned here, contact your RCA Representative. Or write RCA, Prime Time, Bldg. 2-2A, Camden, NJ 08102.

Selecting The Right FM Antenna

RCA's family of circularly polarized antennas—FM and VHF—gives you a wider margin of choice in selecting the antenna to transmit your signal with top-notch efficiency.

"BF" Series ring antennas can be pole or side-mounted to suit your application—and protection from the effects of icing can be assured by choosing an antenna with radomes or high efficiency deicers. This product selection, together with our Pattern Optimization service, can be used to tailor a system to very exacting requirements.

In addition to the ring series of FM antennas, RCA offers the BFJ Series panel antenna which is built to mount around the supporting tower. This patented antenna features low windloading and uses half the number of feedlines used by our competitors.

If your FM operation is moving upscale, or you'd like to, check with your RCA Representative. Or call our toll-free number: 800-257-7952.

New HOT LINE for Aural Broadcast Systems

RCA Aural Broadcast Systems is a prime source for AM/FM Antennas and Transmitters as well as offering a diverse range of audio products. For product availability, pricing and application data, see your RCA representative or call "toll-free":

800-257-7952

WOR-TV TK-47's Save Time, Air Picture-Perfect N.Y. Mets Games Across USA



Channel 9 covers home plate action from one of their six TK-47 automatic color cameras. In the distance, the Met's Diamond Vision replays game action in slow motion from another TK-47 output.

WOR-TV is no ordinary independent VHF station. It's one of the few superstations in the U.S. Of the 81 Mets home games per season, most are carried via satellite to baseball fans in nearly every major U.S. city. "Fundamental to the quality of service we provide viewers . . . and essential to production efficiency are our six TK-47 Automatic Color Cameras installed at Shea Stadium (the Mets' home field)", reports Dick Quodomine, WOR's Chief Engineer.

In their third season of operation, WOR's 47's have proved the advantages of their extensive automatic capabilities. Explains Quodomine, "With our previous cameras, we needed the assistance of each cameraman to set-up our cameras before every telecast . . . an operation taking one and one-half to two hours. Now the video operator can do the total job himself in about 12 minutes. Cameramen are free to do other jobs, such as setting up audio facilities and assembling our two 47's used on the field."

Quodomine adds, "With the diascope in the lens and the automatics, the video operator just hits a button at the set-up terminal and the 47 goes through the complete set-up on its own." And, because the TK-47 covers more parameters (100 in all) than the video operator and cameraman can manually, "You're getting far more precise results. Video quality is far more consistent from telecast to telecast . . . far more

uniform from camera to camera. We've had comments from a number of ball clubs in the league as to the excellent quality of pictures we're airing from Shea Stadium."

WOR-TV has also found that the TK-47 memory files have challenged the changing lighting conditions inherent to outdoor production. Lighting settings are preset for games played at night . . . or day games where there's bright sunlight or overcast conditions. By simply selecting the appropriate memory file, the proper balance is set automatically . . . saving the video operator time and providing the precise setting for the lighting conditions encountered.

Reliability, consistently and uniformly superior pictures have convinced Quodomine that his TK-47 choice was right-on-the-money. He comments, "No, we're not happy with our 47's . . . we're very, very happy!"

This year WOR received the New York State Broadcasters Association's TV award for "Outstanding Telecast of a Local Sporting Event". In Quodomine's estimation it was the superior picture quality of the TK-47 and the expertise of WOR's technical staff that clinched the award for the station. He says proudly, "As an independent you like to feel you're providing video quality comparable to the networks'. From the feedback we're getting from various sources, we believe we are."

TR-800 NEWS UPDATE

WRGB, Schenectady, NY

"We have been increasingly aware that the future of commercial production at WRGB was in the retail area," remarks Charlie King, Manager of Operations for WRGB in Schenectady, New York. "We needed increased quality in recording and more sophistication in post-production. We realized that the TR-800 might be the answer to our need for better equipment."

With two TR-800's in use at WRGB, Charlie King reports a shift towards more mobile production and relying heavily on the TR-800's for post production. "Our first editing job on the TR-800's was for our annual Christmas special. The clients and station staff were very pleased with the results," says King. An interesting side note is that the location recording was done on three different brands of portable units. All tapes were edited on the TR-800's which are equipped with the integral TR-800 editing unit. Charlie King at WRGB states, "Our clients have become very interested in going almost exclusively to 1 inch as the best marriage between 3/4 inch portability and the 2 inch quality. You do encourage the local client, particularly the retailer, to come in to your shop and do your work with you. You can really be his consultant from start to finish." King concludes, "Our programming people are insisting on 1 inch quality and flexibility in their productions. Our promotional people are very intrigued with the flexibility of 1 inch. Our commercial clients have received it very favorably."



Charlie King (left) watches TR-800s in action

WEHT-TV, Evansville, Indiana



Elmer Chancellor Director of Engineering for Gilmore Broadcasting/WEHT and Earl Waitman WEHT Director at the station's new TR-800 installation

"Our local clients have been impressed with our TR-800's editing capabilities. The machines are convenient to use, the flexibility is very good, quality is very high, and we believe that clients should be very happy with the quality of work we can produce for them," says Elmer Chancellor, Director of Engineering for Gilmore Broadcasting Company/WEHT television.

WEHT is replacing its RCA quad VTR's, in service for sixteen years, with modern 1 inch machines. According to Chancellor, "We looked at the 1 inch market for quite some time before making a final decision. We believe that the RCA TR-800 with its micro-processor based control circuitry is the most modern machine on the market today. Our clients come to us for quality production work and we want to continue to maintain that image."

Earl Waitman, TV Director at the station finds that "being able to edit very accurately to the frame is something else that we're ecstatic about."

One of WEHT's two TR-800's is equipped with the Super Search Editor (SSE) option. Also micro-processor controlled, the SSE gives tape operators even more flexibility: nine independent search-to-cue points, modifiable edit point through the keyboard, a store-direct model to capture edit points on the fly, an out transfer mode, keyboard entry and playback VTR control. About SSE, Waitman says, "One tremendous

feature is search to cue . . . the ability to make that same edit on that very same frame any number of times, if it's not correct the first time."

Director of Engineering Chancellor concludes, "We wanted to make sure that the equipment we purchased was state of the art, that it would serve our clients, have flexibility, be functional, and efficient. We decided that the TR-800 was the machine that would fulfill our needs, now and for the future."

Built in historic Camden, New Jersey, U.S.A., RCA's TR-800 1 inch type C helical scan VTR's are now in service in many parts of the world. New TR-800 shipments include:

BTV-6, Ballarat, Australia
Continental Color
Recording, New York, NY
ECV, Enterprise ColorVideo,
Crows Nest, NSW,
Australia
Humphrey Video Service,
London, England
KUSI-TV, San Diego, CA
Northern TV, Auckland,
New Zealand
PTL (Praise The Lord),
Charlotte, NC
Swell Pictures, Chicago, IL
Union Carbide, Danbury, CT

RCA

Circle (30) on Reply Card

An introduction to wireless intercoms

By Bill Swintek, Swintek Enterprises, Sunnyvale, CA

Communications is vital to a fast-paced, well-coordinated production effort. A wireless intercom system can provide an untethered communications link that frees every member of the production crew for action and yet allows close coordination of efforts. The author reviews some factors to consider in selecting the wireless intercom for your operations.

Most people understand how a standard *hard-wired* intercom system operates: Each person has a headset, perhaps a belt pack (or equivalent), and all units are interconnected by wires. Wireless intercoms are essentially identical in operation, except they use no cable between operators. Instead, each belt pack includes a radio transmitter and receiver for 2-way communications.

In the studio or on location, a wireless intercom is a communications aid between directors; stage managers; camera, lighting and sound crews; and security personnel. For cueing of talent and crews (or monitoring intercom conversations), economical receive-only units are available. In sports production, wireless intercoms are not only used by coaches, spotters and players, but also by production crews and reporters. A major advantage is zero setup time. In critical stunt coordination, a wireless intercom can make the difference between a safe event or none at all.

Criteria to consider

There are a number of criteria that must be considered in obtaining a wireless intercom system suitable for professional use. Ideally, such a wireless intercom must work reliably in a variety of tough environments with good intelligibility, and it must be usable near strong RF fields, lighting dimmers and other sources of electromagnetic interference.

Types of intercom systems

The wireless intercom user typically wears a headset and can simultan-

ously transmit on one frequency and receive on another. This *duplex* capability permits 2-way communications without pressing a button, offering a hands-free advantage over single-frequency push-to-talk walkie-talkies. (See Table I.) Another advantage of the duplex wireless intercom is that the person speaking can hear a priority message immediately.

Table I.
Frequency assignments for duplex operation

	Base	Remote
Transmit on	f_{base}	f_{remote}
Receive on	f_{remote}	f_{base}

Table II.
Frequency assignments for multiduplex operation

	Base	Remote 1	Remote 2
Transmit on	f_{base}	$f_{\text{remote 1}}$	$f_{\text{remote 2}}$
Receive on	$f_{\text{remote 1}}$ $f_{\text{remote 2}}$	f_{base}	f_{base}

Table III.
Frequency assignments for simplex operation (push-to-talk required)

	Base	Remote
Transmit on	f_{base}	f_{base}
Receive on	f_{base}	f_{base}

remotes listen. Simultaneous, hands-free conversation is thus possible between all stations. Some base stations have line-level program inputs that can be used for IFB feeds to the intercom.

A viable alternative is *half-duplex*, in which the base station may be optional or mandatory, depending on the brand. All but one of the units transmit on one frequency and listen on another frequency, meaning they must push-to-talk to avoid heterodyne interference. (See Table III.) The odd unit may be a remote or a base station; in either case, we will call it the *director*. The director's station receives to the other remotes' transmit frequency and transmits on its receive frequency. Because the director's unit automatically rebroadcasts each remote's transmission, all remotes can hear while any one is talking. Priority messages from the director can get through to all remotes.

Contrast the half-duplex system to a *simplex* system. Simplex means that everyone talks and listens on a single frequency, necessitating push-to-talk. (See Table IV.) There is no way to make a priority transmission while someone else is speaking on a simplex system. The system amounts to a *walkie-talkie* with a headset.

Interfacing to hard-wired systems

Wireless intercoms can be connected to 3- and 4-wire hard-wired intercoms, and to TELCO lines using a special interface box, a base station or a simple adapter cable on the intercom remote, depending on the brand. When interfacing with switchboard-

Table IV.
Frequency assignments for half-duplex operation (push-to-talk required)

	Base	Remote 1	Remote 2
Transmit on	f_{base}	f_{remote}	f_{remote}
Receive on	f_{remote}	f_{base}	f_{base}

When many people want to converse freely (similar to a conference line phone call), a *multiduplex* system is required. Here a base station incorporates individual receivers with a discrete listening frequency for each remote. (See Table II.) As it picks up all the remotes, the base station simultaneously retransmits that audio, plus any local headset's mic, on another frequency to which all

type hard-wired intercoms, a private channel multiduplex configuration can be used to prevent multiple private conversations from becoming a party line.

Kinds of RF

Several wireless intercom systems operate on high band VHF frequencies between about 130MHz and 230MHz, using inactive TV channels.

THE INSIDE STORY



That's what you need for the long haul, and with our 34 you get what you need. We listen to our owners when we begin a new design.

- Full size 10½ inch reels. Two speeds 15-7½ IPS with Variable Speed Control built-in.
- Full frequency response in Sync mode.
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- At TASCAM we make tools, not toys. After the factory polish is long gone, our inside story will still be going strong. Reliability is always our bottom line. We've made our reputation there the hard way. We earned it. With the all new Series 30 Recorder/Reproducers (32, 34 and 38), we also have some good news for your bottom line. Three decades of experience building all forms of magnetic storage make it possible for TASCAM to offer the impossible, 1985 technology at 1975 prices!

We make the broadest line in the industry. From the MM-20 and the PORTA-STUDIO all the way to the 85-16B and M16, TASCAM means business. Multitrack, Multi-image and much more. Talk to your dealer to get the rest of our inside story.

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This band is not only free of CB and business radio interference, but it has greater noise immunity due to the use of FM modulation. Better high band VHF receivers must have adequate selectivity to reject nearby commercial TV or FM broadcast signals... which means either helical or crystal-tuned front ends, which can raise the cost compared to mid or low band systems. Some manufacturers use high band VHF transmission at the base station, while the remotes broadcast on a lower frequency (near the 27MHz CB or the 30-35MHz and 72-76MHz business bands). In split band systems, there is the possibility that half the communications link will be more subject to noise and interference than the other half.

High band VHF intercoms that use narrow deviation FM permit multiple systems to be used on adjacent frequencies. Wide deviation systems are subject not only to interference but also to de-sensing, in which the receiver is muted because another intercom or a TV station is transmitting in close proximity. This muting limits effective range. In addition to narrow-band FM, look to see if a single antenna is used simultaneously for transmitting and receiving; such systems have antenna duplexers and are more

likely to be immune to the problem of de-sensing.

The RF power is generally between 25mW and 50mW (at most a 3dB difference), so usable range relies heavily not only on receiver sensitivity and selectivity, but also on the audio dynamic range. A greater signal-to-noise may let you communicate over greater distances. Although some wireless intercoms use a simple compressor to avoid transmitter over-modulation, other systems include compandor circuitry for a 15-30dB better signal-to-noise ratio.

Other factors to consider

An important feature to look for is *sidetone*, which confirms that communication is actually taking place. Sidetone simply means that you hear your voice as you talk (just like you do when using a telephone)—but only after it has been transmitted by you, received by the other party, retransmitted by his intercom unit, received by yours, and then fed to your headset earpiece(s). Some systems do not offer sidetone, or they have *local sidetone*, in which your voice is fed directly to your earpieces via a preamp and, therefore, does not confirm 2-way communication.

Some wireless intercoms are built

entirely into headsets. Although these units are compact, be sure to check carefully for comfort (weight), serviceability, range and sound quality. In other intercoms, the transceiver is packaged separately and is designed to work with a variety of headsets (which may save you money if you already own the headsets). You should also find out whether the system you are considering will work with carbon mics or electret mics, as well as the usual dynamic mics.

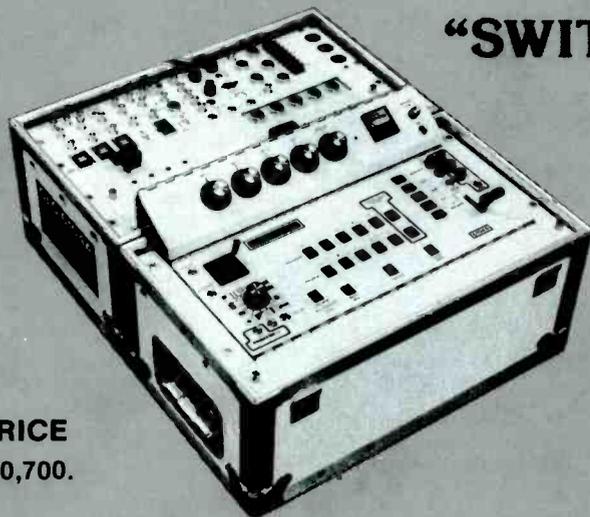
Also, consider whether the wireless intercom uses throwaway or rechargeable batteries. Typically, a rechargeable system will save you more than \$350 per battery per year, based on a 5-day work week. Can the system be powered by a remote dc input, such as a camera battery pack or car battery? Is the system sturdy and easy to carry? You will want to check for a transceiver vs. separately packaged transmitter and receiver, and metal vs. plastic construction. Also check circuit board quality and mounting, battery security, and so forth.

Choose the right wireless system for your needs, and you are sure to enhance creative freedom and production efficiency.

||:~:~)))))

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PRICE
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This is the first and only successful concept in portable switchers. We have carefully checked user needs and come up with the right solutions. This package has everything required for a remote production; the built-in sync generator has all the signals to drive five cameras of any make or model, or any combination of cameras. It is light, because the monitors are housed in a different package where they belong (Models 6133 or 6134). It is robust enough to be shipped by air as baggage and can withstand rough handling in the field. It is a finished product; with all the little convenience features that are so important and which you have always wanted on a remote.

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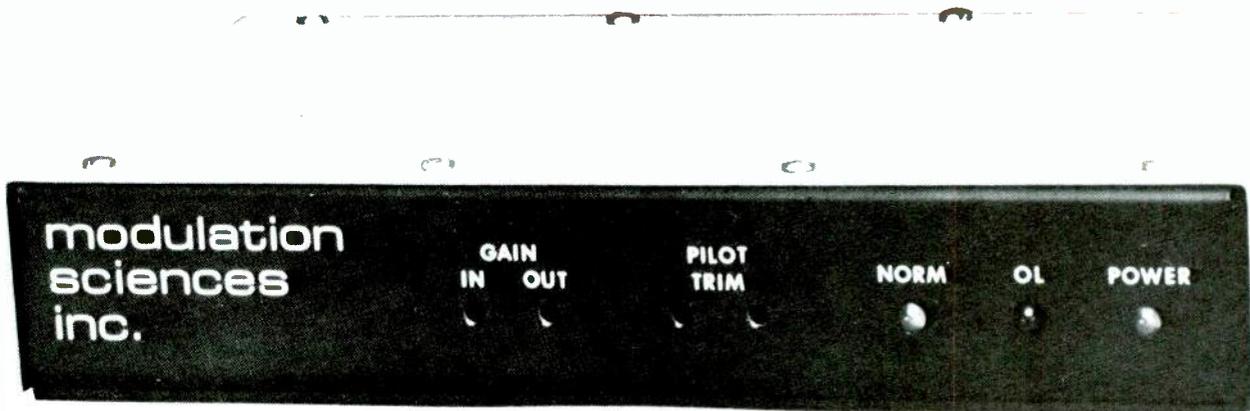
We kept the rest the same. The same 20 input expandability, the same prewired back panel, and the same day in-day out reliability. At TASCAM, reliability is always our bottom line. We've made our reputation the hard way. We earned it.

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Field report:

By John Shepler, technical consultant, Rockford, IL

The Modulation Sciences CP-803 FM composite processor



CP-803 composite processor

Composite processing is an FM audio technique that has been surrounded by much controversy. Those who are for it claim that it significantly increases signal loudness with minimal quality losses. Those in opposition claim that it jeopardizes the integrity of the audio and, perhaps, the legality of the station operation.

My own experience is that composite processing has a lot to offer the stereo broadcaster. Be forewarned, however, that this is a high power technique and, unless you have the finesse to keep the genie in the bottle, you could be buying some problems.

Recently, I had the opportunity to field test a new composite processor that is designed to be easily adjusted and that will protect the signal from interference-causing side effects. I'd like to share my findings concerning the Modulation Sciences CP-803 processor.

History of composite processing

FM broadcasters have always been plagued with modulation problems. The 75 μ s pre-emphasis curve tends to create undue sensitivity in high frequency audio material. Crashing cymbals and raspy voices can easily flash the modulation peak indicator. Stereo generator circuits have only made matters worse with low-pass filters that ring and overshoot.

Recent audio processors have come a long way in solving these problems, but they still suffer from one signifi-

cant deficiency—all audio processing is done before the stereo generator. Any discrepancies in the stereo generator, STL receiver/transmitter, or anywhere else between the processor and the FM modulator cannot be corrected.

What is needed is processing on the total or composite stereo signal. This is why composite processors or "clippers" were developed. The composite clipper connects between your stereo generator or STL receiver and the exciter input. Its function is to clip or chop off the minor modulation peaks that limit your modulation level.

Two major benefits result. First, your modulation is solid and can be kept much closer to the 100% level on the modulation meter without flashing the peak indicator. Second, and even more important, a clipped signal sounds cleaner and more "open" than a compressed or peak limited signal given the same amount of processing.

Granted, peak clipping generates harmonic distortion. But processors that play with the dynamics of the audio tend to create a dull, unnatural sound when pushed very hard. Our trusted tool, the wideband limiter, can make a mess out of an otherwise beautiful signal.

The harmonic distortion would not be so bad if the extra frequency components generated did not spread the signal into other channels, inviting an FCC citation. The audible effects are mainly filtered by the receiver circuits

and do not seem to hurt much at low clipping levels. Of course, the temptation for most people is to see how much bite the signal can stand. This may create a raspy edge on voices and music, and is said to turn a receiver's stereo pilot indicator into a disco light show.

The MSI approach

The Modulation Sciences CP-803 composite processor is a recent development designed specifically to correct the problems of modulation splatter, temperature drift and tricky operator adjustments. I was curious to see if the performance of this unit would live up to the claims that were made. Fortunately, Eric Small at MSI was willing to loan me a test unit for a few weeks. I had the eager assistance of engineers Jim Douglas and Bud Walters at WXXO, who helped put the unit through its paces.

Installation of the CP-803 is easy enough. The input and output connectors are BNC types, common to most stereo generators and exciters. In this case, we simply put the MSI unit in the line between an Orban Optimod 8000 processor and a Harris TE-3 exciter equipped with an Optimod input adapter.

The package is small (1 $\frac{1}{4}$ "x12"). It sat on top of the Optimod for the tests. A rack-mount is available, although you might want to think about keeping the adjustments out of the reach of

Continued on page 68

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But that's not all the CR-4700U offers. It has SMPTE time code capability to speed post-production editing. Head switching is in the vertical interval to eliminate undesirable switching points. There's microprocessor-based logic for full remote control. You can do assemble editing in the field with the automatic editing function.

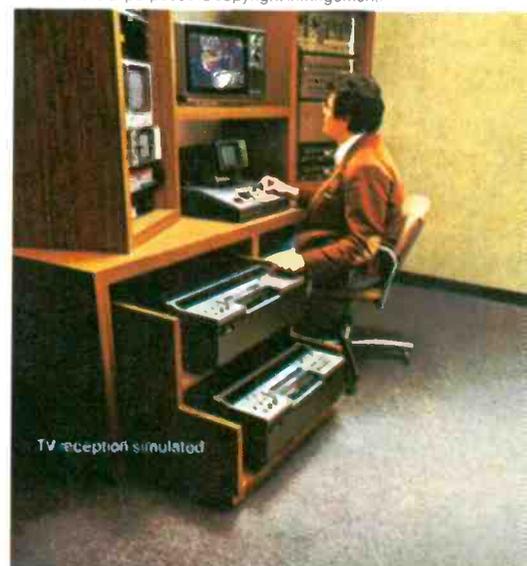
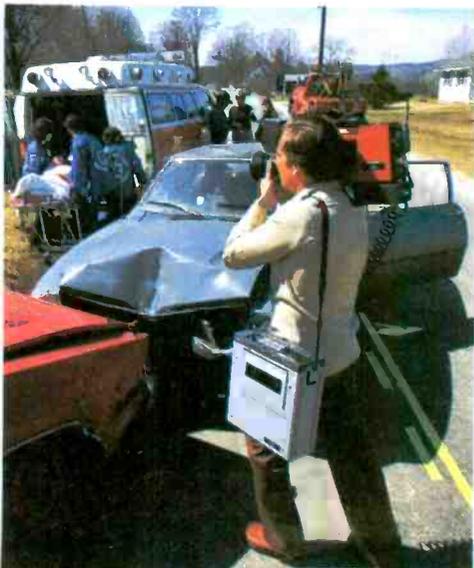
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JVC COMPANY OF AMERICA
Professional Video Division

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Manufacturer's specifications for the CP-803

SIZE 1-3/4" H x 12" W x 5-3/4" D overall
1-3/4" x 19" rack mount kit available

POWER 95 to 130 volts AC, 10 watts max
190 to 260 volt option available

TEMPERATURE RANGE
0 to 50 degrees C.

RF PROTECTION
All inputs and outputs RF suppressed, power supply RF suppressed and shielded from main circuitry.

GAIN CONTROLS
The input and output controls are used to set levels and control the amount of limiting.

PILOT TRIM
The pilot filter trim controls are preset at the factory. They should be checked yearly according to the procedure in section 5.1.

INDICATORS
Power: Green LED.
Norm: Yellow LED — indicates that signal has exceeded limiting threshold.
OL: Red LED — indicates that limiting duty cycle is too great.

CONNECTORS/LEVELS/IMPEDANCES
Input: BNC connector
0.5 to 4 volts PP
22 kOhms
Output: BNC connector
0.5 to 4 volts PP
50 to 250 ohms (depending on output gain setting)
Minimum load impedance 500 ohms
Pilot Test: RCA jack — used for alignment of pilot filter
J4: RCA jack — open collector TTL, low when signal is above limiting threshold. 15v/10ma. max.

TEST CONDITIONS FOR THE FOLLOWING SPECIFICATIONS:

Input and output levels: 1 volt PP
Input frequency range: 50 Hz to 15 kHz and 23 to 53 kHz
Source impedance: 0 to 1 kOhm
Load impedance: 10 kOhm shunted by 100 pF
Temperature: 0 to 50 degrees Centigrade
Threshold of limiting set to 100% modulation

FREQUENCY RESPONSE
+ / - .03 dB referenced to 1 kHz

HARMONIC DISTORTION
.02% max. at 95% modulation

IM DISTORTION
70 dB below 100% modulation, tested with any two frequencies in input frequency range, 1:1 at 95% peak modulation.

DIFFERENTIAL PHASE
0.1 degree maximum, 19 to 38 kHz
0.2 degree maximum, 15 to 53 kHz

WIDEBAND NOISE
75 dB below 100% modulation, measured 20 Hz to 100 kHz unweighted

STEREO PERFORMANCE AT 100% MODULATION (note 1)
Crosstalk (note 2):
Main to Sub: more than 40 dB below 90% mod.
Sub to Main: more than 40 dB below 90% mod.

STEREO SEPARATION:
400 Hz: better than 48 dB
15 kHz: better than 36 dB

HARMONIC DISTORTION (note 3):
50 to 100 Hz: less than 0.4%
100 Hz to 7.5 kHz: less than 0.5%
7.5 to 15 kHz: less than 1.5%

PILOT MODULATION
Varies less than 0.2% up to 6 dB of limiting.

1. These figures are for the entire stereo generator/Composite Processor/transmitter system. It is assumed that the system was within the limitations of the FCC Rules before installation of the Composite Processor. All figures are typical, and were measured on a system consisting of a Moseley SCG-3T stereo generator and a Belar FMS-1 monitor.
2. Systems having nonlinear crosstalk of worse than -45 dB before installation of the Composite Processor may not meet these specifications at all frequencies.
3. All noise and distortion components from 20 Hz to 80 kHz were measured.

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Too much routine studio maintenance is enough to turn off any good technician. They'd prefer to spend their time on more pressing problems, rather than just practicing their skills on routine chores. And that's what makes the AVL Digital Routing Switcher perfect for busy maintenance departments. It's routine-maintenance free. No practice is necessary!

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ADDA

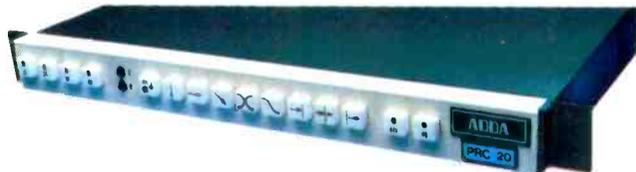
CORPORATION



Try This on Your TBC.

When we set out to design a dual-channel time base corrector, we knew we had an exciting opportunity. The AC 20 would be more than a superb, economical TBC; it would be the basis for a system that could incorporate production functions normally found only in separate stand-alone units. For instance, a 2:1 Production Remote was a natural.

The AC 20 gives you two channels of digital time base correction in just seven inches of rack height, saving space, maintenance, capital cost, cooling, and power. The Production Remote gives you digital switching effects at very little extra cost.

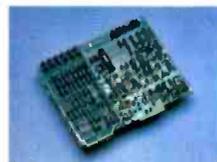


In fact two channels of time base correction with 2:1 digital effects are priced at only \$18,950.

Two of the effects are shown above: Corner Wipe, and Push Off. You also get Vertical Wipe, Vertical Interval Cut, Fade/Dissolve, Push On, and Pull Off, plus Reverse and Mid-Stop controls and a choice of four transition speeds. Not bad for a TBC.

This means that with three VTR's and an AC 20 (with the

Production Remote option) in an editing suite, your ENG post-production crew is ready for A/B-roll editing with digital effects, some of which have only been seen on upscale switchers until now. No need to tie up your production switcher. And you can remote the AC 20 to your editor, if you like.



A complete video channel is on a single board.

The AC 20 works with 3/4-inch and 1/2-inch V-locked, unsegmented VTR's that accept derived 3.58 MHz feedback. It uses a 16-line store, eight-bit technology, and fourth-harmonic sampling to produce a broadcast-standard output. Its digital circuitry assures that the output signal is the same quality as the video input signal. It is virtually transparent. And it is modular; you can start with a single correction channel and do cuts-only editing; you can add a second channel and move up to A/B rolls. You can add the Production Remote for digital transition effects. And that's just the beginning. The AC 20 TBC is the first of a new family of products that will have a significant influence on the future of broadcast production equipment.

The bottom line: Two TBC's plus 2:1 digital effects. At less than a fifth the cost of separate stand-alone production units.

Affordable Excellence

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Manufacturer's claims

Modulation Sciences claims that you can sharpen your competitive edge by adding its CP-803 to your compressor/limiter/stereo generator to enhance the stereo composite signal. The claim is for a resulting signal up by 6dB with a

greater dynamic range for a more open sound—all without the breathing, pumping or swishing associated with conventional processing.

These oscillograms show the manufacturer's claimed difference between its CP-803 action

and illegal baseband clipping. Figure 1 shows the 19kHz sine wave riding the crest of the signal at 100% modulation, illustrating that the CP-803 does not clip the pilot. In Figure 2, illegal baseband clipping is shown by the square tops in the oscillogram trace.

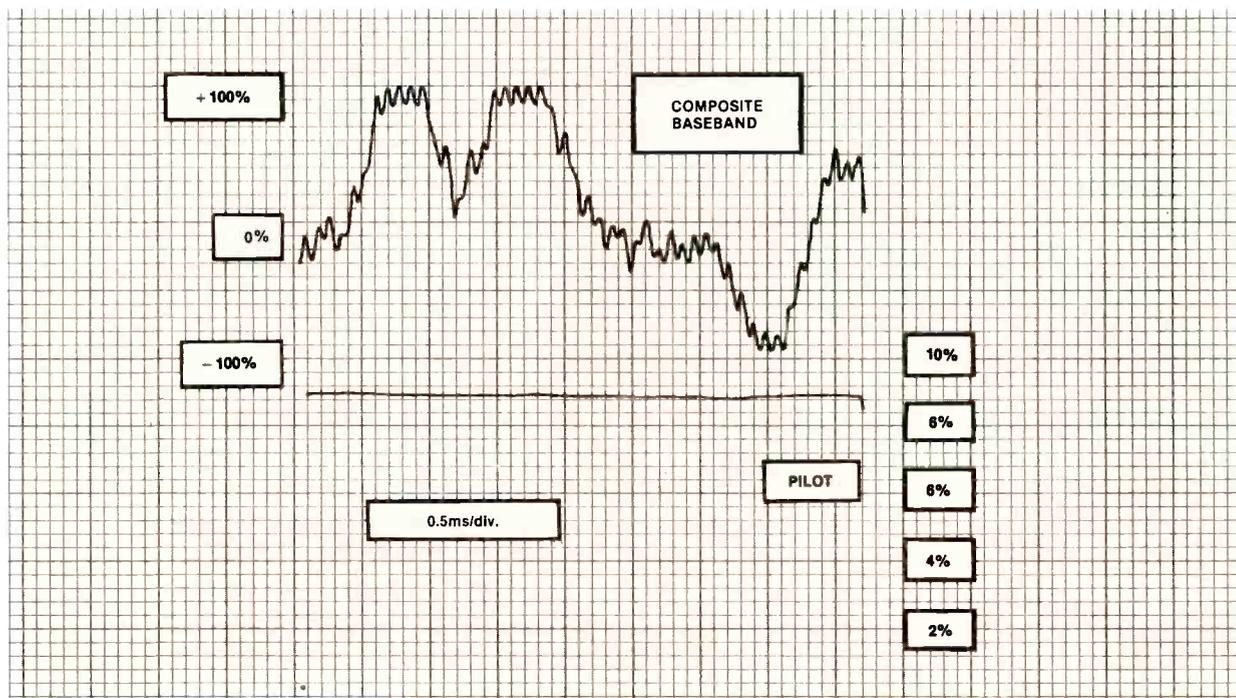


Figure 1. Legal composite processor

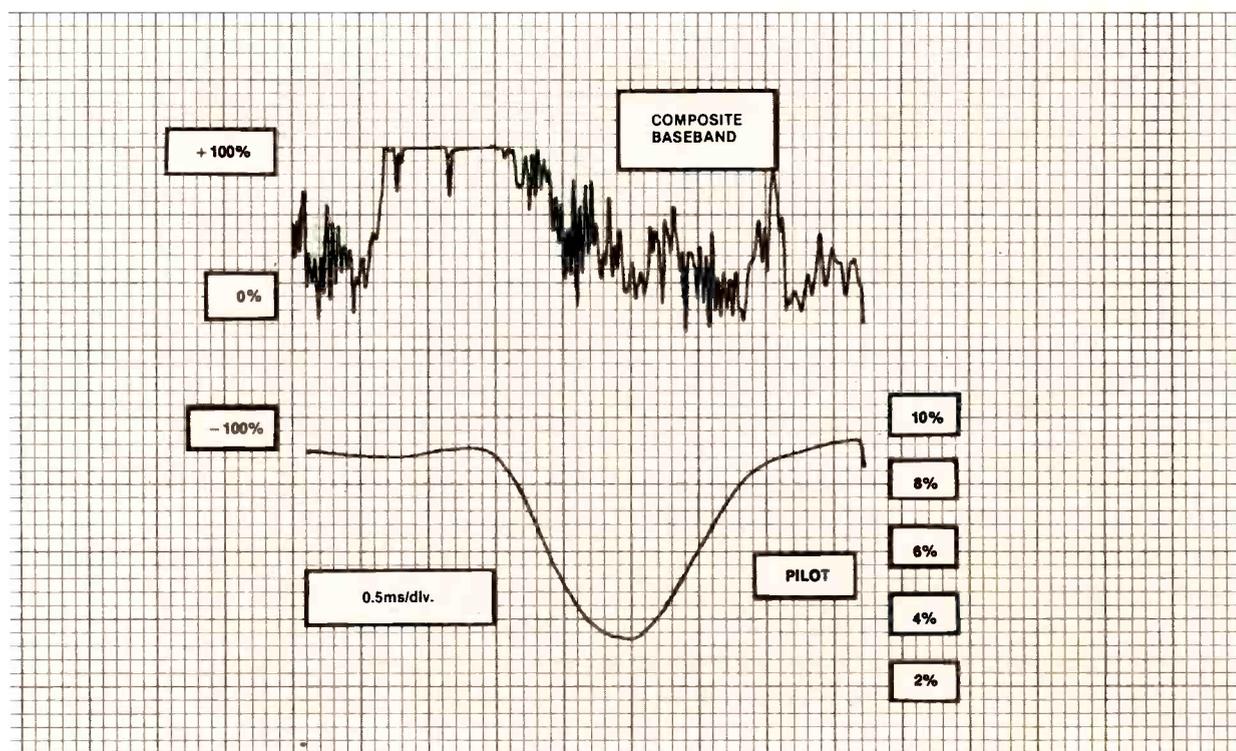


Figure 2. Illegal clipper

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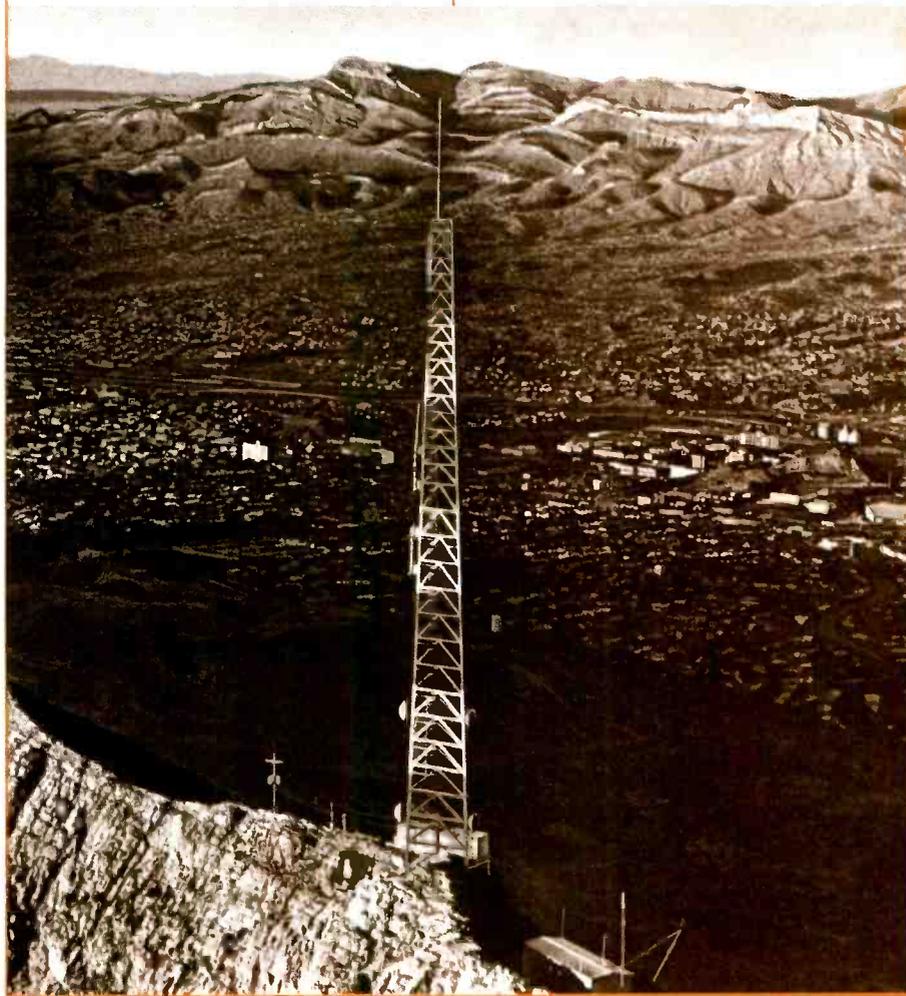
Whatever your needs may be, we can probably meet them with a range of 25 different types from which to choose; low power, high power or super high power. Use an



element as a single bay antenna for limited coverage or use multi-element arrays. We also have circularly and horizontally polarized stainless steel educational antennas. Directional couplers and low pass filters complete the line.

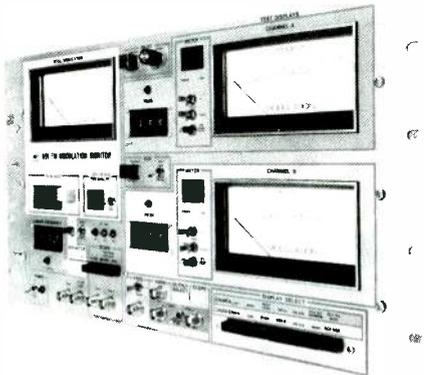
Whichever model you choose, your Phelps Dodge antenna arrives complete, ready for installation, with a tunable input transformer to match the antenna to the location. Deicer kits and radomes are optional.

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Continued from page 62

non-engineers, behind a blank panel.

Power is provided from a standard 120Vac line and illuminates a front panel LED. The only other things you have to worry about are the normal and overload indicators and the input and output level adjustments.

Setup was no problem. You adjust the input gain until the normal LED (yellow) starts flashing. Increase the output gain for the highest modulation level you can get without flashing the peak lamp. Once the processor is working, an increase in the input level gets more processing, if desired. Be sure to stay below the point where the red overload LED comes on.

Hot, brassy musical selections with lots of transients will make the processor more active. Mellow selections do not get, or need, as much correction. Don't forget to make sure that your pilot level is at 9% after these adjustments.

Evaluation

How does the CP-803 sound? Very nice, I must say. This is obviously somewhat subjective, because what constitutes good audio is a matter of personal taste. Even so, an A/B comparison with an older design of a composite clipper definitely showed the MSI unit to be cleaner and more open sounding. The stereo separation was also greatly improved. The raw Optimod signal was not nearly as loud without the clipper and needed to be driven harder to sound competitive with other stations.

An interesting effect that I have noticed is that adding the composite clipper actually makes a signal sound more lively than one without it. This is similar to the effect that you get on AM between a processed and non-processed station.

Regarding the interference prevention claims, I must go with statements made by MSI. The operating manual contains copies of legal and technical opinions from attorneys and consulting engineers that this unit will not violate any FCC regulations when operated properly. You can verify this yourself if you have access to a spectrum analyzer or can get an opinion from your own consultant. I will say that no splatter or pilot modulation was apparent in this evaluation.

Construction of the MSI processor gives me both good and bad impressions. The human engineering is great. The adjustments are multi-turn pots, and the indicators are easy to use. The unit also contains a good amount of RF suppression to keep AM audio out of the FM. (I wish all manufacturers would think about this.)

However, I was disappointed in the

packaging. The construction isn't bad, but it isn't great. The container does not do justice to the performance of the unit. Compared to the high class construction of Orban's Optimod, the little MSI processor looks out of place. I expect that most broadcasters would be willing to pay extra for heavy-duty sheet metal and a flashier appearance.

Another drawback is a mystery module in the audio circuit. I hate those things, because you know there is only one place to buy them, and they are usually much too expensive to keep spares. Unfortunately, the potting of components is often necessary if you want good temperature stability, so we will have to grin and bear it. If you are in a fiercely competitive situation and are worried about equipment failures, the only solution is to have redundancy on all equipment, including valuable processing gear.

The instruction manual is also rather weak in technical detail. Being a circuit fanatic, I enjoy digging into the nitty-gritty details of equipment design. The trend of operating manuals for audio equipment, however, seems to be away from detailed circuit explanations and more into operating instructions. Some of this is probably because of the proprietary nature of processing techniques.

Final notes

My overall impression of the MSI CP-803 composite processor was favorable. I believe that this piece of equipment represents another step forward in technology for FM broadcasters and provides another option for those stations dedicated to improving the performance of their audio signals. The efforts toward making this device easy to use and unlikely to generate interference problems will help legitimize a valuable processing technique.

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.

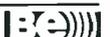
In each field report, the author will discuss the full applicability of the equipment to broadcasting, including personal opinions on good features and serious limitations—if any.

In essence, these field reports are prepared by the industry and for the industry. Manufacturers' 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.

The author, a consultant, conducted the tests reported herein at station WFRL/WXXQ in Freeport, IL, with the cooperation of station engineers Jim Douglas and Bud Walters.

The system covered in this field report is marketed by Modulation Sciences, 99 Myrtle Ave., Brooklyn, NY 11201. Comprehensive product data may be obtained directly from this company.



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Fact is, when you look into the Ikegami 8-Series standard and high resolution color monitors, you'll see more than 13V and 19V monitors (23V standard resolution monitor available). You'll see a host of standard features, from American Standard Matched Phosphors (not available on 23V) to a Shadow Mask Dot Matrix CRT to an Active Convergence Circuit to Delta Gun tubes and more. And you'll see a product name that says exceptional quality—every time.

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Conversations

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

Julius Barnathan, president, broadcast operations and engineering, ABC, was interviewed recently by the author. The following is part of their discussion, which includes Barnathan's views on key industry and company issues.



McClain: What is your background?

Barnathan: I was educated in New York. After graduating from DeWitt Clinton, a high school in the Bronx, I went into the Navy, serving until 1946. Under the GI Bill, I went to Brooklyn College, majoring in statistics, and after that, to Columbia. When I graduated with a Masters in mathematical statistics, the Korean

War was on, and it was difficult to find a job. I got one as an actuary and did some work for a bureau that determined the rates for compensation insurance around the country. I worked there about a year and a half. That wasn't what I wanted to do. I wanted to be in market research or advertising. I went to work for Kenyon & Eckhardt, an advertising agency, doing market research and learning about media research. In 1952, my first project was to try to estimate Nielsen ratings.

In 1954, I came to ABC as supervisor of ratings in radio and television. I worked up to vice president of research by March 1959. In July of that year, I was made vice president of stations relations, and served as the head of research at the same time. In 1962, I became president of the Owned and Operated TV Stations. In March 1962, I returned to the network as vice president and general manager, running ABC under the president, Tom Moore. Then, in April 1965, I came into broadcast operations and engineering. In 1978, I was appointed president of this department.

McClain: How do you feel about receiving the NAB Engineering Achievement Award?

Barnathan: It's nice to be honored by your peers. I think that's most important. People who don't know you, really don't know how good you are. You're just a name. Sometimes they give you an award because you can pack the house or raise money or some other reason. To get the Engineering Achievement Award from NAB is a high honor, and I'm very proud of it.

For more information about the NAB Engineering Achievement Award, see our June 1982 issue, page 8.

Julius Barnathan

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McClain: What achievements were your award based upon?

Barnathan: Primarily for pushing the industry forward with technology that we have developed, or helped to develop, since I've been in this job, to meet the needs of our stations, and our own Sports, News and Entertainment divisions. It's those achievements, plus my work in trying to bring the hearing impaired into the TV community. I believe it's the leadership in these areas. Also, the training of people and trying to set high standards for employment, trying to get better pay, better recognition, for engineering. We (engineering) have come a long way, but we're still a long way off, comparatively speaking, from other members of the station or network team.



Barnathan, at the 1980 Winter Olympics. "At the Olympics and conventions, I am the field general. I am personally involved in seeing to it that everything happens technically the way it should."

McClain: One of the primary areas ABC is known for is the Olympic coverage. Do you take a personal interest in the Olympics?

Barnathan: Yes. I am very seldom personally involved in the production of a program. I may visit certain programs. I may attend an Academy Awards or a Derby, but somebody else is usually technically responsible. However, at the Olympics and conventions, I am the field general there. I

am personally involved in seeing to it that everything happens technically the way it should.

McClain: What part did you play in getting ABC into color?

Barnathan: We were in color only with film when I first got into this job.

One reason I was put into this job was because ABC was going into live color. We also had to transistorize our plant, because the tube equipment would not pass color successfully. So, we had to do two things. We had to go directly to color without even going into transistorization first. Tran-

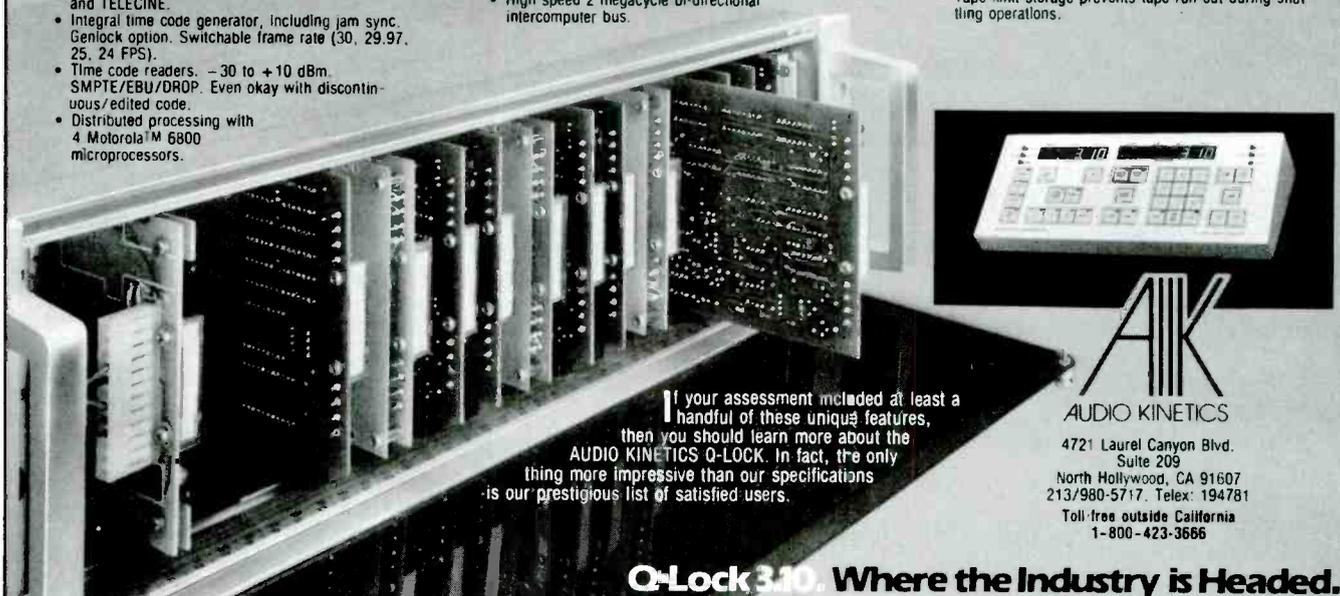
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sistorization came later. They asked me to oversee the program. I set up a plan for us to get into color as soon as possible. That was how I spent my first five years.

McClain: How did you go about getting the color slow motion machine?

Barnathan: We had a request from the sports department to develop a color slow motion machine for the then upcoming Olympics in 1968. We had both the Winter and Summer Olympics. This was in 1965. It was one of the first requirements that I had gotten concerning what production wanted. I went around the world trying to find somebody to make it, and I finally ended up at Ampex. They said they were prepared to make a color stop motion device. 'Forget it,' I said. We wanted to go all the way. We had 18 months, so I told them to give me a price. They wanted us to commit to three machines at \$110,000 each. They also solicited the CBC to see if they were interested. The Canadians were, and bought two. So Ampex had an order for five. On that basis, they began development.

McClain: You also helped work on development of the Ampex AVR-2 videotape recorder.

Barnathan: The AVR-1 was a very big and expensive machine. What we real-

ly needed was a smaller and cheaper machine that would be more mobile than the AVR-1. That developed into the AVR-2, which was another very successful product. We also pushed Ampex into building a cart machine because we needed it badly.

McClain: Do you think that it's advantageous to be of assistance to manufacturers?

Barnathan: Absolutely. It is in our best interests. Whether we buy it or not, we always use it. We are the largest renters of equipment in the world. We rent from everybody all over the world.

McClain: ABC is the only network that has a president over both engineering and operations. What is the advantage to this?

Barnathan: Technically, it gives us the status of presidents of other divisions, namely the presidents of entertainment, sports and news and so forth. There is a head of operations and engineering at other networks. They have a vice president in charge of engineering and operations in both cases. Our case is different. We have all the engineering for radio and television. We also do ENG. In neither case do the other networks have ENG as part of their operation.

Our big strength is that we're very service oriented. The engineering department recognizes that their customers are the operations department. The operations department recognizes that production people are their customers. We're geared exactly that way. The operations person has to be satisfied by the engineer. Therefore, engineering tries to satisfy operations. The operations person has to satisfy the production people.

Because at ABC we have engineering and operations together, we can call on far greater resources, whether they be engineering design, or otherwise, than if each one were run separately. We treat each production group as a separate entity. We give them the best of both worlds by assigning people who are experts, in operations and also in engineering. When we have an emergency, we have a special weapon. We can pull our people and use them all in one area, such as the Olympics or conventions.

McClain: With your responsibilities in engineering and operations, which is the most difficult to oversee?

Barnathan: I think operations is more difficult because it has less control over its own destiny. We have greater control over the engineering efforts, and less over the operations efforts



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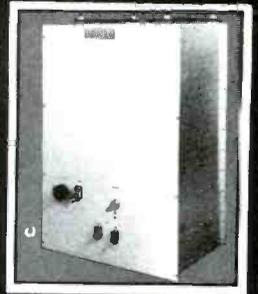
Tube Type	Output	Gain	Efficiency	Cavity Model
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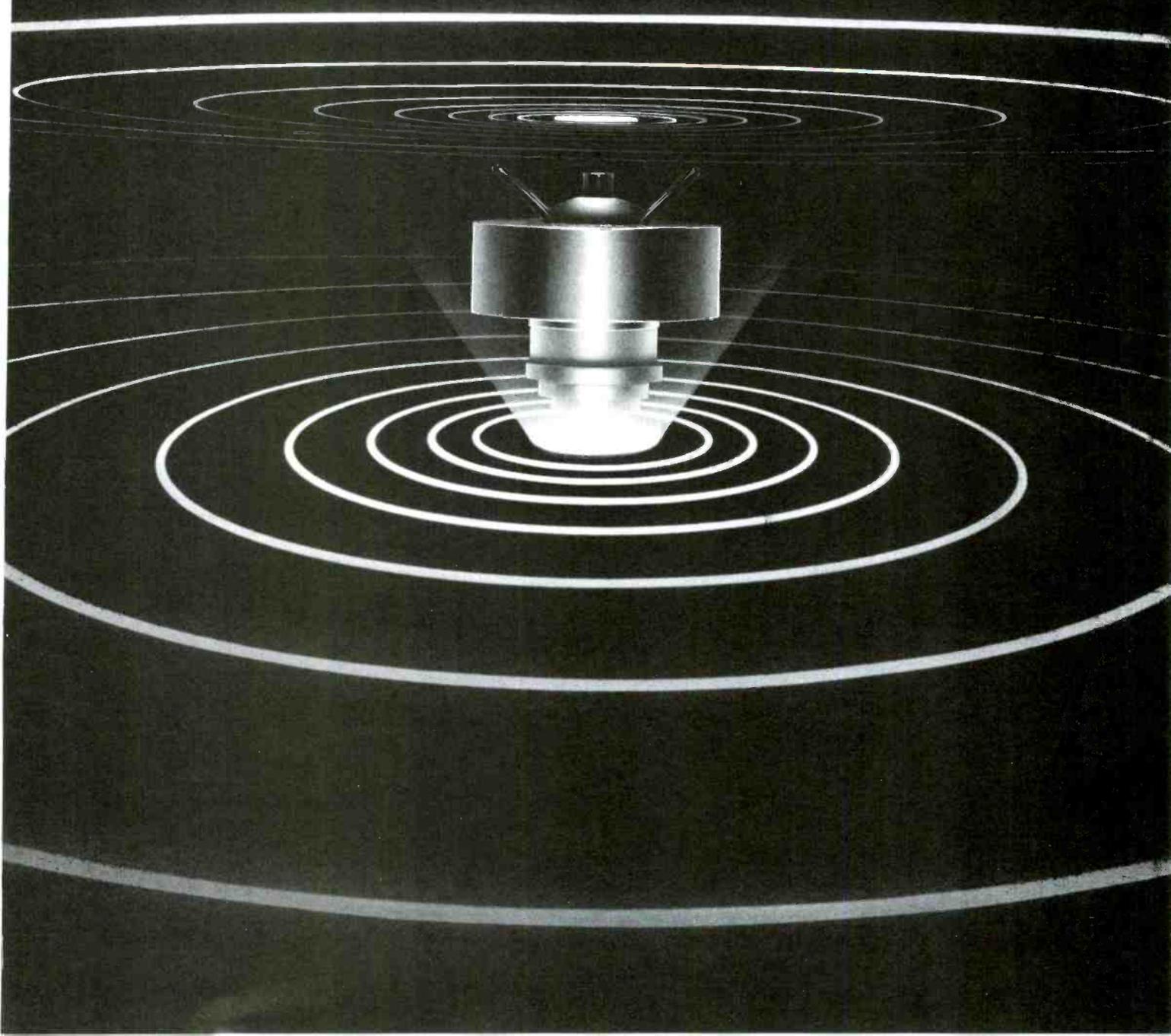
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We supply both the power tube and the cavity. In our pictured Y1393 cavity, the 9011 tube delivers a measured gain of 20 db with an efficiency of 80%.

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because so much depends on production people, budgets and what's happening.

McClain: If you make a mistake in engineering when selecting future equipment, do you later have a problem in operations?

Barnathan: The engineers don't exclusively choose the equipment. The operators choose the equipment along with the producers. The engineers evaluate the equipment and design and build facilities. The operations group tells engineering what they want the equipment to do. As long as

the equipment does what the engineer says it will, we have no problems. The engineer cannot go out and buy something that does not meet the requirements of the operator without gaining the operator's permission or without coming back to me. The same thing is true with the production people. We buy what they need to get the job done. If they want a 5-headed squeeze zoom, we find it. And if they want a camera with some special lens requirement, then we try to come up with it.

McClain: Will you handle the

engineering and operations for ABC's cable ventures?

Barnathan: We are doing part of it for those that are under ABC control. We advise in many other areas.

McClain: What is the state of closed captioning in broadcasting?

Barnathan: Closed captioning, right now, is being done by ABC, NBC and PBS. We are very disappointed in the number of decoders that have been sold. We think the hearing-impaired community has not bought enough units to make this a viable venture. There have been less than 100,000 units sold. Even if 100,000 units supply 200,000 hearing-impaired persons, that's less people than in one small city. They must find a way to get more decoders into more homes, to more people.

McClain: Do you foresee ABC entering into any other type of specialized broadcasting?

Barnathan: Possibly dual-language broadcasting. As soon as stereo is approved for TV, it's possible that we may be transmitting some of our programs in English and a second language.

McClain: What new technology will ABC be using in the coverage of the Winter and Summer Olympics?

Barnathan: That's a military secret.

McClain: How would you define the purpose of the ABC Engineering Lab?

Barnathan: The lab is a problem-solving operation, an evaluation lab. It evaluates equipment, not only to determine if it's good or bad, but to determine if the equipment will meet the specs that the manufacturer has warranted. If it meets the specs, the report will say it does. It is evaluated in terms of its operating ease, maintenance ease, and its quality. If the lab is specifically evaluating items for our own use, in those particular cases, it will have our requirements and will determine which meet and don't meet our specifications. It is more of a place to evaluate. We don't breadboard equipment. But from time to time, because no one else in the world wants to do it, we have to do things for ourselves. Often we evaluate equipment we know we are not going to buy—but we may one day have to rent it. Also our stations or other stations might buy it.

McClain: Why do you share your test evaluations with the vendors when the other network laboratories do not?

Barnathan: We share them with the vendors because the customers are the ones who will benefit from it. We are not out to make equipment for ourselves. We don't think you com-

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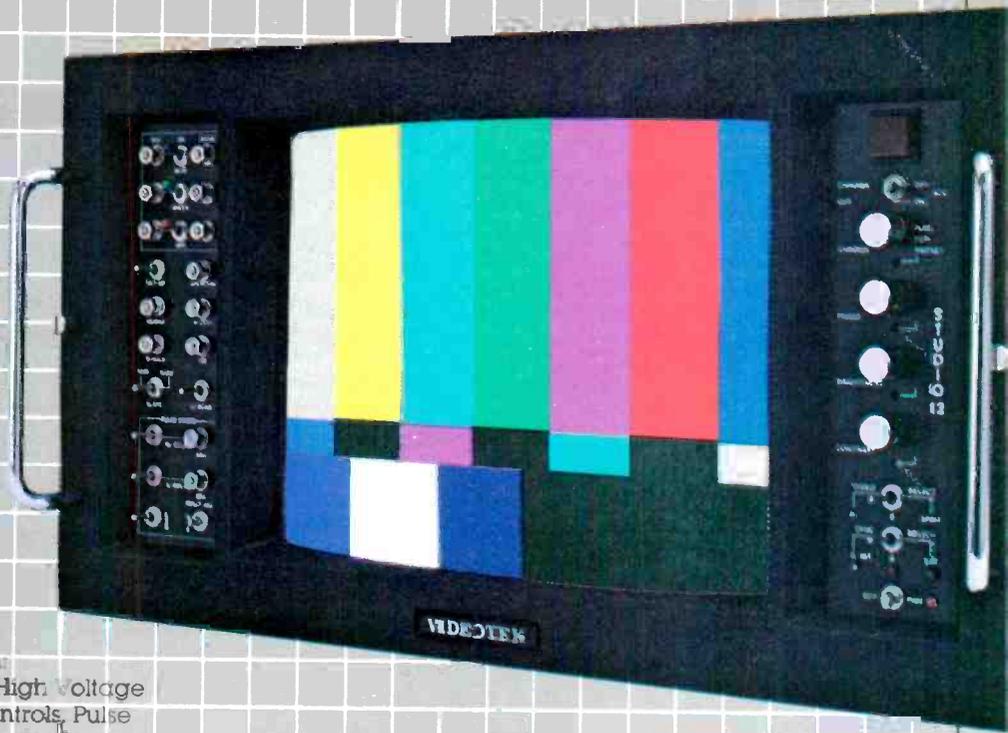
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pete this way; we think that if the venders come to us to find out what the buyer wants, and what the buyer believes, then we should let them know. All we do is give them back what tests show. If it happens to be good, fine. If it happens to be bad, so be it. We give it to venders, because we want to be honest with them. This is our contribution to the industry.

McClain: What do you think is the future of the 1/2-inch video recorder/camera combination?

Barnathan: If there's no standard, I don't see too much future. We need to find a way of having a standard and reducing the size. The size is still too large, I think the problem is that they're trying to maintain high quality. Because of that, they have a very large cassette. It's possible that the cassette could be reduced, which would reduce the size of the tape machine.

McClain: What is the future of the 1/4-inch format?

Barnathan: I love 1/4-inch. I think there is a great future for it and would love to see it come. We could bypass the 1/2-inch and go to 1/4-inch. It could happen if the technology is there. We don't know how it will reproduce. We don't know how many generations it will allow.



Barnathan, standing in front of a TV monitor displaying closed captioning, in 1979. On the current state of closed captioning, Barnathan recently expressed disappointment in its distribution. "They must find a way to get more decoders into more homes, to more people."

McClain: Do you think that the format will eventually be 1/4-inch?

Barnathan: It will be smaller, but I don't want to say 1/4-inch. It could be wire. There are people working on wire tape because you can get more information on it. You've got to understand that it's not the tape that's

recording, it's the iron fillings inside. If you increase the density, you increase the ability to store information.

McClain: What is the future of film in broadcasting?

Barnathan: I think there will always be film in broadcasting; particularly

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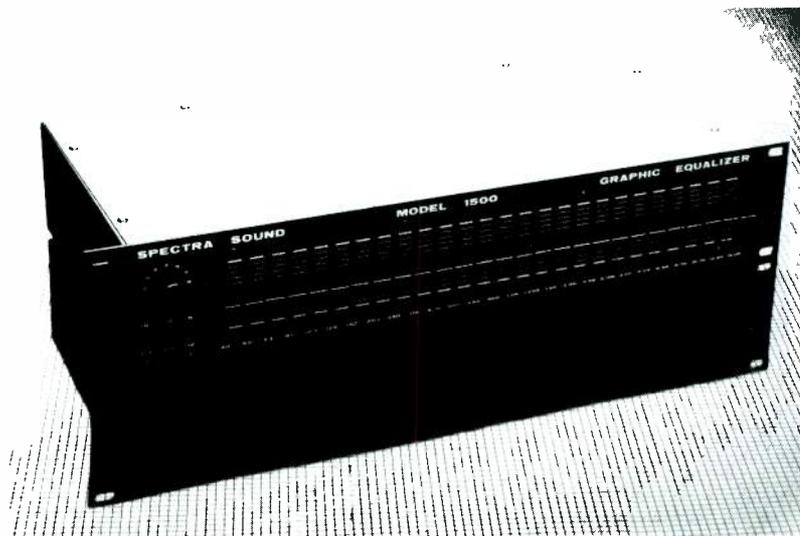
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in the shooting of it. It will become an off-line medium in terms of broadcasting. In other words, most of the transmittal devices will be tape, but I think film production still has a tremendous future, particularly in prime time movies. I believe that certain programs can be made on tape less expensively. But I don't think that the 35mm film for movies will be replaced until high definition TV comes around.

McClain: What about HDTV?

Barnathan: We think that high definition TV is interesting, but it has to be compatible with the current TV set. If it isn't compatible, it probably won't get off the ground, other than in highly specialized areas. There isn't enough of a market. If you do a fight, you may want to put it on a high definition TV. But you will also want it seen on the current NTSC system. Another problem is that transmission on the terrestrial circuits is difficult because of the amount of bandwidth required.

I think it could be a great bonanza to the theaters because they could run different pictures on different nights. They might run a special program on Monday night, to reach a special audience. They could get a quality audi-

ence and charge a higher rate than on Tuesday, Wednesday, Thursday and Friday, when they would run regular programs. On Saturday and Sunday, they might show children's programs in the morning, adult programs at night. The theater can become a far more useful thing than it is now.

McClain: Does ABC foresee converting into digital television?

Barnathan: We're into digital television, but again, we don't have any great need for digital television, unless it's going to do one of three things for us. Is it going to give us a better look on the air? Is it going to be more reliable? Is it going to be more efficient? If it doesn't do one of those three, then the answer is no. By efficient, I mean it reduces costs. It reduces labor costs, it reduces tape costs or it reduces machine costs. If it doesn't do one of those things, it's not going to go. Just to say it's digital? So what? Who cares?

McClain: Do you foresee using videodisc technology?

Barnathan: Videodisc technology can make an excellent cartridge machine. We proposed that to RCA, but they're too busy trying to get the consumer market.

McClain: What about interactive television?

Barnathan: Two-way television is videotext, if that's what you mean. And there is the QUBE-type thing with interactive cable or interactive video, telemarketing, teleshopping, and so forth. I think there is a future there. That's just one of the untapped resources of cable. We are looking at it, yes. By cable, or via telephone.

McClain: Do you think that interactive video will be interesting to the general public in the future?

Barnathan: Broadcasting—no. A future for teleshopping, a future for telecommunications, yes. I think that it's something that the people at home would want to have. What kind of things, I don't know. Market research is under way right now to determine what people will buy.

McClain: What do you think of fiber-optic cables?

Barnathan: With fiber-optics, we believe we'll be able to bring more signals to a home, less expensively. Fiber-optics can reduce the cost of telecommunications, because the conduits are already in. You can put much more capacity in the same con-

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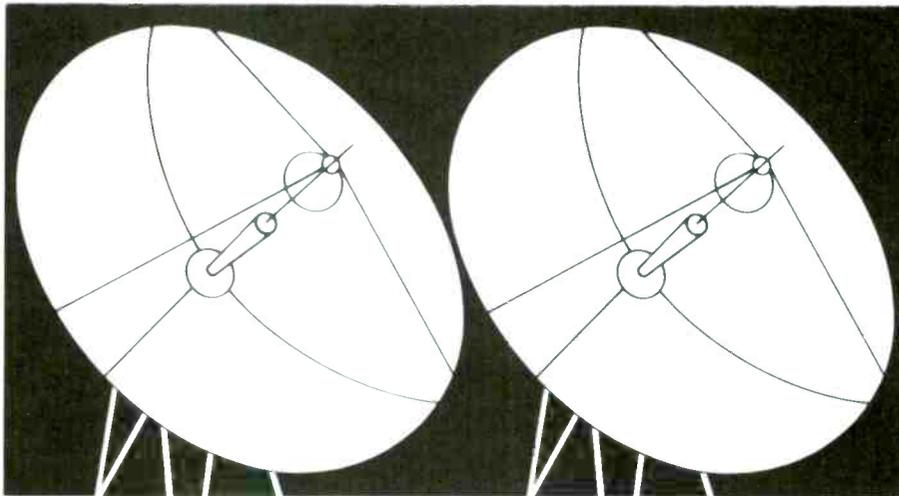
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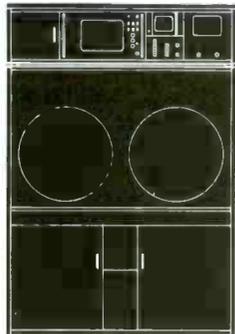
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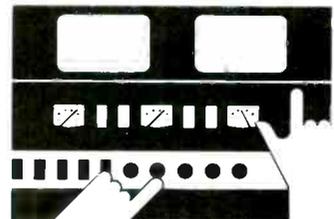
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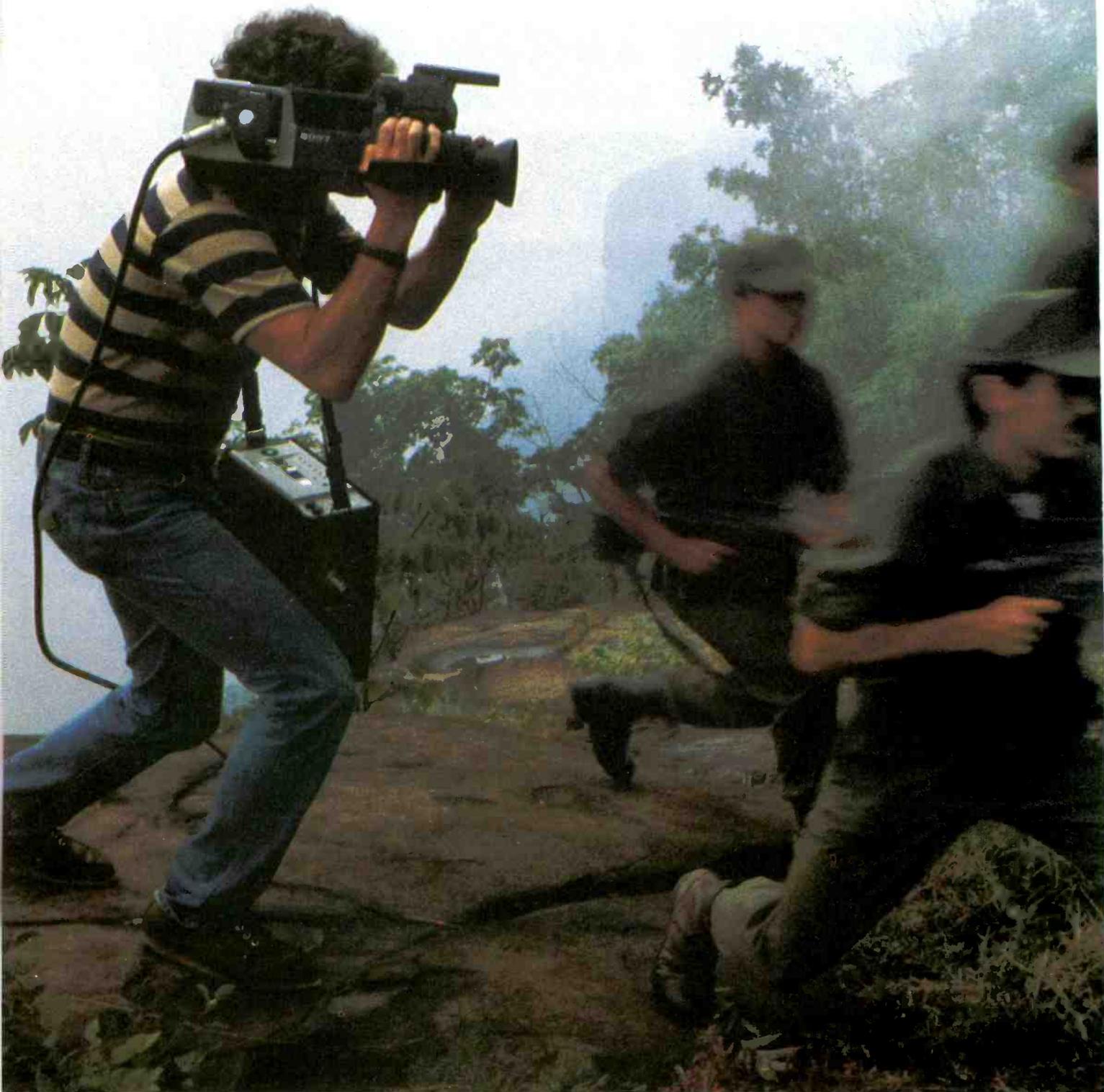
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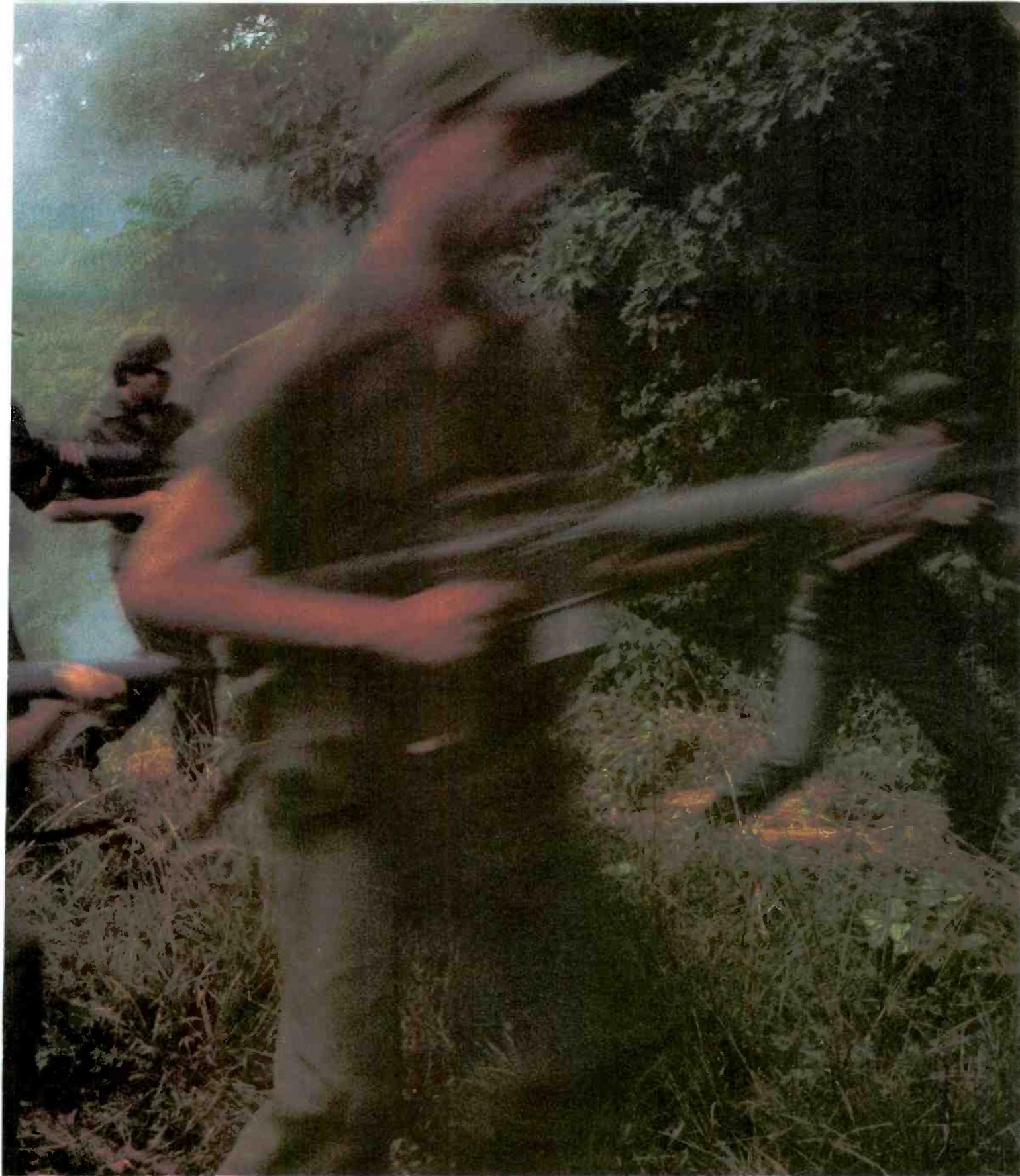
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Sony makes a complete line of cameras as well as 1/2", 3/4" and 1" broadcast VTRs, editors, Digital Timebase Correc-

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For more information, call Sony Broadcast Company, in New York/New Jersey at (201) 368-5085; in Chicago at (312) 860-7800; in Los Angeles at (213) 537-4300; in Atlanta at (404) 451-7671; or in Dallas at (214) 659-3600.

SONY
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duit. In other words, if there's a conduit coming across the street, we pull out the coax cable that's in it. We can put a lot more fiber-optic circuits in a smaller area. The big cost in the city is not wiring. It is the cost of building conduits to put the cables in, not the cabling itself. Because conduits are in place, it could save a lot of money, once the fiber-optics is available.

McClain: Would you comment on the future of chip technology in cameras and telecines?

Barnathan: There's no question that the chip technology is growing by

leaps and bounds. And the bubble memory is getting almost mind boggling. In 1975, the memory was 1000 bits of information on a chip. We're now up to 16,000, and shortly we'll be up to 64,000 bits. So 128,000 isn't far behind. They're becoming very reliable. Where it used to take an entire 8-foot rack of equipment to store one frame of video, we can now store one frame of video in about an inch and a half. One rack today might have at least 20 or 25 frame synchronizers in the space where you used to have one. This volume compression is making more things possible.

McClain: How long do you think it will be before ABC has satellite distribution?

Barnathan: We use satellites in terms of uplinking and getting materials, but we are not going to have full satellite distribution for a long, long time. We don't have any single network, we have many networks. It doesn't appear that way to anybody, because we make it look so easy.

When we do a baseball game, we need four transponders. For example, if the Atlanta Braves were playing the New York Mets, and the Los Angeles Dodgers were playing Philadelphia in September, and we have snow tires or anti-freeze to advertise, we don't want to sell anti-freeze or snow tires in Los Angeles. But we don't want to sell summer tires in Philadelphia and New York either. So we need to have one transponder for one game and a second transponder for the second game. We need transponders for alternate commercials to each location. That's a bunch of transponders. That's just to go out to the stations, that's not to come back into the network.

At the moment, we have one transponder from AT&T. We've asked AT&T for more, and we're still waiting. We're going to evolve into it. It's like we have a great railroad system. We can get to everybody. The problem with others is that they had no system at all. So they built an airplane system. They fly from one location to the other. But if you get fogged in, you can't go anywhere. This is what happens when you're in the air. When we're on the ground, we can go one way or another way. In fact, we can go several ways by railroad. But when you're flying, you can only go one way. And the same thing is true here. If you can't land there (if you don't have a dish), you don't have any other source. We're making sure that we evolve into this thing slowly. Where we're going is really more important. We don't know whether we can do in the air what we do on the ground at the same cost.

McClain: Are you encouraging the affiliate stations to purchase downlinks?

Barnathan: No. We're not encouraging anybody to do anything. We are developing a plan that will start out with the Mountain Zone. Then we will move into the Central Zone. That's as far as it's going at the moment. We have no plans to feed the West or East Coast by satellite at this time.

McClain: Do you have any suggestions for solving the problem of RF congestion?

Barnathan: I'm not going to comment. We are just as much the problem as the one who needs more. I think that we all have to have greater

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coordination and better shared time and also use better ingenuity in terms of using equipment and multiplexing.

McClain: You made a statement once that the success of ABC Sports was due to triax. What did you mean by that?

Barnathan: Prior to the development of triax, we used multiconductor cable, consisting of 81 different conductors bound together, each having a different function. The length of the cable could only be about 2000 feet. It was very large, very expensive, and it didn't go very far. Because of the weight, we had a connector every 200 feet. Each one added to the weight. It became very expensive, because we required a number of mobile units since we couldn't have long runs, especially if we were doing a golf match.

Skiing events were very difficult. We could only do the bottom of the hills. If we were going to do the hill tops, we had to build a studio on top of the mountain, which we did for the Olympics at Grenoble, France. We had many cabling problems in Grenoble. They would get wet, somebody would step on them or something didn't work.

When I got back from Grenoble, I

said: 'There's got to be a better way. My colleagues told me we could do it by using multiplexing techniques, and coding it, the way you code a signal into the home, but using RF. Instead of sending the signal through the air, you'd send it through a wire. I asked: 'It could be done?' The answer was yes. We tested the idea and it worked. We went to Philips and said: 'You've got to do something about this.' John Auld of Philips in New York and Jim Wilson developed a camera, the PC-100, the first triax camera. It gave us tremendous mobility.

We can now do a golf match from beginning to end. We can put 10 cameras in a truck. The longest runs we've used are 15,000 feet. On one reel, we can put 5000 feet of cable where we used to put 200 feet. The weight, the size, the reliability—it goes on and on. It's far more reliable, and if it breaks, a connector is fixed in no time. It used to take a man a whole day to put a connector on.

McClain: Do the other networks use triax now?

Barnathan: CBS has also used it for years. We could not get NBC to use it because RCA did not have a triax camera. At last, after many years, they have a triax camera, so now NBC is also using triax. It was a shame we

had to wait so long. At one time, because of our NFL requirements, we only went to a stadium once a year. But, CBS and NBC were going back every other week or every week. They were really calling the shots. So when we went to an NBC market, the guy had multiconductor cable in, and he would say: 'Well that's what NBC uses.' Now we're all using triax, thank God!

McClain: In the early '70s, ABC started experimenting with a small portable camera and VTRs. What were some of the problems that you had to overcome?

Barnathan: The news department! They wanted high quality. They thought we were an embarrassment to them. They wanted us to do what the other guys were doing, which was carry a heavy PCP-90 with an Ampex 3000 recorder that weighed 40 pounds and cost \$50,000 to \$70,000. It was ridiculous. That wasn't ENG, it was brute force. That wasn't going to replace film. I said if they wanted to go with something to replace film, they'd have to get a small camera and small tape recorder.

It was the mobility that didn't exist. So, we started with the small Akai. When our turn in the network pool came up in Washington, we were go-

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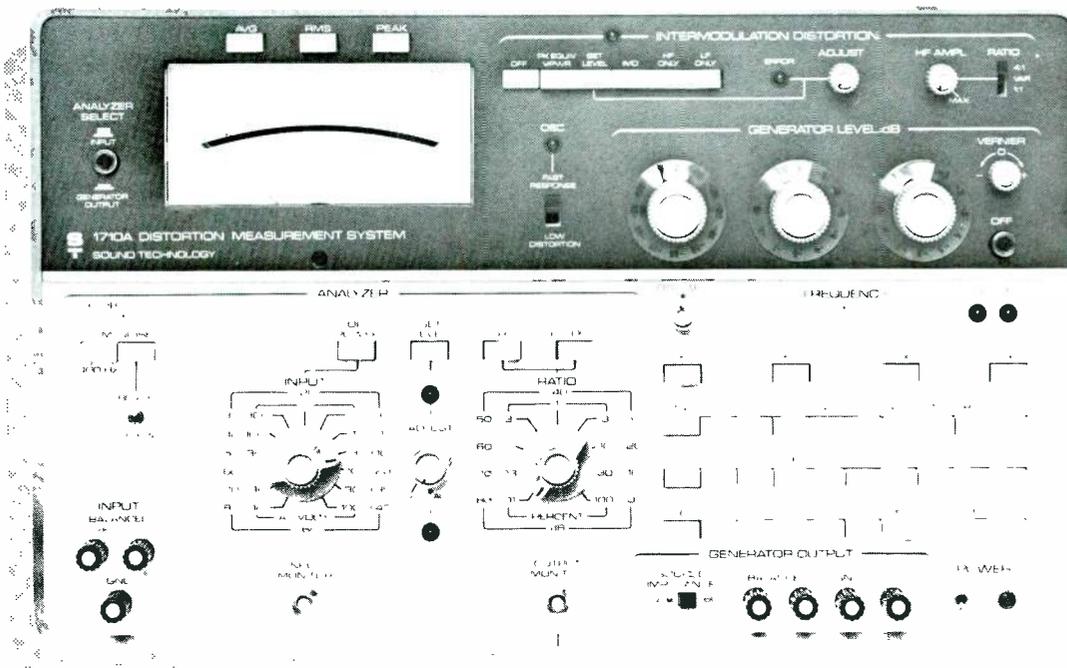
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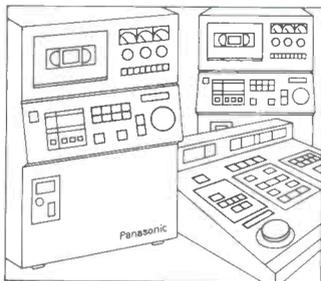


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Total freedom from video cables isn't the most important reason to buy Panasonic Recam. Recam's exciting combination of a new recording system and a 3-tube prism optics camera is. Especially when you consider the result: Broadcast quality from 1/2" VHS™ recording tape.

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The Recam system consists of the AU-100 portable VCR, the AK-100 3-tube prism optics camera and the AU-300 playback editing system. Together they add a new dimension



to ENG and EFP.

Here's how: Unlike conventional recording systems, Recam records frequency modulated luminance signals on a single-slant track. At the same time, I and Q signals are recorded on another parallel track. By assign-

ing separate FM frequencies to the I and Q signals, color noise, streaking and other two-phase color problems are eliminated because only the final product is NTSC encoded.

The AU-100 has a direct-drive motor for precise tape movement and a capstan motor designed for reduced gyro effect. And for accurate assembly edits after every shot, the AU-100 backspaces 30 frames every time the VTR trigger is released.

The AU-100 also records audio on two longitudinal tracks and time code on a

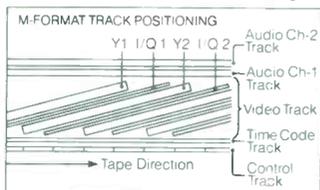
third track. The AU-100 supplies a constant read-out of vital operating conditions including drum and capstan lock status, slack tape detection, dew warning detection and a lot more.

Proven Prism Optics Performance

The AK-100 camera gives you the choice of 2/3" diode-gun Plumbicon® tubes or 2/3" Saticon® tubes. So you can shoot under a wide variety of lighting conditions without worrying about lag, blooming or burn-in.



Resolution with the Plumbicon configuration is 600 lines with a S/N ratio of 59dB, while the Saticon version produces 550 lines and a S/N ratio of 58dB. For added dynamic range



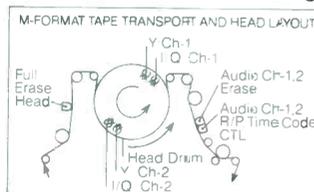
and reduced comet tailing, the AK-100 includes feedback beam control. Dynamic focus and corner registration compensation circuitry add to picture

quality as do horizontal and 2-line vertical contouring. There's also switchable black stretch and knee circuits for detail retention in dark or bright areas of the image. An eight-bit A/D and D/A converter with memory automatically adjusts white and black balance.

Better Chrominance Than 3/4"

Recam looks even better when you look at the AU-300 playback editing system. In fact, a Recam dub is actually superior to a 3/4" master. The reason: The AU-300's six-head scanner plays and

records the separate Y and I/Q tracks so there's virtually no loss of luminance or chroma information during



dubbing or insert and assembly editing. At the same time, two rotary erase heads and vertical head switching make for clean, accurate edits.

Panasonic Recam. It gives you the convenience of a recorder/camera with

the picture to measure all recorder/cameras by. Plumbicon is a registered trademark of N.V. Philips for TV camera tubes. Saticon is a registered trademark of NHK (Japan Broadcasting Corp.)

Panasonic VIDEO SYSTEMS DIVISION

For additional information on the Panasonic Recam, mail to:

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ing to use the Akai. CBS and NBC refused our feed. They planned to throw us out of the pool. Thank God for Bill Sheehan at ABC News. He backed us all the way. He understood what we were trying to do. Because of our experiences, we helped develop a time base corrector, the CVS 504 and the Ampex 800.

McClain: You have been involved in engineering for a long time, but you have also been in other areas. It is said that you have brought many into this business. Is that true? And who are they?

Barnathan: I started in research. First and foremost was Fred Pierce, executive vice president of ABC. Bill Rubens, vice president of research at NBC, worked for me at ABC; Arnold Becker, vice president of CBS Research. They were all so-called proteges of mine. Marvin Mord, Paul Sonkin, Sy Amlen, in programming, and even Freddie Silverman were part of my group. Fred came in here when he was doing a thesis on television about ABC. I worked closely with him and explained to him how we programmed. In addition, there are many other people who are now at ABC and NBC, in the research areas. Leonard Goldberg, of Spelling-Goldberg, was one of my co-workers. Mark Cohen, our senior vice president, was one of my proteges in station relations.

McClain: With all these areas of rapidly advancing technology, where does your heart actually lie?

Barnathan: I've always been proud of doing good things. Bringing the deaf community into television was, I felt, a good thing. It is something that we should do as broadcasters. God knows we spend fortunes to reach people in far away locations, one and two channel markets. Here were people who were not a part of our community.

I have a great feeling of accomplishment about doing live-event programming. I think that's what television does best, bringing the events of our times, whether they be the wonderful events that occur, such as the Olympics, the history of the conventions, or the tragic events of our times such as the shootings, the assassinations, the funerals. Being able to bring this to the American public, first hand, live, is an exciting thing. To me that is what television is all about. The rest of it is just to pay the rent.

But I'm a very practical person. I think it is important to work hard on the shows that are very important to ABC. The daytime soap operas are very important to our tremendous audiences. Although I get my greatest satisfaction out of live events, believe me, I spend just as much time working on other programs.

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INNER VIEW 3: A closer look at Conrac Monitors



Comb Filter Separator: Resolution Solution at 3.58 MHz.

Conrac's Comb Filter Separator delivers the high resolution needed for today's high performance camera and taping equipment. It removes color information from the composite video signal without the luminance loss in the 3.58 MHz region produced by notch filters.

Conrac's Comb Filter takes advantage of spectrum interweaving to separate luminance from chroma, without reducing luminance bandwidth.

But the best part of Conrac's Comb Filter is that it gives you this improved picture clarity without the drawback of conventional comb filters. Because, unlike conventional comb filters which exhibit heavy dot patterns in the luminance path, Conrac utilizes non-linear techniques to virtually eliminate these patterns around vertical and horizontal transitions.

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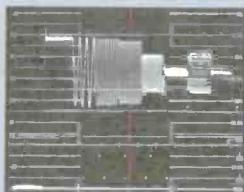
the quality factor. This system provides the capability of daily test analysis from four different product test and inspection areas. The net results are improvements in product quality and long term reliability.

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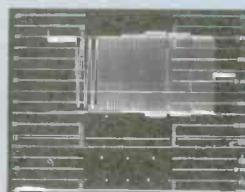
Conrac's track record of technical innovations stretches back nearly three decades; and what we've learned since then goes into every monitor we make today. That is important to you because the more technology we pack into each monitor, the more performance you will receive from it.

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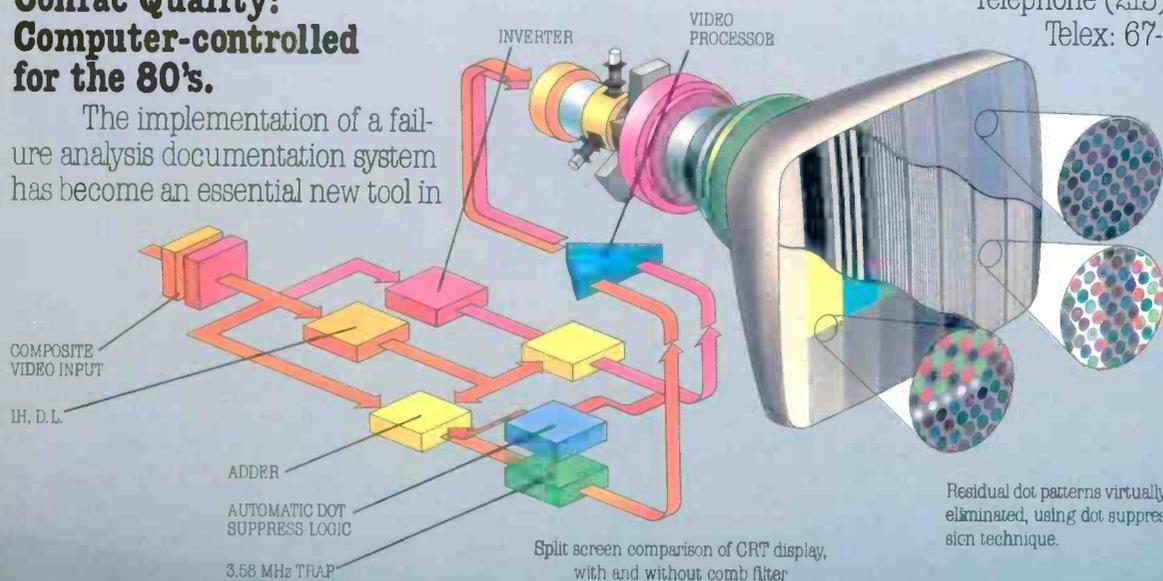
For the complete inner view of Conrac technology, call or write us today. Conrac Division, Conrac Corporation, 600 North Rimsdale Avenue, Covina, California 91722, Telephone (213) 966-3511, Telex: 67-0437.



1. Multiburst test signal with conventional bandpass and notch luminance/chrominance separator.



2. Multiburst test signal with Conrac's Comb Filter luminance/chrominance separator.



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Market for radio equipment & services

Compiled by and printed with permission of the NRBA

On November 20, 1981, questionnaires were mailed to the more than 1550 commercial station members of NRBA along with their weekly *Monday Morning Memo*. At the cut-off date of December 23, 1981, the NRBA had a return of 34.1%, which is significant enough to project to the entire membership.

Although actual purchases and consultant changes in the past two years can be considered accurate, the buying plans for the next two years are probably understated, due to the unforeseen need for many types of equipment and services.

In those cases in which a greater percentage plan to buy than had bought in the past two years (such as satellite dishes, towers, transmitters, satellite programming and word processing), it is safe to assume these are growth markets. The results of the survey are presented in Tables I – VI.

**Table I.
Equipment**

	Percentage of NRBA members who:	
	Bought one or more in past two years	Plan to buy one or more in next two years
Amplifiers	55.0	28.8
Analyzers	22.5	12.2
Antennas	26.9	27.7
Audio control centers	24.4	16.6
Audio limiters	53.5	23.2
Audio systems	18.1	10.3
Automation systems	14.8	11.1
Bdcst./prog. logging recorders	9.2	10.7
Computers	36.5	28.4
Consoles	50.2	40.6
Directional couplers	8.9	4.8
Demodulators and modulators	13.7	7.4
EBS equipment	12.9	4.8
Generators	15.5	12.9
Headsets	73.1	48.7
Local loops	32.1	15.1
Microphones	74.9	49.1
Modular equipment	9.2	5.5
Monitors	38.0	24.0
Remote equipment	39.9	32.8
Satellite dishes	24.4	38.0
Sound recording equipment	49.8	38.7
Stereo equipment	34.7	25.5
Subcarrier modems	6.6	7.0
Switching	9.6	9.2
Towers	12.9	25.8
Transmission lines	22.5	27.3
Transmitters	30.3	33.6
Tuners	27.3	16.2
Turntables	51.3	29.9

**Table II.
Equipment**

	Rank by % who	
	bought in past two years	plan to buy in next two years
Microphones	74.9	49.1
Headsets	73.1	48.7
Consoles	55.0	40.6
Audio limiters	53.5	Sound recording equipment 38.7
Turntables	51.3	Satellite dishes 38.0
Consoles	50.2	Transmitters 33.6
Sound recording equipment	49.8	Remote equipment 32.8
Remote equipment	39.9	Turntables 29.9
Monitors	38.0	Amplifiers 28.8
Computers	36.5	Computers 28.4
Stereo equipment	34.7	Antennas 27.7
Local loops	32.1	Transmission lines 27.3
Transmitters	30.3	Towers 25.8
Tuners	27.3	Stereo equipment 25.5
Antennas	26.9	Monitors 24.0
Audio control centers	24.4	Audio limiters 23.2
Satellite dishes	24.4	Audio control centers 16.6
Analyzers	22.5	Tuners 16.2
Transmission lines	22.5	Local loops 15.1
Audio systems	18.1	Generators 12.9
Generators	15.5	Analyzers 12.2
Automation systems	14.8	Automation systems 11.1
Demodulators and modulators	13.7	Bdcst./prg. logging recorders 10.7
EBS equipment	12.9	Audio systems 10.3
Towers	12.9	Switching 9.2
Switching	9.6	Demodulators and modulators 7.4
Bdcst./prg. logging recorders	9.2	Subcarrier modems 7.0
Modular equipment	9.2	Modular equipment 5.5
Directional couplers	8.9	Directional couplers 4.8
Subcarrier modems	6.6	EBS equipment 4.8

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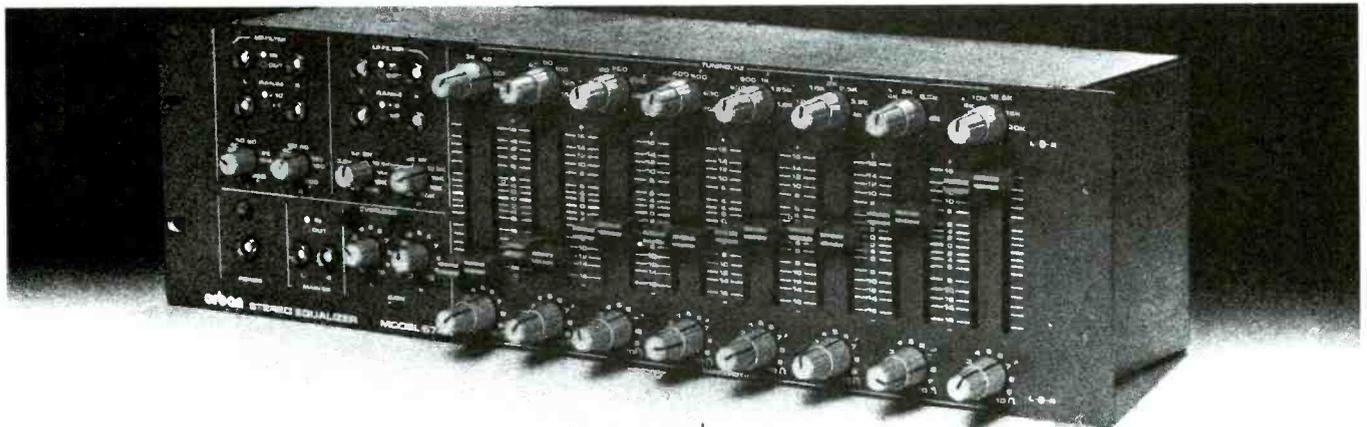
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Table III.
Services and promotion materials

	Percentage of NRBA members who:	
	Bought in past two years	Plan to buy in next two years
Billboards	51.9	37.1
Billing services	6.8	2.3
Bumper stickers	59.8	43.6
Business computer systems	31.1	24.2
Bus posters	23.5	12.5
I.D. packages	36.0	26.1
Jingles	32.6	27.7
Membership cards	9.5	8.0
Music libraries	30.7	14.8
Music services	38.6	20.0
News services	46.2	22.3
Program production services	25.0	11.7
Production services	15.9	9.1
Promotion and marketing services	11.4	8.7
Sales promotions	32.6	21.6
Satellite programming	11.7	24.6
Sports services	8.7	5.7
TV promotions	16.3	15.2
Weather services	31.1	17.0
Word processing	8.3	14.8

Table IV.
Services and promotion materials

	Rank by % who bought in past two years		Rank by % who plan to buy in next two years
Bumper stickers	59.8	Bumper stickers	43.6
Billboards	51.9	Billboards	37.1
News services	46.2	Jingles	27.7
Music services	38.6	I.D. packages	26.1
I.D. packages	36.0	Satellite programming	24.6
Jingles	32.6	Business computer systems	24.2
Sales promotions	32.6	News services	22.3
Business computer systems	31.1	Sales promotions	21.6
Weather services	31.1	Music services	20.0
Music libraries	30.7	Weather services	17.0
Program production services	25.0	TV promotions	15.2
Bus posters	23.5	Music libraries	14.8
TV promotions	16.3	Word processing	14.8
Production services	15.9	Bus posters	12.5
Satellite programming	11.7	Program production services	11.7
Promotion and marketing services	11.4	Production services	9.1
Membership cards	9.5	Promotion and marketing services	8.7
Sports services	8.7	Membership cards	8.0
Word processing	8.3	Sports services	5.7
Billing services	6.8	Billing services	2.3



The Dream Equalizer: Now mono or stereo.

When we introduced our 672A "dream equalizer" in 1979, we had an instant hit. Audio professionals loved its versatility and clean sound. Eight parametric EQ bands (with reciprocal curves) were combined with wide-range tunable 12 dB/octave highpass and lowpass filters. The result: an amazingly powerful and useful machine. A cost-saving one too, because the outputs of both filters are available to perform a full electronic crossover function.

The 672A now has a stereo twin — the new 674A, with all the power of two 672A's in a space-saving 5¼" rackmount package. Naturally, both equalizers are built to full Orban professional standards. That means industrial-quality construction and components, RFI suppression, a heavy-duty roadworthy chassis, and comprehensive backup support.

orban

Orban Associates Inc.

645 Bryant St. San Francisco, CA 94107

Telex: 17-1480, Cable: ORBANAUDIO

TECHNOLOGY YOU CAN TOUCH

*The Otari MTR-10 Series
1/4" & 1/2" Mastering/Production Recorders*



The MTR-10 Series are fully microprocessor controlled mastering/production recorders available in four recording formats: 1/4" full-track; 1/4" two channel; 1/2" two channel and 1/2" four channel. They are the ultimate in analog tape recorder performance and are the embodiment of our dedication to innovation and quality. Practical, efficient and exclusive transport and electronic features abound. Unprecedented control and

flexibility are now yours because they are the only mastering recorders in their class which feature an extremely sophisticated, full-function, ten memory locator. For the stringent requirements of multi-media production all versions of the MTR-10 Series machines easily interface with any SMPTE-based video editing system, machine controller or synchronizer.

Working closely with industry leaders in broadcast, film and recording production, we have engineered a recorder that is ready to meet any audio professional's challenge. Superb reliability, the hallmark of Otari's reputation, assures a professional's investment in today's business... secures it for tomorrow's.

The MTR-10's are engineered like no other tape machines in the world; with the qualities you can hear and feel.



OTARI Technology You Can Touch.

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

Circle (59) on Reply Card



**Table V.
Consultant changes**

	Percentage of NRBA members who:	
	Changed in past two years	May change in next two years
Attorneys	14.8	7.6
Audience measurement	17.0	15.5
Brokers	4.5	4.9
Consulting engineers	17.0	9.8
Employment firms	4.2	3.4
Financing	9.1	12.1
National sales representatives	22.7	17.0
Sales promotion	17.4	17.8
Sales training	26.1	25.8
Station promotion	26.5	27.3

Survey highlights

Equipment

- More than half the radio stations purchased microphones, headsets, amplifiers, audio limiters, turntables and consoles in the past two years.
- The growth markets for equipment are satellite dishes, towers, transmission lines and transmitters.

**Table VI.
Employee benefits**

Benefits partially or fully provided by the employer	Currently provide	Are willing to consider
Group hospitalization insurance	90.2	4.5
Major medical insurance	87.1	3.8
Life insurance	72.7	6.4
Disability income insurance	44.7	7.6
High limit accidental death insurance	39.0	7.6
Pension or profit-sharing plan	31.1	21.2
Hospital income insurance	22.3	8.0

Services and promotion materials

- At least one out of three stations purchased bumper stickers, billboards, news services, music services, I.D. packages, jingles and sales promotions in the past two years.
- The most noticeable growth markets are satellite programming and word processing.

Consultant changes

- More than one out of five stations changed station promotion consultants, sales training consultants and national sales representatives in the past two years.

Employee benefits

- At least three out of four stations provide their employees with group hospitalization, major medical and/or life insurance.



Looking for a Distortion Measurement System?

The Amber model 3501 is quite simply the highest performance, most featured, yet lowest cost audio distortion and noise measurement system available.

It offers state-of-the-art performance with THD measurements to below 0.0008% (-102dB), maximum output level to +30dBm and noise measurements to below -120dBm.

It has features like automatic operation, optional balanced input/output and powerful IMD measurement capability. It includes comprehensive noise weighting with four user changeable filters. Unique features like manual spectrum analysis and selectable bandwidth signal-to-noise measurements.

The 3501 is fast, easy to use and its light weight and small size make it very portable. It can even be battery powered.

And the best part is that it is 20% to 50% below what you would pay elsewhere for less performance. The Amber 3501 starts at \$2100. Send for full technical details.



amber

Amber Electro Design Inc.
4810 Jean Talon West
Montreal Canada H4P 2N5
Telephone (514) 735-4105

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ELIMINATING HORIZONTAL SHIFT... AND MORE!

The Grumman SYNC PROC™ embodying the unique feature of color field identification will provide for the economic implementation of an SCH timed facility as per RS170A, and eliminate the shift problems plaguing your match frame editing operations.

The SYNC PROC™ which combines a sync generator (master and slave capability) with a processing amplifier, contains additional options including VITS and VIRS, Video Source Identification, Blanking Width Verification, and Digital Remote Control.

Through the use of data bus, and multiplexing, advanced digital/analog circuit design,



custom hybrid circuits, software, microprocessors and system integration, Grumman is cost effectively applying its aerospace design and manufacturing capabilities to areas such as master control room systems, satellite transmission processing, and machine controls.

For more information write Marketing Department, MS A24-43, Grumman Aerospace Corporation, Bethpage, N.Y. 11714, or call (516) 435-6089.



SEE US AT SMPTE SHOW, SHERATON CENTRE, N.Y.C., NOV. 9-11, 1982.

GRUMMAN

Circle (61) on Reply Card

IF IT WERE YOUR JOB TO GET THIS ON TAPE, WHAT TAPE WOULD YOU GET IT ON?

It's a complete mismatch. A collection of college amateurs together for only a couple of months against the equivalent of the Russian professional all-stars, a team that has dominated world hockey for a decade or more, a team that has recently embarrassed the NHL All-Stars with a 7-2 exhibition victory. But in the end, the amateurs win in a dramatic showdown for all the world to see at a time in world politics when a victory really counts.

America, like most of the world, will see the game on tape, recorded and broadcast by ABC-TV. In fact, many of the events at Lake Placid will be broadcast and rebroadcast to the world on tape under the most demanding time and temperature conditions. It's a one-chance situation all the way and the stakes are always high.

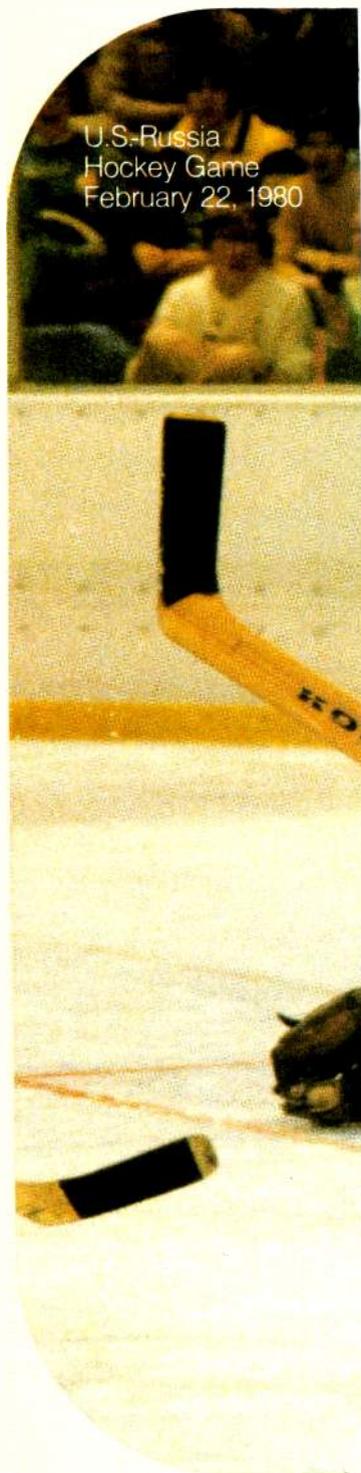
That's why Scotch® Video Tape was there when the U.S.-Russia Hockey Game was first recorded. And again when the Moon Walk was first recorded. And again when the Space Shuttle Landing was first recorded.

The Papal Tour of America. The Return of the Hostages. The Eruption of Mount St. Helens. Whenever there was one chance to get it, chances are they got it on Scotch Video Tape.

So whether your production is important to the world or just important to you, why take chances? Get it on the one tape you know will get it right.

Magnetic A/V Products Division/3M.

Circle (62) on Reply Card





HISTORY IS RECORDED ON SCOTCH VIDEO TAPE.

3M hears you...

3M

Field report: Otari MTR-10 recorder

By Charles R. Strickland, assistant chief engineer, WHAS Radio, Louisville, KY

Shortly before Christmas, 1981, WHAS became one of the first stations to take delivery of the new Otari MTR-10 tape recorders. A new radio production studio was being built, for which we needed one 4-track and two 2-track machines. The studio was to be the best it could be in terms of technical quality, ease of operation and production capability. The recorders would have to provide top performance, high reliability, ease of service, and features oriented toward broadcast audio production. After looking at the best equipment on the market, we decided to buy the MTR-10s.

As soon as the recorders arrived and were removed from their crates, we went through the entire setup procedure. We found that they would meet published specifications with no adjustment, but we wanted to be sure of optimum performance and to become familiar with the machines. Some of the performance figures we measured are shown in Table I.

The MTR-10 electronics are located below the transport. The power supply at the bottom has LED indicators for the various outputs. Above the power supply is a sturdy card cage for the various modules. There is one audio card, which contains record and playback electronics, for each channel. Adjustments for record and playback equalization, gain, bias and LF compensation are available on the front panel. The audio control card may be switched to NAB or IEC equalization. There is a 3-position bias switch. Three sets of bias adjustments are provided so that different types of tape may be handled easily. A test oscillator generates square and sine waves at 100Hz, 1kHz and 10kHz. Oscillator positions appear on the input selector switch, making it possible to run a quick test at any time.

Three other cards in the frame are for capstan control, reel control and transport control. The master CPU board completes the electronic assembly. The rear panel is removable for access to the rear of the frame.

The meter panel, which is hinged for servicing, has indicators to show which equalization and bias have been selected. The meters feature LED peak indicators to warn of excessive levels. For each input and output,

Continued on page 106

Table I.
Measured performance

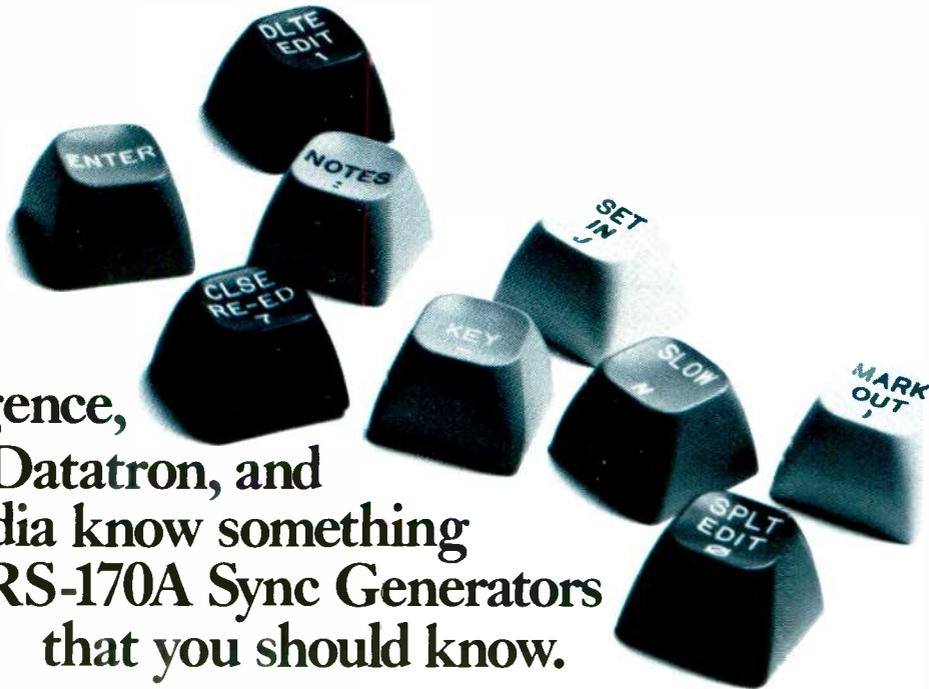
	7.5ips	15ips	30ips
Wow and flutter	0.08%	0.06%	0.04%
Speed accuracy	0.03%	0.03%	0.03%
Overall response (± 2 dB)	20-18kHz	20-20kHz	40-28kHz
Signal-to-noise (weighted)	66dB	65dB	68dB
Distortion	0.30%	0.30%	0.30%
Output clipping level	+28dBm	+28dBm	+28dBm

Manufacturer's specifications

MTR-10 series, 4-channel

TRANSPORT			
Configuration:	1/2" (12.7mm), 4 Channel		
Tape Speeds:	30/15/7.5 or 15/7.5/3.75 ips		
Rewind Time:	User adjustable to 65 sec. for 2500 ft.		
Reel Size:	5 to 10.5" automatically compensating		
Motors:	3 D.C. Servo; 9600 Hz., PLL capstan - microprocessor controlled		
Wow and Flutter: (DIN 45507 peak wtd.)	30 ips 0.03%	15 ips 0.04%	7.5 ips 0.05%
Pitch Control:	$\pm 20\%$, variable speed		
Max. Speed Deviation:	$\pm 0.03\%$		
Start Time:	30 ips: less than 400 msec. 15 ips: less than 200 msec. 7.5 ips: less than 100 msec.		
ELECTRONICS			
Inputs:	Active Balanced Transformerless (optional transformers 10K ZA-52W) 20K ohms impedance +4 dBm nominal input level		
Outputs:	Active Balanced, Direct Coupled (optional transformers 600 ohm ZA-52X) less than 5 ohms source impedance +28dB maximum output level into 200 ohms or greater		
Equalization:	NAB/IEC switchable, AES - 30 ips; Adjustable record phase compensation for all speeds		
Bias Frequency:	250 kHz		
Cal. Levels:	Switchable 185, 250 nWb/m NAB; 320 nWb/m IEC		
Frequency Response: Record/Reproduce	30 ips 55-26 kHz +5/-2dB 67-23 kHz ± 0.5 dB 50-20 kHz +5/ ± 2.0 dB	15 ips 27-23 kHz +5/-2dB 31-20 kHz ± 0.5 dB 30-18 kHz +5/ ± 2.0 dB	7.5 ips 30-12 kHz ± 2 dB
Sel-Rep			
Record/Reproduce	7.5 ips 16-17 kHz +5/-2dB 18-13 kHz ± 0.5 dB 20-12 kHz +5/ ± 2.0 dB	3.75 ips 30-12 kHz ± 2 dB	
Sel-Rep			
Signal to Noise Ratio: (3% Third Harmonic to Noise Floor) unwtd. 30-18 kHz wtd. ANSI "A"	30 ips 75dB 79dB	15 ips 73dB 74dB	7.5 ips 73dB 76dB
Operating Level:	250 nWb/m, all measurements made with 3M #226 tape at operating level except where specified.		
Distortion: (1 kHz)	less than 0.2% third harmonic (7.5-30 ips)		
Crosstalk:	45dB (63-12 kHz), adjacent channels		
Depth/Erasure: (1 kHz)	greater than 80dB		
Oscillator Freq.	100, 1k, 10 kHz-sine wave; 1k, 10k-square wave		
PHYSICAL			
Power Req.:	100, 117, 200, 220 or 240 VAC, 50/60 Hz., 180 watts		
Operating Env.:	40-104 degrees F. (5-40C), 20-80% RH		
Storage Env.:	-5 to 113 degrees F. (-20 to 45C), 10-80% RH		
Mounting:	All modules standard E.I.A. 19" rack mount		
Weight:	200 lbs. (inc. SC-1 console and shipping crate)		

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?

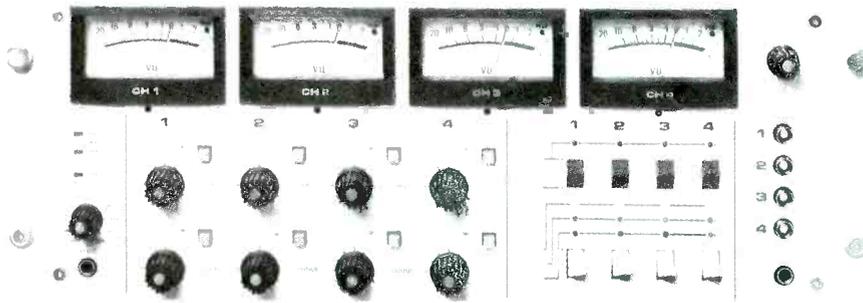
Lenco, Inc., Electronics Division 300 N. Maryland St. Jackson, Missouri 63755.
Telephone: (314) 243-3147

Engineered and manufactured in the United States

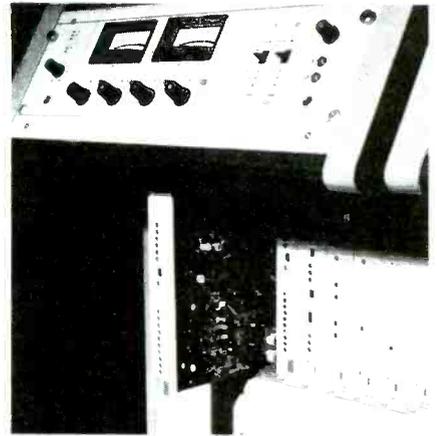


The Professionals' Choice

Circle (65) on Reply Card



The audio control panel of the MTR-10/4 offers straightforward operation, including level adjustments, tape bias selection, equalization choice, individual channel mode controls and indicators, as well as headphone control. The MTR-10/2 provides the same facilities for two channels.



All electronic modules of the MTR-10 recorders are located on the front panel, providing easy access for any needed adjustments.



BALANCING ACT

Our new ITE/Miller H16 fluid-dampened head is specifically designed for state-of-the-art ENG cameras where balancing problems are of prime consideration.

MULTIPLE, ADJUSTABLE COUNTERBALANCE MODES

Four counterbalance modes provide for changes in camera center-of-gravity caused by variations in view-finder and lens size. Both pan and tilt are adjustable in four steps, from free-wheeling through maximum fluid tension. Thus, total shooting freedom is yours be it quick pans and tilts, or slow, panoramic coverage.

The H16's adjustable center-of-gravity provides incremental fluid dampening in both pan and tilt. Nose- and tail-heavy camera configurations are completely eliminated, with perfect, dynamic counterbalancing achieved in seconds.



AUTOMATIC CAMERA LOCKING

An automatic camera locking quick-release plate assures instant and perfect camera mounting and balance. Once the plate has been fitted to the camera, simply snap it onto the head and you're ready to shoot. And a one-motion movement releases it for hand-held operation or transport.

A REAL LIGHT - HEAVYWEIGHT

The H16 is engineered and built to last. Weighing in at less than six pounds, it can support cameras of up to 30 pounds.

One control handle, a built-in spirit level and claw ball mounting for all ITE/Miller tripods are standard features of the H16. Dual handles are optionally available.

When it comes to ENG coverage—or any location shooting—count on the ITE/Miller H16 to keep you in perfect balance.

Available through all camera manufacturers and from quality dealers and distributors throughout the world.

INNOVATIVE TELEVISION

EQUIPMENT

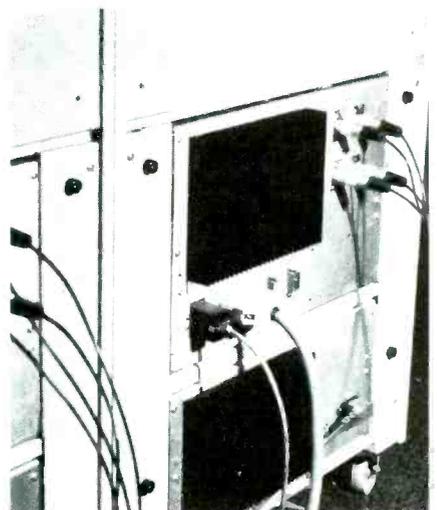
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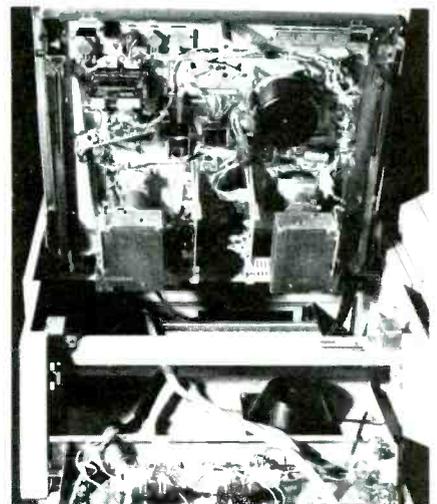
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Total Television Camera Support Equipment—From The Ground Up.

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The clean rear panel of MTR-10s provides quick access to connections. Three-pin audio connectors and multiconductor jacks serve audio and control signals, respectively.



The meter panel and deck panel are hinged, providing quick access to wiring or mechanics.

Before you invest in new studio monitors, consider all the angles.

No one has to tell you how important flat frequency response is in a studio monitor. But if you judge a monitor's performance by its on-axis response curve, you're only getting part of the story.

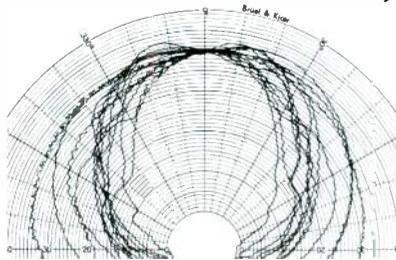
Most conventional monitors tend to narrow their dispersion as frequency increases. So while their on-axis response may be flat, their off-axis response can roll off dramatically, literally locking you into the on-axis "sweet spot." Even worse, drastic changes in the horn's directivity contribute significantly to horn colorations.

Introducing the JBL Bi-Radial Studio Monitors.

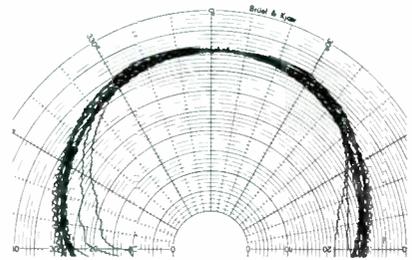
At JBL, we've been investigating the relationship between on and off axis frequency response for several years. The result is a new generation of studio monitors that provide flat response over an exceptionally wide range of horizontal and vertical angles. The sweet spot and its traditional restrictions are essentially eliminated.

The key to this improved performance lies in the unique geometry of the monitors' Bi-Radial horn.¹ Developed with the aid of the latest computer design and analysis techniques, the horn provides constant coverage from its crossover point of 1000 Hz to beyond 16 kHz. The Bi-Radial compound flare configuration maintains precise control of the horn's wide 100° x 100° coverage angle.

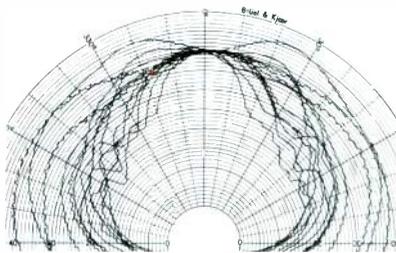
1. Patent applied for.



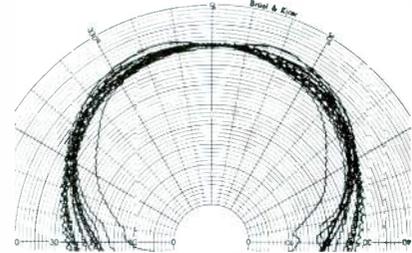
Typical horizontal



JBL 4430 horizontal



Typical vertical



JBL 4430 vertical

And the Bi-Radial horn's performance advantages aren't limited to just beamwidth control. The horn's rapid flare rate, for instance, dramatically reduces second harmonic distortion and its shallow depth allows for optimal acoustic alignment of the drivers. This alignment lets the monitors fall well below the Blauert and Laws criteria for minimum audible time delay discrepancies.

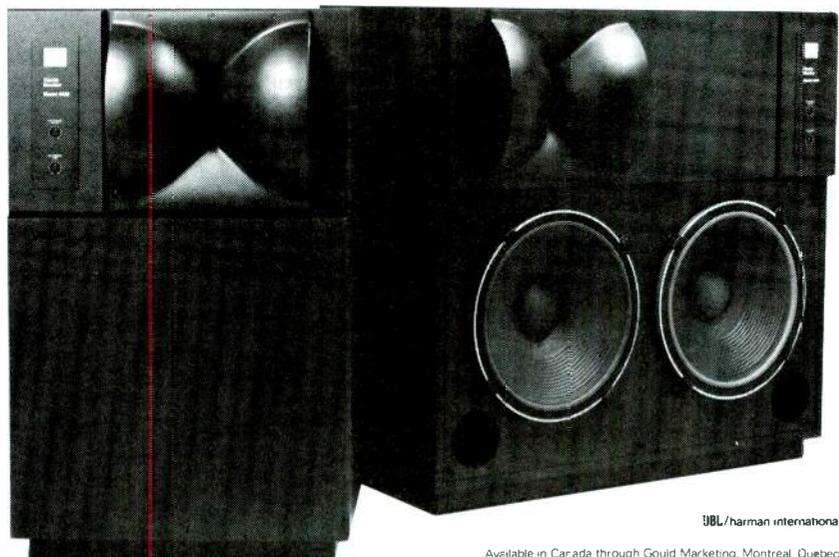
But while the Bi-Radial horn offers outstanding performance, it's only part of the total package. The new monitors also incorporate JBL's most advanced high and low frequency transducers and dividing networks. Working together, these

components provide exceptionally smooth response, high power capacity, extended bandwidth, and extremely low distortion.

Judge For Yourself

Of course, the only way to really judge a studio monitor is to listen for yourself. So before you invest in new monitors, ask your local JBL professional products dealer for a Bi-Radial monitor demonstration. And consider all the angles.

James B. Lansing Sound, Inc.
8500 Balboa Boulevard
P.O. Box 2200
Northridge, California 91329 U.S.A.

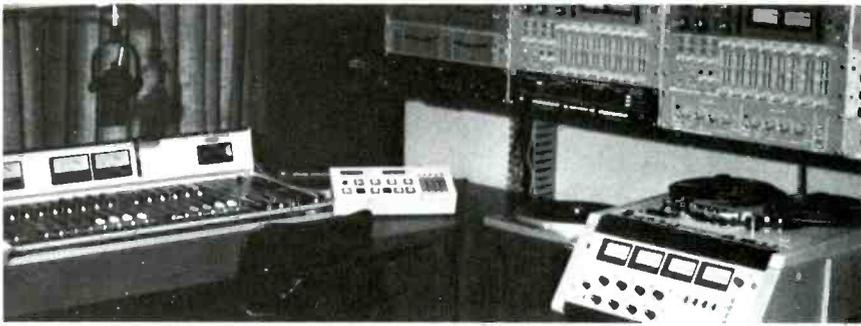


JBL/harman international

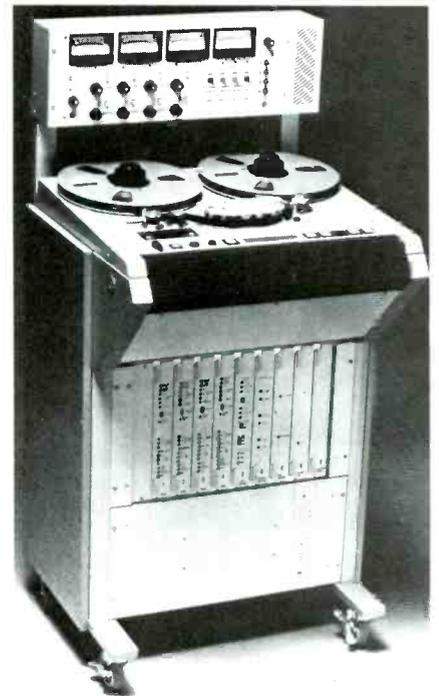
Available in Canada through Gould Marketing, Montreal, Quebec.



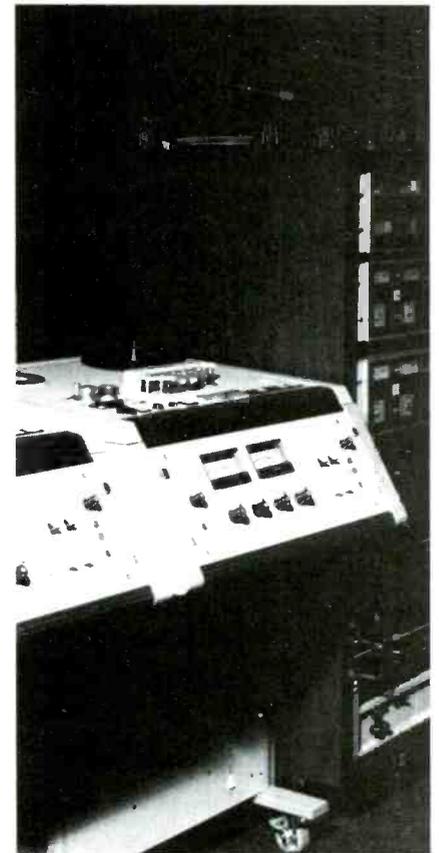
Circle (128) on Reply Card



In the WHAS production room, the MTR-10/4 is surrounded by phono and processing equipment. From the WBS board, the operator may use the auto-locator for machine control, and with little more movement has access to equalization facilities, time compression equipment and patching.



The Otari MTR-10/4 4-channel mastering/production recorder may be requested in the overbridge version (shown) or in the low profile package purchased by WHAS. The 2-channel MTR-10/2 is also offered in either package.



To the operator's left in the production room are the two MTR-10/2 machines, each with auto-locator control. They are flanked by two PLAY and two RECORD/PLAY cartridge decks.

HEDCO Takes NEW Paths!

We recently developed the first integrated "three-stage" non-blocking, 100 x 100 routing switcher. This system uses 43% fewer crosspoints in a physically compact 22 rack unit frame. Logic uses a Motorola 68000 microprocessor with NOVDRAM™ memory, including a duplicate "slave" processor. These elements provide path selection, fault detection, path duplication and simultaneous handling of 100 control panels with vertical interval switching within three fields.

16/4 V

8/1 V

16/1 AFV

100 x 100 V w/Terminal

256x2 A

Custom Control Panels

ADF

8x8 A

24x2 A

Control Panels

X-Y

AFV

We manufacture Audio Distribution Amplifiers capable of accepting balanced or unbalanced lines over a wide bandwidth (10Hz-100KHz for SMPTE time code), with ultra low THD and six high performance outputs without transformers.

We produce our small class switcher line using single wire per crosspoint control for ultimate versatility in interfacing to your control systems.

We make the equipment you need for complete distribution systems, from 0.1% precision BNC Terminations, Return Loss Bridges, a full line of Video and Audio Distribution Amplifiers to mid and large class switchers. Check our innovations, quality, prices, and our competitors. Choose the best.

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HEDCO

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VIDIFONT® GRAPHICS V. The excitement radiates through your creative staff. Reaches out. Grabs your audience. Vidifont Graphics V™ refines the art of electronic graphics. From often-needed name supers to story highlighters to full animated sequences. Imagine the added impact!

You start with distinctive graphic composition capabilities. With digitizing tablet or keyboard, design and create character fonts, logos, weather symbols and other graphics.

Add color. Over 4,000 colors for those multi-colored characters, extended edges, banners, backgrounds and graphics you could never before create in-house

Now get things moving. With animation, color cycling and mix effects, including wipes, fades, mixes and merges. Our multiple plane frame-store means freedom of movement for rolls, crawls, character-by-character ripples and diagonals and full-screen animations.

Graphics V is a multi-channel system that welcomes simultaneous multiple-user access. Two high resolution channels and six off-line entry channels provide enough operating positions to custom fit your needs, including elections and other special programs.

For all its features and flexibility, Vidifont Graphics V is user-friendly. In the studio or on the road, operation is easy and efficient. Real-time productivity is the result.

Call or write Thomson-CSF Broadcast, Inc., 37 Brownhouse Road, Stamford, CT 06902. Tel. (203) 327-7700. TWX: (710) 474-3346.

 **THOMSON-CSF BROADCAST, INC.**

Circle (69) on Reply Card

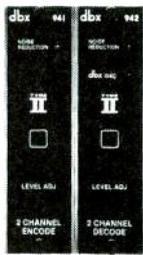
Generate excitement!



FIGHT CLEAN AND WIN. \$260*

Increased use of carts makes tape noise reduction more critical than ever in your fight to stay competitive. With dbx Type II Noise Reduction, you have an affordable way to get high quality sound whether you're into classical music or drive-time rock. Our new Model 941 offers two channels of encode, the new Model 942 two channels of decode. Combine them for simultaneous encode/decode. Get up to 16 channels in one 5 1/4" high rack mount frame. Broadcast noise reduction is the latest addition to the dbx 900 Series modular signal processors. All interchangeable, all compatible. See your dbx Pro dealer, or write for complete technical information.

*Manufacturer's suggested retail price, Model 941, Model 942, \$270.

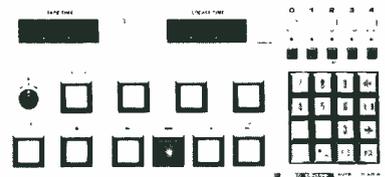


Model 941 Encoder and Model 942 Decoder

dbx, Incorporated, Professional Products Division,
71 Chapel St., Newton, Mass. 02195 U.S.A.
Tel. (617) 964-3210, Telex: 92-2522. Distributed in
Canada by BSR (Canada) Ltd., Rexdale, Ontario.

dbx®

Circle (63) on Reply Card



The Otari CB-109 auto-locator interfaces the transport CPU and makes every transport and variable speed function accessible remotely. For less extensive control capability, the CB-111 and CB-102 are available.

Continued from page 100

there is a level control plus a button to select a preset reference level. Each channel can be placed individually in the safe or record-ready mode. Selective reproduce is standard, as are a built-in monitor amplifier and speaker.

The transport comes equipped for three speeds: 7.5ips, 15ips and 30ips. The capstan motor is servo-controlled, and the reel motors are dc brush units. Variable speed with a range of 20% is standard, as is the capability of locking the transport to an external reference. Tape speed is displayed on a digital readout and may be shown either in inches per second or in percentage variation. This is handy when using the variable speed feature, along with a digital pitch-changing device for correcting the length of a spot. The pitch control is a multi-turn potentiometer.

A second digital display shows tape time, counting in either direction. The display may be reset to zero at any location on the tape. Pressing the search-to-zero button will then cause the machine to fast forward or rewind and cue accurately to the zero point.

At the left of the transport control strip is a cue lever switch. Tape can be shuttled from a slow crawl to high speed in either direction for fast access to any location. An edit switch allows tape to be dumped with the takeup reel remaining motionless. If both the play and cue buttons are pressed, the tape will be spooled at a moderate speed, producing a smooth tape pack suitable for storage.

With no tape on the recorder, there is enough space between the capstan and the pinch roller for easy threading. After the tape is loaded onto the machine, the LOAD button can be pushed to activate the first of two solenoids and pull the pinch roller close to the capstan. When the PLAY button is pressed, the second solenoid pulls the pinch roller the rest of the way, resulting in fast and quiet starts. The low noise level is a plus in a production studio.

Tape handling is smooth and precise. The microprocessor maintains correct tension at all speeds and

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Canon broadcast television lenses represent the state-of-the-art, providing an exceptional combination of advanced electronic technology, mechanical durability and optical superiority.

ABC Television has made Canon 12X and 18X Series broadcast lenses standard in practically all of their major studios and production facilities. One reason is outstanding performance: dynamic range high



sensitivity and relative aperture, and superior edge-to-edge sharpness. Another is reliability, proven day in and day out on major ABC shows and local network news.

Tune in any time to see why Canon lenses should be standard in your operation, too. Or call or write for detailed information and full specifications on Canon studio lenses. The standards against which all others should be judged.



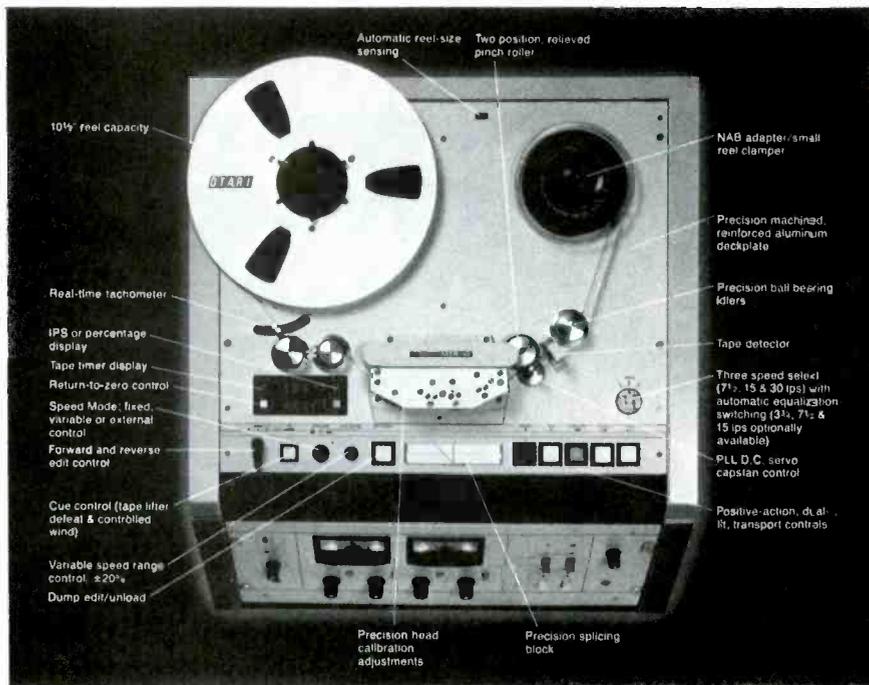
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Deck layout of the MTR-10/2 and MTR-10/4 models.

under all control conditions, so there are no worries about tape spills and damage. Braking is totally dynamic, with mechanical brakes used only when the power is off. As a result, if one reel is turned by hand, the other will accurately track it, and 1-hand cueing becomes possible. For instance, if the supply reel is turned forward with one hand, the takeup reel maintains the correct tension and the tape is actually pushed across the heads.

Other user-oriented features include a splicing block mounted on the transport and a generous supply of indicator lights, such as the record light that flashes when the recorder is in the ready mode.

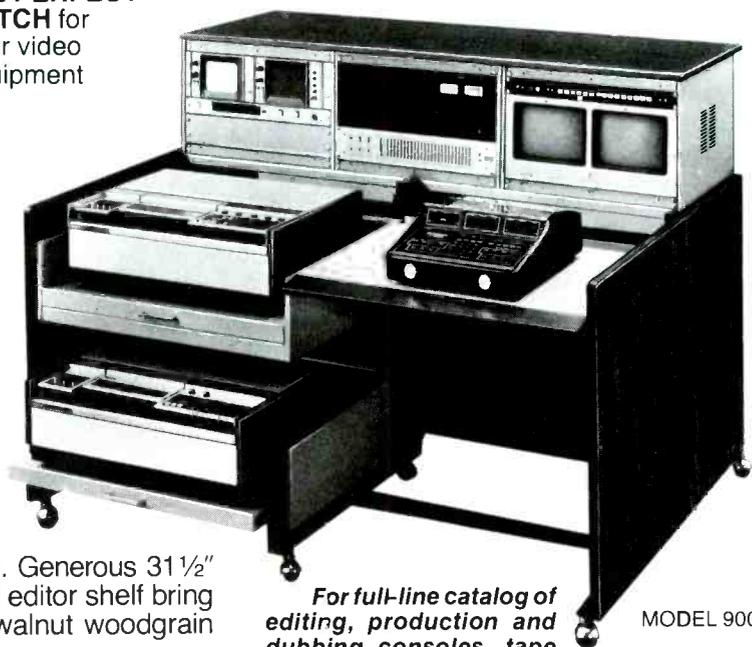
The MTR-10 cabinet design eliminates the common above-the-deck bridge location for meters and electronics. In our studio layout, this made it possible to mount equipment in cabinets over the recorder, and, thus, to use space that would otherwise have been wasted. An amazingly large amount of equipment can be reached from the operator's normal seated position.

Audio inputs and outputs are via standard professional 3-pin connectors. Remote control, for which an attractive panel is available, requires on-

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Utilizing the Pulse Code Modulation (PCM) digital process, the SV-P100 instantaneously translates musical notes into an exact numerical code, stores them on any standard VHS cassette, then "translates" them back into music on playback. Duplicate tapes are exactly the same as the original. Thus, every recording and every copy is a "master."

The revolutionary size of the Technics SV-P100 Cassette Recorder (17" x 11" x 10") is the result of state-of-the-art semiconductor technology. The built-in videotape transport mechanism brings the convenience normally associated with conventional front-loading cassette decks to a digital application. Tape loading is

completely automatic. And, frequently used controls are conveniently grouped on a slanted panel with LED's to confirm operating status.

Despite its compact size, the SV-P100 Recorder offers performance beyond even professional open-reel decks. Since the digital signal is recorded on the video track, the space usually available for audio can therefore be used for editing "jump" and "search" marks. The unit employs the EIAJ standard for PCM recording. And, in addition, editing and purely digital dubbing are easily accomplished with any videotape deck employing the NTSC format.

The Technics SV-P100 Digital Cassette Recorder is currently available at selected audio dealers. To say that it must be heard to be appreciated is an incredible understatement.

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Now there's even more to look into



TM14-9RH



TM20-9RH

Ikegami's new Broadcast Color Monitors

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

They call it the 9-Series, two new monitors (13V and 19V) with standard features that include a High Resolution Shadow Mask CRT with a Self-Converging In-Line Gun; American Standard Matched Phosphors; a Comb Filter to preserve luminance resolution; pulse cross and R-Y/B-Y outputs. We think you'll call it just what you've been looking for. Along with its streamlined design and easily serviced modules, Ikegami's new monitors follow in a tradition of excellence. Each offers high stability, exceptional performance and proven reliability. Together with Ikegami's Delta-Gun Series, the 9-Series provides yet another reason to look into the monitors that more and more video users are spending their time looking into. Isn't it time you looked into Ikegami monitors?

Ikegami

9-Series monitors

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

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Part of the General Instrument Assembly Division at Quantel's Newbury plant.

Corporate profile: Quantel

By H. A. Cole, British correspondent

Although not yet 10 years old, Britain's Quantel company has an international reputation. Its name is derived from "Quantised Television." Quantel is one of six companies in the Micro Consultants Group, and their combined expertise in computer programming, data acquisition and complex electronic systems for the professional user has produced many technological achievements in such fields as radar, offshore oil exploration, medical research and TV broadcasting.

Quantel was formed in 1973 to concentrate on the development and exploitation of digital techniques for TV studio and broadcasting equipment. Since then it has been the recipient of many national and international awards for technological progress, including the Montreux Achievement Gold Medal and the coveted Emmy from the National Academy of Television Arts and Sciences.

Based in Newbury, about 50 miles west of London, the Quantel engineering facility is located in a recently completed building developed from a factory that once manufactured the World War II Spitfire aircraft. There

is a staff of about 200, of which 160 are qualified engineers. The company had a net turnover of £10 million in the financial year 1980-81, and more than 90% of its output was exported.

The company manufactures a wide range of portable frame store units that allow broadcasters and program producers to interact with material originating from videotape—or directly with live pictures from any TV standard—and to introduce picture manipulation to that material during transmission or at any time during its production.

Electronic art

The company's digital Paint Box was exhibited for the first time at NAB-'81. In essence, the Paint Box provides artists or graphic designers with a large touch tablet simulating the drawing board or canvas, a TV monitor on which the picture being created is displayed, and a hand-held stylus that may be used as a pencil, a crayon, a paint brush or an air brush with choice of head size. The stylus even provides the sensation of feeling so that the harder it is pressed against the touch tablet, the thicker is the area

of the paint applied.

An electronic palette gives artists a choice of 20 basic colors that may be used directly, or that may be mixed in a separate area to make a variety of colors. Twelve empty electronic paint pots are provided, which artists can fill up as their work progresses. This is useful because it allows artists to put complex colors to one side for use later. And, of course, the *paint pots* never dry out and are inexhaustible.

The Paint Box is also useful for retouching real video pictures captured from a transmitted program or from the Quantel digital library system, or retrieved from the Win-

Editor's note:

Last year we began a department of *journalistic plant tours* and *corporate profiles* to let you see some of the staff and facilities of companies manufacturing equipment for broadcasters. We included response numbers and our readers voted for us to continue such coverage.

This article, prepared by one of our sources in England, allows you to *walk through* Quantel's pioneering facilities. This information is provided as a service to BE readers who may or may not be able to take an actual plant tour. We plan to *tour* other facilities as time and space permit. If you would like to see a particular organization included, write and let us know.

FM BROADCASTERS, IS YOUR SIGNAL REALLY ON TARGET?

You know your market numbers, and the demographics that tell you where you should have your best signal coverage.

That's good, because your competition knows them too.

But, are you certain that you're delivering every watt into those numbers? Do your field-strength numbers raise a few doubts? And, what about the quality of your station's sound? You've spent all that money on the studio equipment. You've fine-tuned your transmitter. Great. But those improvements really don't count for much if your programming is hitting the open pastures while your competition is zeroing-in on the key demo sectors. This is where a CETEC FM Antenna comes in.

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Because your market has changed since your antenna was first put into service, or it's come time to directionalize, it makes good sense to look into the benefits of upgrading with CETEC ANTENNAS. Here's three different ways:

1. Our Pattern Optimization Service;
2. Directionalization on any of our standard antennas;
3. Upgrading to our patented Series JSCP antennas.

With pattern optimization, we can give you more uniform coverage and better signal quality. Typical nulls and peaks can be virtually eliminated. All of our work is done fullscale to eliminate errors too. Parasitic elements are precisely determined on a custom basis for your particular site. When you optimize your signal our way, you optimize your market reach and penetration—your way.

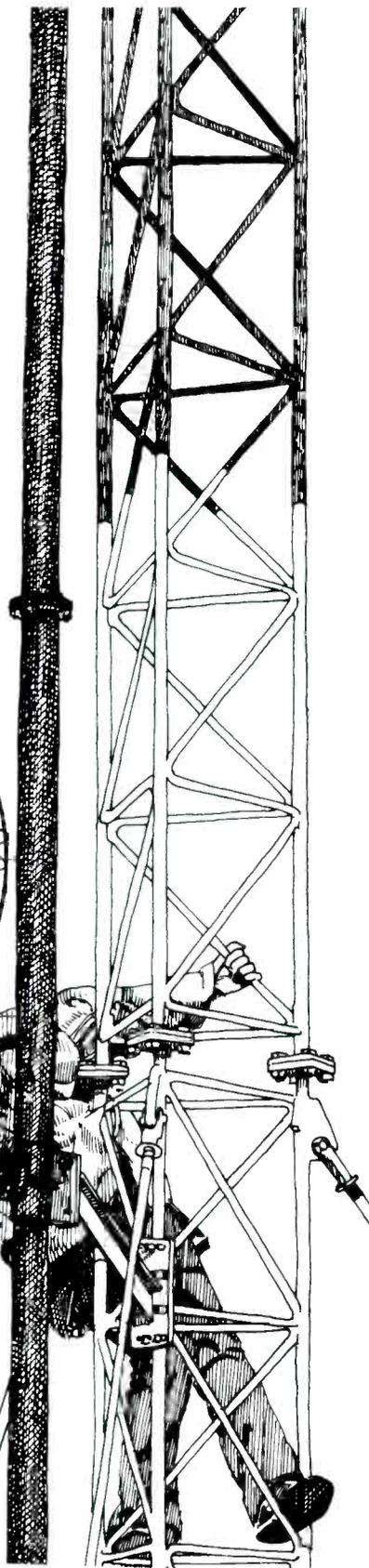
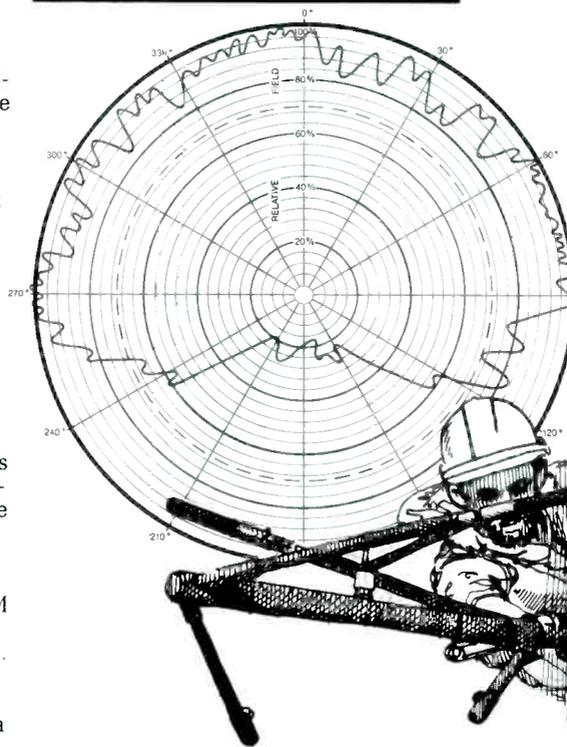
Cetec Antennas meet FCC requirements for directionalizing. With us, FM antennas aren't a sideline. All of our FM's are CP and can be directionalized. From 4KW to 360KW, one bay to large, multiple bay systems, we're one of the largest suppliers to the industry. With a CETEC directional, we can place your signal right where you want it.

By originally specifying or upgrading to CETEC, you get more than 20 years proven experience in engineering capability that has delivered more than 900 FM antennas. With us, you also get factory tuning to start with—on a "customer" structure, a fully-tested antenna at our year-round range. This helps when you need fast delivery. We really move on free price quotations too.

When you're up and running with a CETEC antenna, we won't disappear either, so we offer a two year material and workmanship warranty.

Whichever program you choose, there's no obligation for complete technical information.

If you're the least bit concerned that your station may not be hitting the bullseye, then let us do a number for your numbers. Let us show you how we can give you—THE EDGE IN COVERAGE.

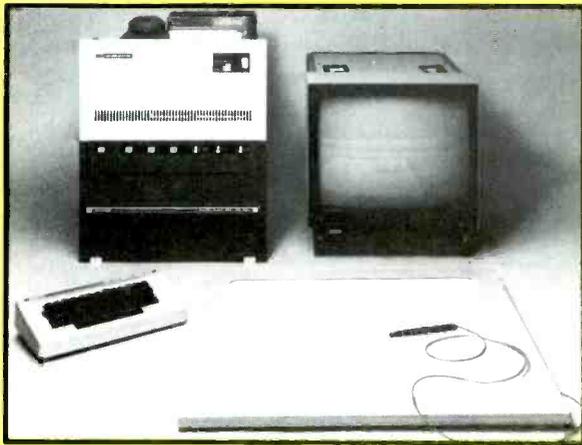


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The digital Paint Box generates paintings and graphics by electronic means.

Behind every great camera is a great battery



Ikegami ITC-730 Camera

The Ikegami ITC-730 camera is yet another example of the Ikegami commitment to the highest standards of both quality and performance, combined with economy never-before-seen in a 3-tube prism optics camera.

Designed to satisfy the needs of industrial, cable and broadcast users, the Ikegami ITC-730 camera features the highest quality internal components available, low noise with high sensitivity, and an optional character display for function status readout. The ITC-730 is system compatible, shoulder molded, and well balanced—and can be purchased for under \$10,000 complete with lens and Anton/Bauer battery.

Ikegami engineers realize that the battery is an integral component of the camera system. After designing a camera as reliable as the ITC-730, Ikegami required



the highest quality, most reliable battery available. They chose Anton/Bauer.

In fact, Ikegami and every other camera manufacturer feature only Anton/Bauer Snap-On™ battery systems as standard equipment for all of their professional cameras.

Don't compromise your great camera by using anything less than Anton/Bauer.

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chester disc library of 160 pictures, provided as part of the Paint Box system. Color matching under these circumstances is guaranteed, because the artist can fill up a paint pot with a sample from the color to be matched taken from the actual picture presented on the monitor. The Winchester disc library also contains a variety of high quality fonts for character generation, and these may be repositioned, resized or reoriented to allow the artist to create an attractive composition. He can even cut and paste, as though using Letraset materials. If the artist is not satisfied with what he has created he can immediately erase some or all of the picture and restart within a few seconds. The Paint Box provides, in one small machine, all the artistic facilities normally found in a large graphics studio.

The company's digital Library System is a compact electronic system for storing and presenting still TV pictures. It was developed by Quantel as an alternative to the more expensive, more vulnerable and less versatile 35mm slide library. The system may be used to capture pictures from an incoming TV signal or to insert an infinite number of Library System pictures or captions in a live transmission. The pictures recalled from the library store may be selected to be of any size and aspect ratio—with or without colored borders—and may be positioned at any point on the screen. They may even be retouched by using the Paint Box.

The system might be used, for example, as a sports commentator describes the line-up for a ball game. As he introduces the players' names and biographical details, their pictures—from the library store—can be made to appear, one at a time, on a suitable background until the whole team is displayed.

The basic library store memory is a standard Winchester-type computer disc. By operating a number of these together it is possible to store many thousands of pictures, captions and symbols. A novel tape backing store, with digital data transfer, makes it possible to provide infinite capacity by adding an ordinary videotape recorder.

One of the many interesting and useful features of the system is a browse facility. In the selective browse mode, a particular subject is called up by name or category, and an automatic search of the disc contents for a suitable picture is initiated. In the random browse mode, groups of pictures are presented to the user, 16 at a time, in a slow vertical scan for the picture tube as the contents of the disc are examined.

An excellent demonstration of the

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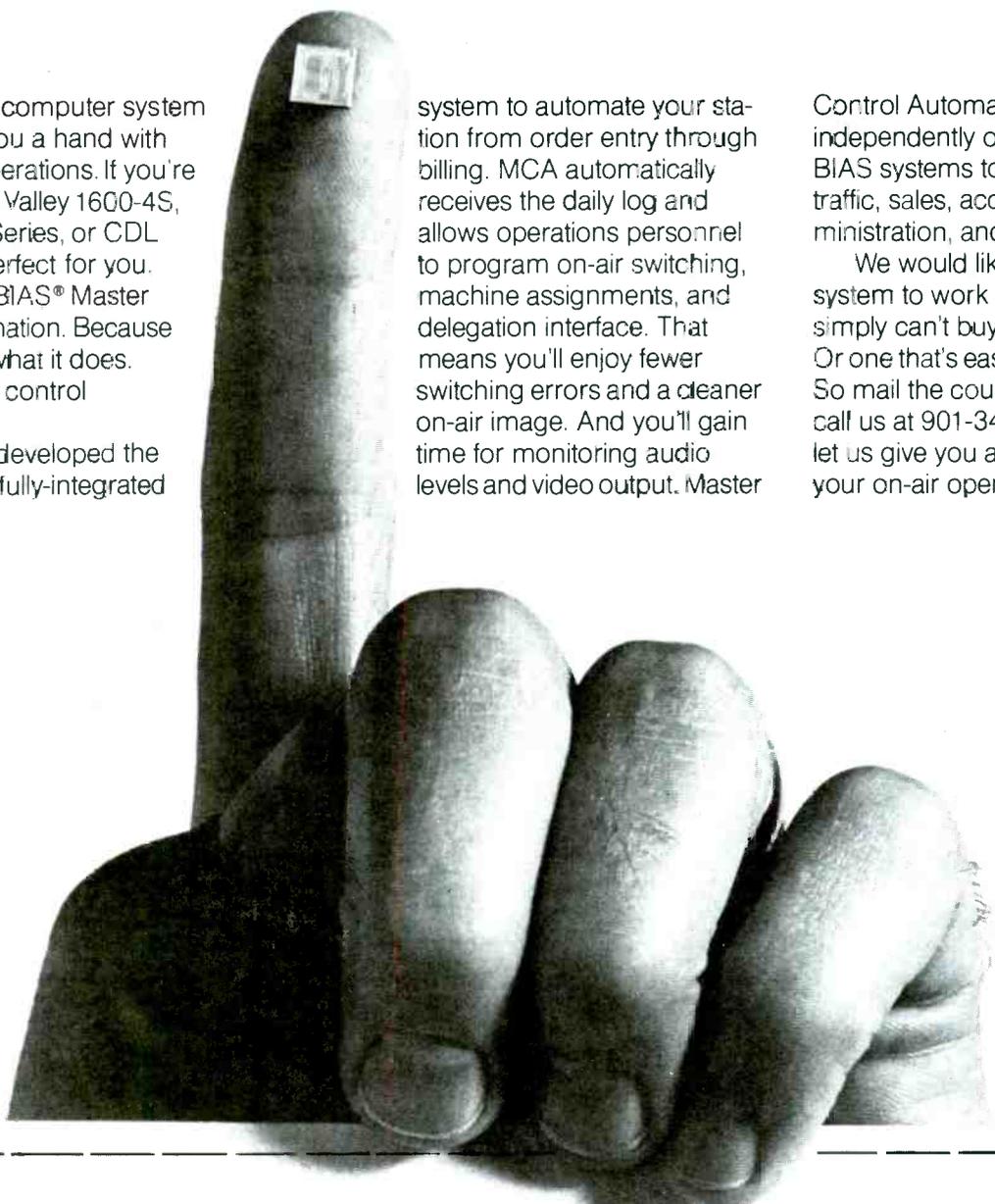
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usefulness of the system occurred during the Royal Wedding in London last year, when the ABC network used it to capture still pictures from live video feeds supplied by the BBC and ITV. After PAL-to-NTSC conversion in a Quantel digital standards converter, the captured pictures were cropped and repositioned to form a montage that was then beamed across the Atlantic along with live picture sequences.

Special effects in television and the motion picture industry have long been important in establishing the mood of a production or event, or simply in adding a degree of realism that otherwise might be impossible or prohibitively expensive to achieve. For example, President Reagan standing alongside members of the Soviet politburo atop Lenin's tomb observing a May Day parade in Red Square, may sound far-fetched. But by using modern special effects technology such a picture is feasible without the need for expensive models or shouts of "nyet" from Moscow.

In a less frivolous vein, special effects allow the viewer simultaneously to observe the newscaster and a pictorial presentation of the event he is describing, or to observe the looks of concentration on the faces of John McEnroe's parents as their son struggles for the Wimbledon championship on the center court.

Special effects allow a gradual dissolve from one scene to another without an abrupt transition that destroys the mood, or the rotation of an unconscious pilot as his aircraft spins out of control toward the ground.

There is nothing new about the use of special effects in the TV and motion picture industries, but what is new—and of outstanding value to the TV producer in particular—is the superb quality of the effects now available, the ease with which they can be employed and the low cost of producing them.

Quantel's digital production effects system, for example, can freeze, compress, expand, tumble, spin, reposition, push and pull, pan and tilt, add borders, automatically track key areas and fit compressed pictures into slots—all during live transmission or in post-production. The system can simultaneously display five separate images, each having its own frame store with independent manipulation.

A particularly useful feature of the Quantel effects system is the push-switch operated Shot Box. This is a replay only control panel that gives the user a choice of 70 different moves and access to 700 operator recorded or factory preset effects stored on floppy disc. In the autoflex operating

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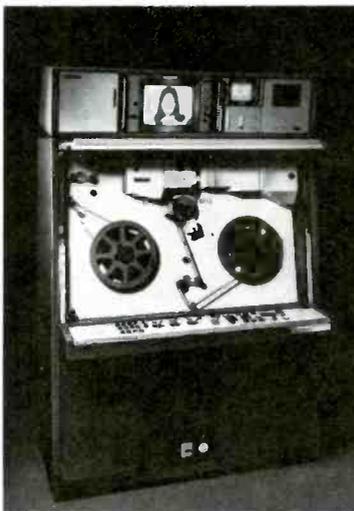
The reasons are simple. The Marconi B3410's fully digital processing and CCD image sensors deliver an extraordinarily true video picture. And the Marconi B3410 does not require time-consuming tweaking, day-to-day adjustments and set-up arrangements that rob you of valuable hours of productive work.

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!

For more information on specifications, costs and delivery, contact Richard Lunniss in New Jersey (201) 767-1000 or Noel Parente in California (213) 466-5066.



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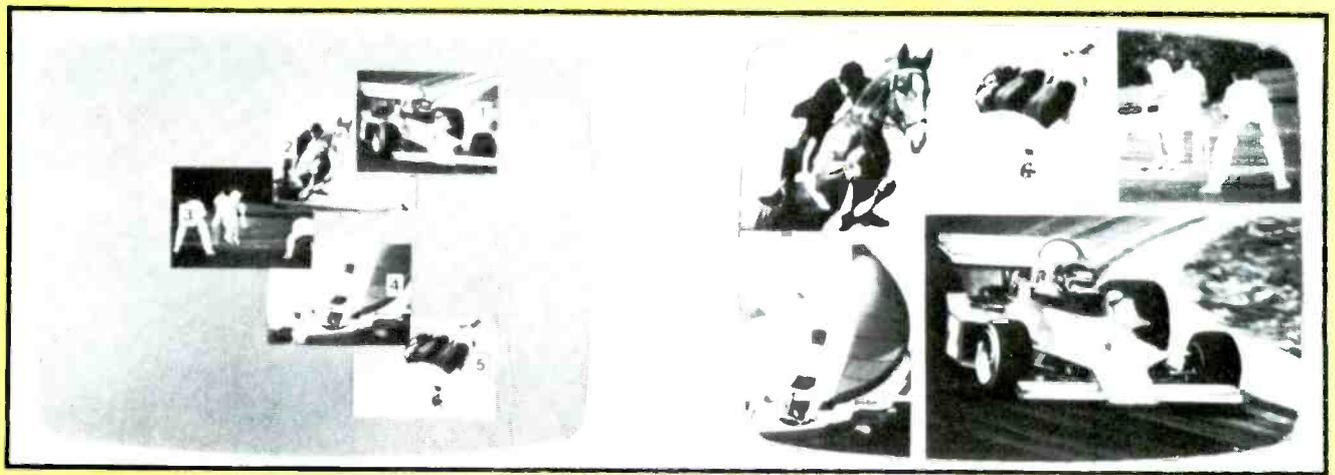
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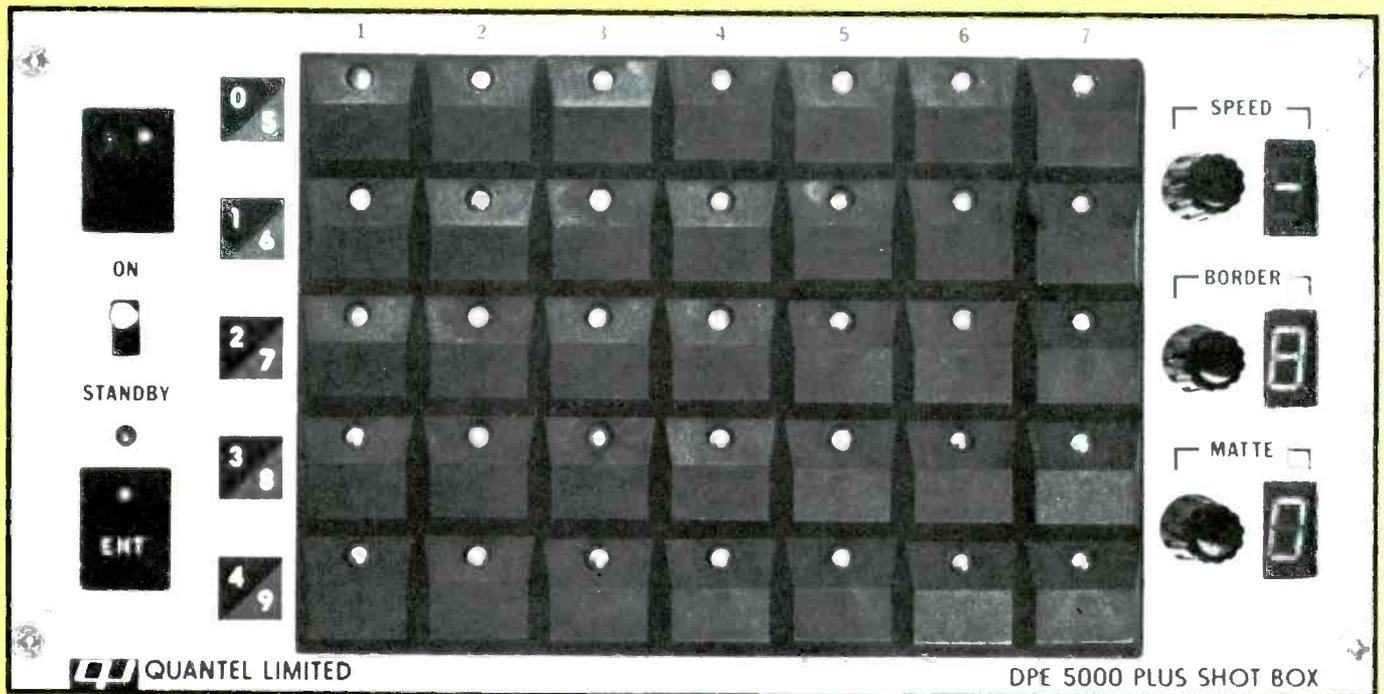
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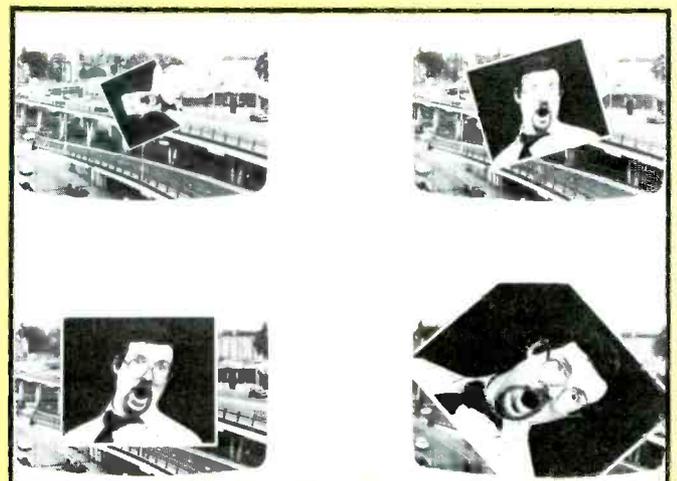
Quantel's digital production effects system can display five separate images at the same time.



The push-switch operated Shot Box is a replay-only control panel that provides access to 700 effects stored on a floppy disc.



With the digital Library System, pictures of an entire team can be superimposed on a suitable background.



The picture rotator facility smoothly rotates pictures of any size or shape in either direction around a given point.

Consistent Quality.

Select your routing switcher and distribution amplifiers as if your reputation depended on their stability . . . because it does.

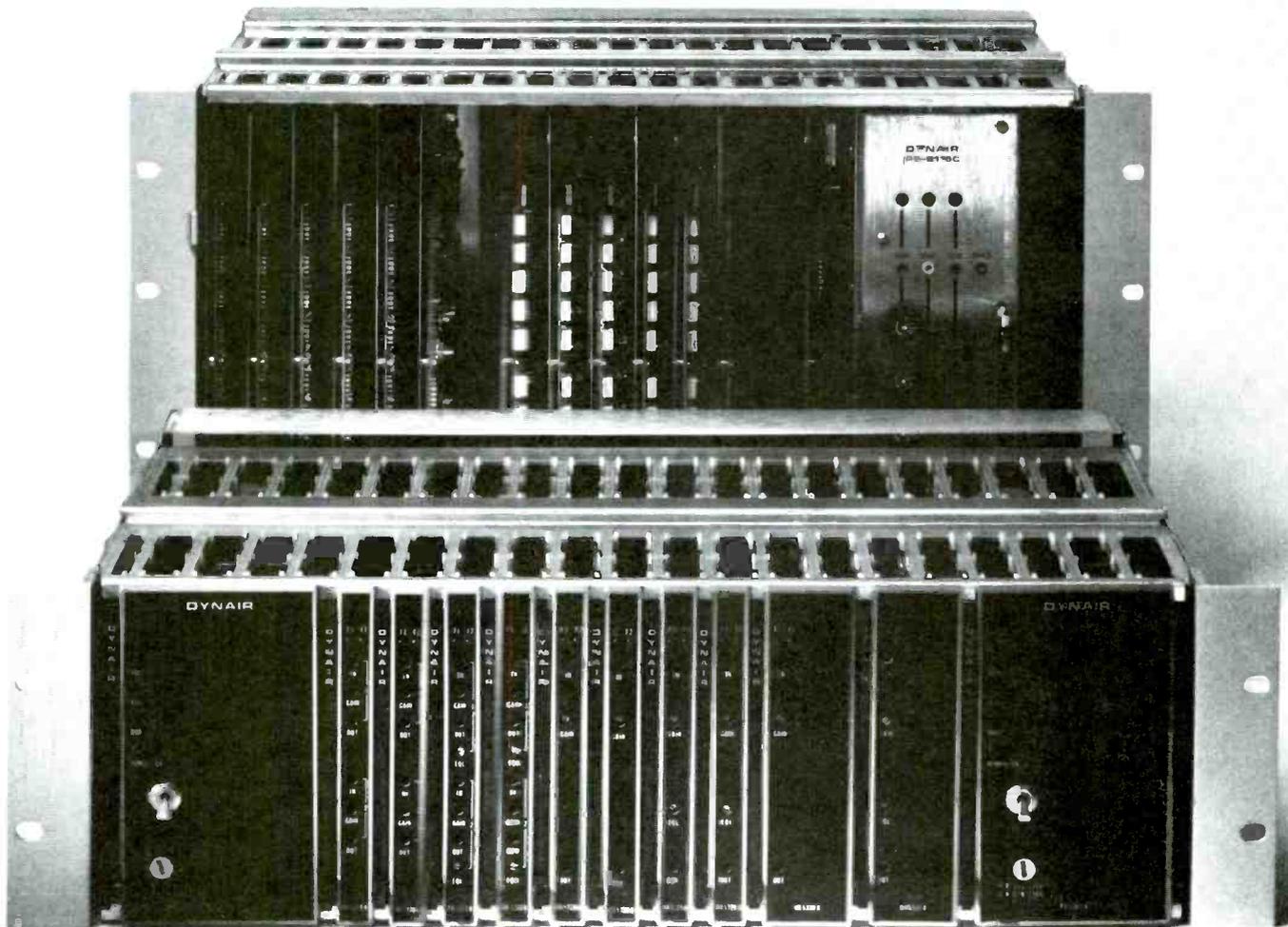
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Because Sony probably has more experience selling and servicing 1" VTR's than anyone else, we're in an unequalled position to understand the wishes of 1" video users.

And now, Sony announces with fulfillment for the broadcast industry: the new BVH-2000 1" video recorder.

WHY "BVH-2000" WILL MEAN DIFFERENT THINGS TO DIFFERENT PEOPLE.

In broadcast recording, there is no such thing as one typical situation.

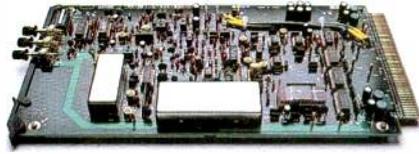
That's why there's no one single BVH-2000.

The BVH-2000 actually allows you to "design" the VTR you need for your own particular applications and budget.

You can choose among three different control panels—ranging from a basic model to one with virtually every possible feature and function.

And the tape transport system, signal system, and control section can either be combined into a single unit, or separated easily and installed in a 19" rack or console.

The BVH-2000 also gives you far greater latitude in setting up your entire recording system. Various remote-control connectors enable you to interface your system in a variety of ways for studio, mobile, and editing configurations. Direct interface with U-matic™ and Betacam™ is possible, too. The BVH-2000



A range of plug-in accessories is available.

also has an optional plug-in time base corrector.

What's more, the BVH-2000's lighter weight and smaller size (almost 50% less than its predecessor) make it as ideal on the road as it is in the studio.

And because of the ever-increasing number of applications requiring longer program times, the BVH-2000 provides up to 2 hours of tape time.

A VTR THAT LEADS THE SIMPLE LIFE.

In the BVH-2000, unlike most other VTR's, microprocessors are used to their full advantage. All data necessary for servo control are channeled into a central processing unit, making the operator's control over all systems and functions simpler and more precise.

Life is made simpler yet by the fact that every necessary function control, metering facility, and electronic module is accessible from the front.

Even the way the tape moves through the recorder has been simplified. One innovation—an extremely precise servo mechanism



The BVH-2000 (shown with Type-III control panel).



Front access to all electronic circuits and modules.

—permits the entrance and exit guide posts to move about 10mm away from the drum during threading. The result is the easiest threading system ever in a 1" video recorder.

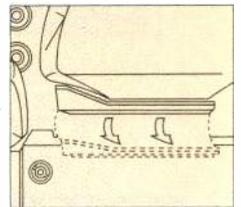
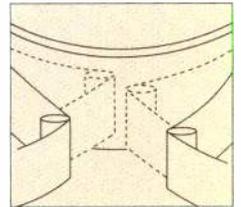
THE MOST ARTICULATE VTR EVER BUILT.

The BVH-2000 removes much of the mystery from maintenance, too. It literally tells you about malfunctions—usually well before you'd notice them yourself—through a microprocessor-governed self-diagnostic system.

The system includes various alarm functions and numerous checks to confirm that everything is working properly.

Most defects can be easily found—allowing for far less complicated maintenance and repairs, and reducing downtime considerably.

And because the best way to simplify maintenance



To simplify threading, guide posts automatically move away from drum, and audio head cover opens.

is by lessening the need for it, the Sony BVH-2000 has been designed to be virtually maintenance-free down to the last detail. For example, only brushless DC motors are used, and all incandescent lamps have been replaced with high-brightness LED's.

Other welcome advances include a greatly expanded dynamic tracking range (from reverse at normal speed to forward at 3 times normal); programmed play (allowing you to vary playback speed across a range of ±20% of normal speed); and video and audio confidence.

Remarkably, these are only some of the Sony BVH-2000's innovations. All of them add up to form the answer to virtually every need ever expressed by the users of 1" video.

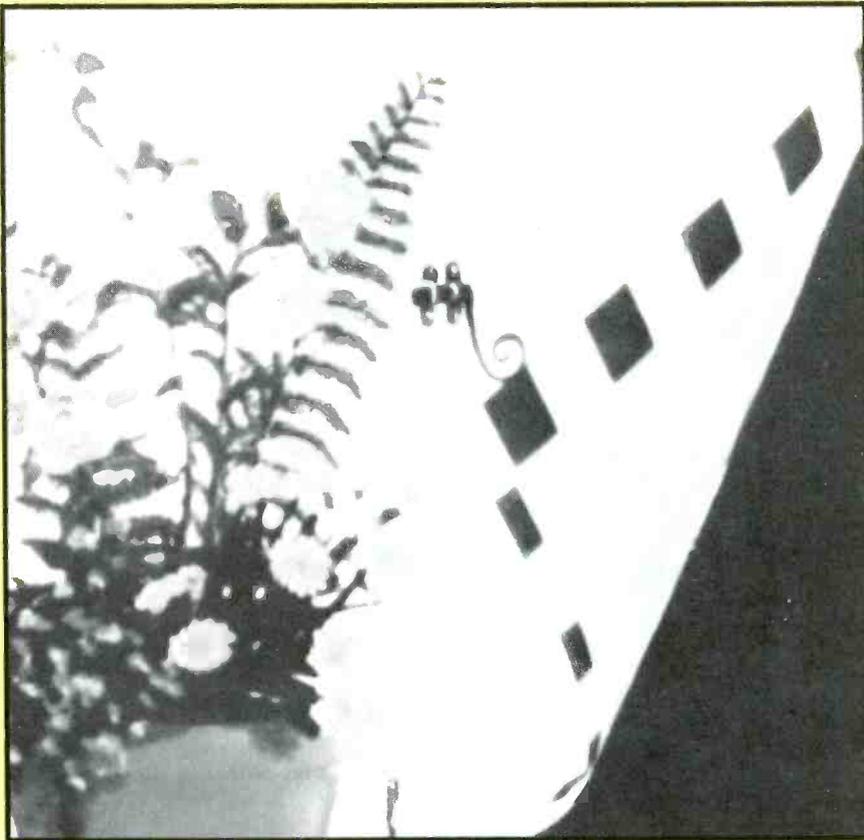


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Mirage is the latest in Quantel's range of digital picture manipulators.

mode, the picture can be changed slowly from one shape to another, with or without ripple modulation. Use of the picture rotator, on the other hand, smoothly rotates pictures of any size or shape in either direction around a given point, and at variable speeds around a full circle.

One of the most remarkable special effects available in the Quantel system is the electronic zoom. This facility allows any selected part of a captured frame to be expanded as a smooth transition in exactly the same way as would be done optically with a zoom lens. An interesting demonstration of this useful facility occurred during the Royal Wedding. An unexpected kiss on the balcony of Buckingham Palace was recorded from a live transmission by a BBC news team and was expanded and reframed using Quantel equipment to be broadcast that evening as a close-up.

The Mirage is the latest in the Quantel range of digital picture manipulators and was demonstrated at the NAB exhibition in Dallas. It makes it possible for a picture to be turned over in the same way as a page is turned, by lifting one corner, and even allows a different picture to be seen emerging on the other side of the

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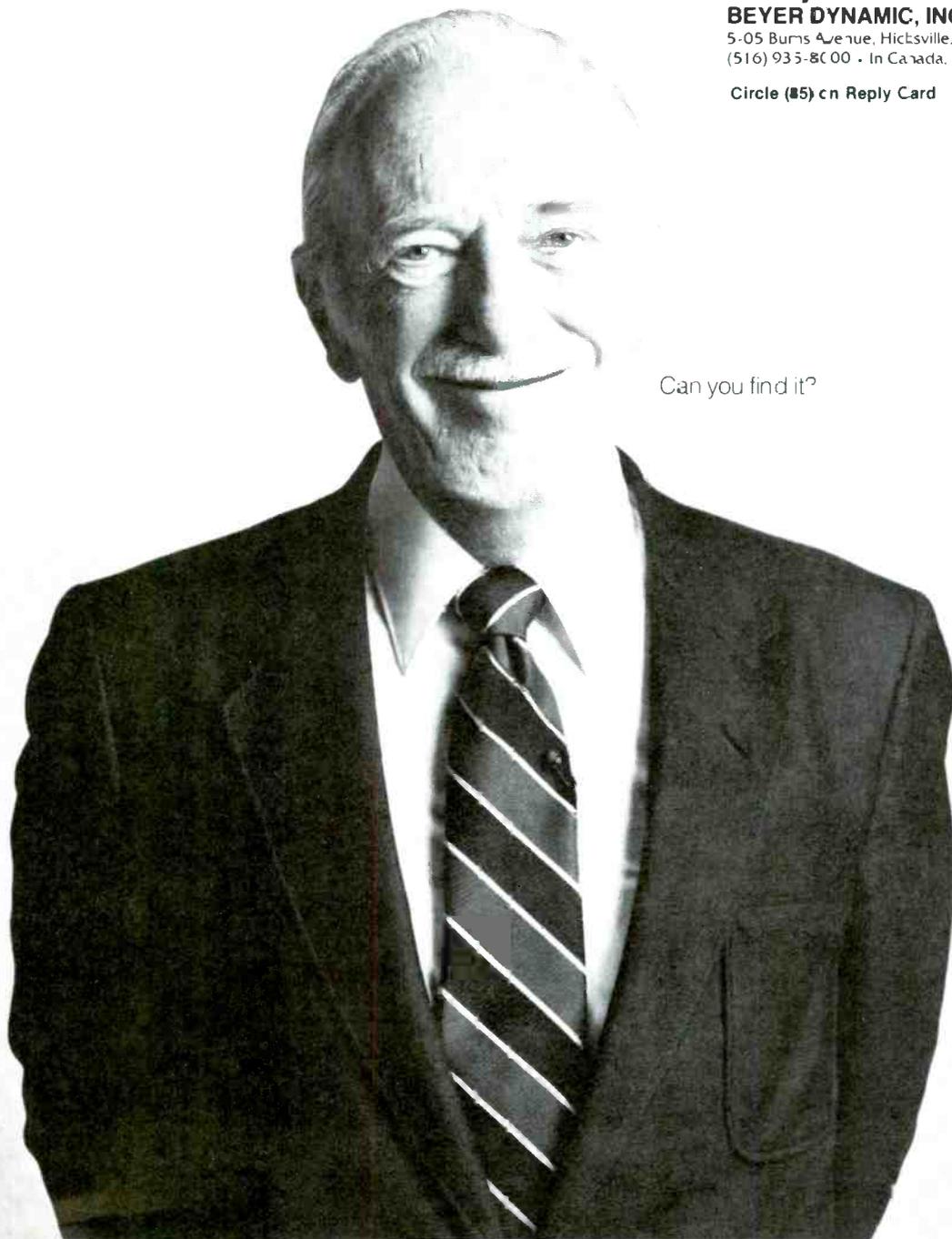


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page. It is also possible for a picture to be swirled like a whirlpool or rolled into a hollow cylinder or globe and rotated so that it can be viewed from any angle. Mirage allows special effects to be conceived and programmed without tying up the main machine.

Standards conversion

The need of the international TV broadcaster to convert program material from one standard to another without loss of picture quality was recognized by Quantel many years ago and resulted in one of the first standards converters. The company's

bi-directional converter is a transportable type only 12¼-inches high, but it can convert between PAL, NTSC and SECAM with automatic recognition and selection of the incoming standard.

The converter is self-contained, with its own power supply and ventilation system, and can be used as a stand-alone item or housed in a standard 19-inch rack. Extensive use of VLSI and microprocessor control has resulted in a number of useful features, including picture freeze, adjustable movement interpolation, a noise reduction system—which can be used to clean up a noisy signal with or



The electronic zoom produces the same effect as an optical lens, and any part of a captured frame can be expanded as a smooth transition.

without standard conversion—and a unique overscan facility. The latter corrects overblanked inputs and unwanted edge distortions caused, for example, by U-matic head switching. This feature is of particular importance when it is necessary to meet the strict blanking limits demanded by the FCC.

Quantel's unidirectional digital standards converter is portable. It stands only 8¾-inches high and is said to be the smallest converter in the world. In addition to being able to convert high quality broadcast inputs, and possessing the usual Quantel overscan, noise reduction and picture freeze facilities, the converter can handle non-timebase-corrected signals directly from ¼-inch recorders. Plug-in boards select between PAL, NTSC and RGB inputs and outputs.

Any review of Quantel's products must include its digital framestore synchronizers, which can accept any asynchronous broadcast signal—even from ENG videotape recorders—for synchronization to a local station output without need for reverse feed or gen-locking techniques. Then there is the recently introduced digital audio synchronizer, which restores sound synchronization to video signals that have been delayed by use of framestore products.

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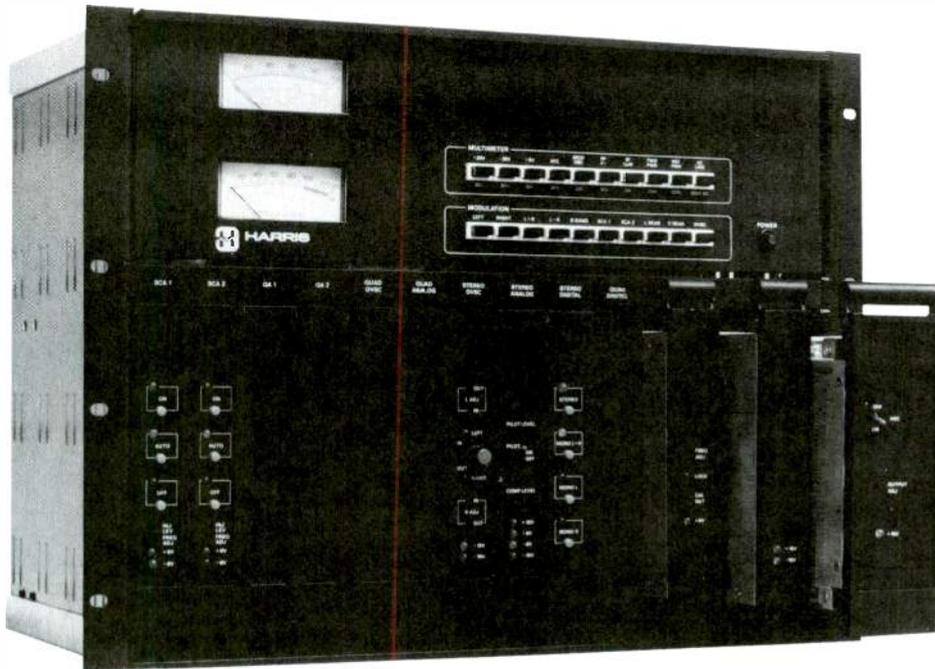
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DBS, cable and teletext/viewdata:

A UK update

Electronic communications are advancing rapidly in Great Britain and the rest of Europe. The author takes a brief look at some of the action in direct broadcast services, teletext and viewdata.

By Michael J. Adams,
British correspondent, United Kingdom

The expected announcement has been made in the British Parliament giving the go-ahead for direct broadcasting by satellite (DBS), and with it came a promise of a further statement on the future role of cable systems in transmitting these and other signals. The next development was the announcement of an agreement to form a company with a budget of £150 million to provide Britain's first national broadcasting and telecommunications satellite system. It is also a world first for direct-to-the-home satellite TV broadcasting.

The new company, to be formed jointly by British Aerospace¹, Marconi² and British Telecom³, will be named United Satellites. It proposes to construct three satellites based on the proven European Communications Satellite design. Two will be launched—one as the active bird with the other an orbital spare—while the



This high quality picture transmitted by BBC-enhanced Ceefax represents an active picture size of 702x576 pixels.

third will be kept as a ground spare. Because the launch is scheduled for 1985, when Halley's Comet will make its next transition, the bird has been named Halley 1.

The company has investigated the potential markets, as well as the technical and operational requirements, for broadcasting and telecommunications in the short and long term.

Discussions with the BBC⁴ have already produced proposals for two of the five TV channels that can be provided. One would be a subscription service, and would have a substantial element of feature films and major sporting, cultural and other events not presently available for transmission by the BBC. The other channel would draw on the best programs from around the world.

There seems a good chance of a 2-channel service starting in 1986. Market research carried out by the BBC has shown that about 10% of households would install individual DBS receivers by 1990.

Reception

The primary footprint of the satellite will cover the United Kingdom, with some overspill, and a 3-foot, 3-inch dish antenna will provide satisfactory reception. It is proposed to use dishes 13 to 16 feet in diameter for the telecommunications traffic, which will account for a third of the satellite's capacity. Dishes of this larger size will probably give reception of the DBS signals over most of Europe.

However, the report on cable systems prepared by the British Government's Information Technology Advisory Panel has produced findings that cut across the predictions and plans of the DBS lobby. The report concludes that there are powerful economic and industrial arguments for encouraging the installation of cable systems in the United Kingdom. It estimates that it could cost some £2500 million to provide cable services to half the homes in the country—those in urban areas. All of this could come from private sources if current restrictions on the programs

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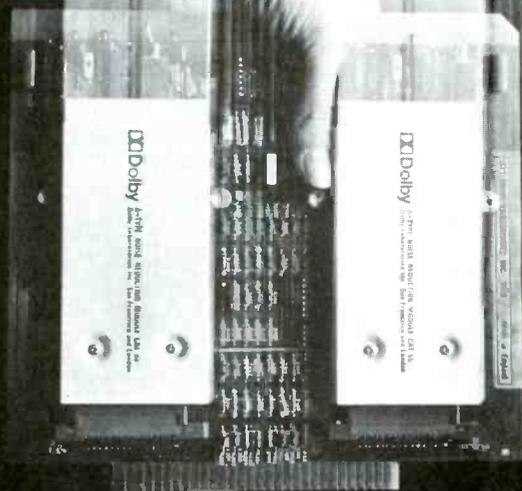
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that can be transmitted by cable were lifted. In that case no large direct public expenditure would be necessary.

The panel pointed out the desirability of new cable systems being in operation before the satellite broadcasting services start in 1986 because cable systems could provide many subscribers with a more convenient and cheaper means of reception than an individual dish antenna.

Although the panel agreed that cable systems will go through an initial phase when their attraction will be based on entertainment considerations, they expressed the view that the technical specification of new cable systems should not preclude the transition from this initial phase to a subsequent phase when cable will provide a full range of interactive services.

ISDN

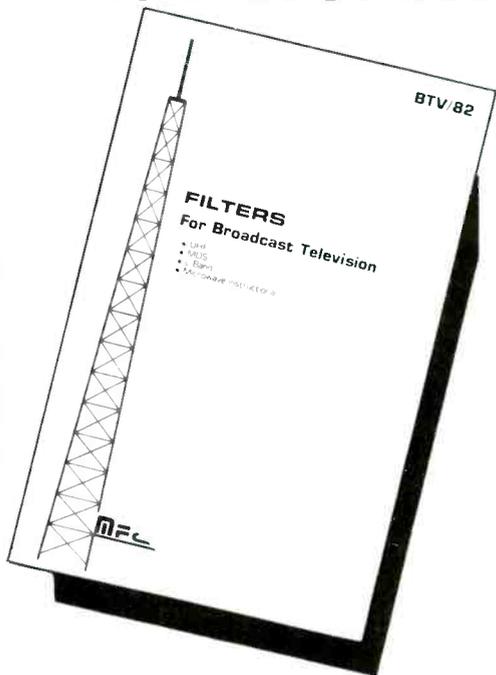
In due course, these services could compete with a number of the services that can be carried by the Integrated Services Digital Network (ISDN). When this becomes available, a quarter-frame-size, full-resolution, Picture Prestel picture will be transmitted in one second because of the 64kbit/s data rate that will have replaced the



The General Electric Company's Datacom 3000 data display executive telephone incorporates viewdata facilities and repertory dialing.

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1200bit/s currently used.

However, before that occurs Prestel⁵ will have had plenty of time to become solidly entrenched by offering a wider range of services at a more competitive price.

It has already completed its software and installation work for the provision of a Gateway service that links the Prestel user to external private computers. British Telecom's X.25 (Switchstream) packet switched service will enable any Prestel user to access large databases whose storage on Prestel would not be economic, computer services requiring real time calculations, databases using keyword search facilities, and other real time and personal services such as home shopping and home banking.

Closed user groups

Another area where British Telecom has strengthened the position of Prestel is in Closed User Groups (CUG). This is the Private Prestel facility that allows an organization to run its in-house view-data communications system using Prestel. British Telecom has made a substantial improvement in the tariffs—a reduction of 90%—and has dramatically increased from 50 to 32,000 the number of CUGs that can be accommodated.

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There has already been a considerable amount of interest in Private Prestel because of its ability to broadcast information quickly, securely—outside access is barred—and cheaply to dispersed offices, agents and itinerant staff such as field sales personnel. They, in turn, can use its interactive capability to send messages and orders to head office for immediate attention.

The facility is also used by a wide range of information publishers who have chosen to market their specialist database pages on a subscription basis. With the price of the Private Prestel facility being only £250 a year per closed user group over the normal fees paid by organizations that are Prestel information providers, these publishers now have greater scope for their work.

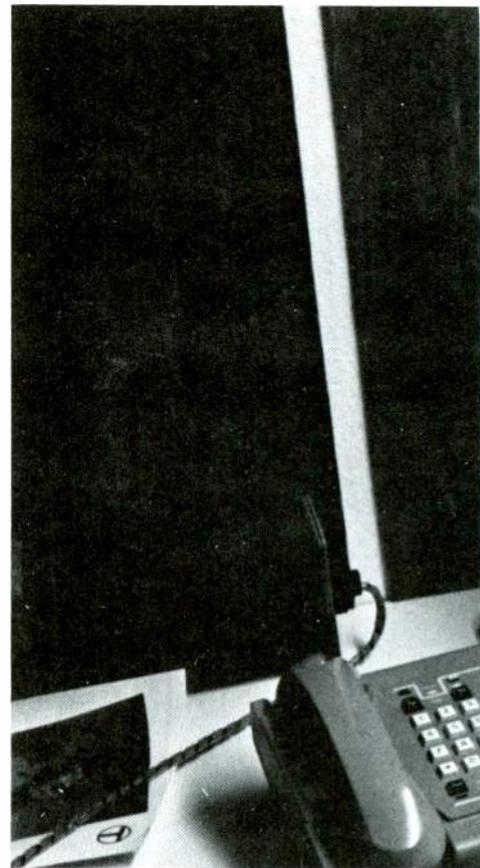
Prestel's Gateway is being demonstrated at the 1982 World's Fair in Knoxville, TN. There are about 200 Prestel terminals on the site, and in adjacent hotels, banks and transportation terminals for use by the public. The bank-at-home demonstration is the first in the United States to use Gateway technology, and is a joint venture by Financial Interstate Services (formerly United American Services Corporation) and British Video-

text and Teletext (BVT)—which has an office in Arlington, VA—in cooperation with British Telecom and GEC Computers Ltd[®]. The latter has supplied the dual GEC4082 computer system upon which the system is running.

The special database required for the project was developed by Financial Interstate. It includes event schedules, information about the fair, and banking, shopping and message demonstrations. Following the World's Fair, Financial Interstate will market the Prestel-based bank-at-home product to financial institutions throughout the country. Such a service is considered crucial to the future of banks in the United States because it will reduce substantially the cost of individual transactions now handled on paper.

Direct sales force

Prestel has also mounted a marketing thrust on the home front. It has appointed Telefusion, a national TV rental and retail company operating from 150 showrooms throughout Britain and Northern Ireland, as the supplier of viewdata equipment that will be sold by the new Prestel direct sales force. The range will include complete TV receivers as well as adapters and peripheral items.



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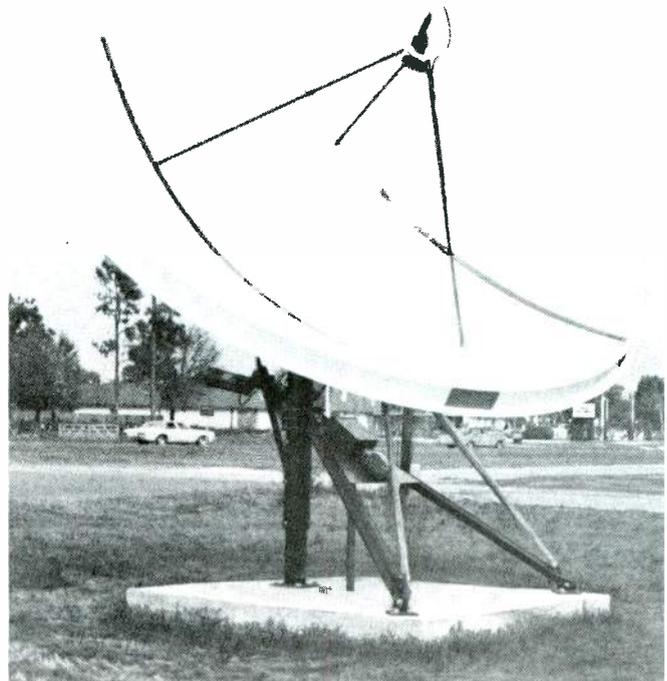
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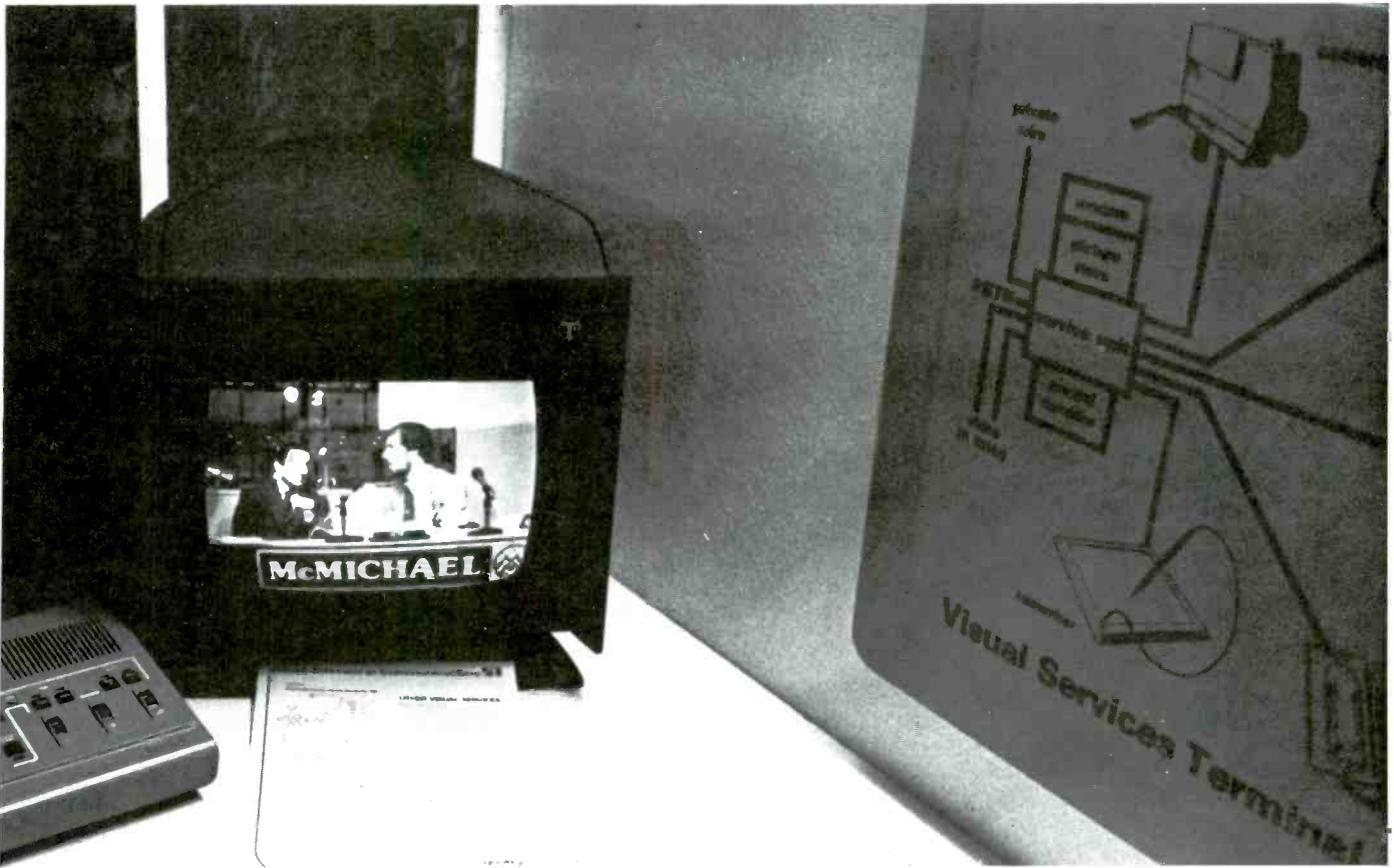
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The videoconferencing room on the British Telecom stand at the Communications '82 exhibition.

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The sales force, which is being set up to exploit the specialized market sectors open to Prestel's information and communication services, will be fully operational shortly. It will work closely with the product marketing managers responsible for the travel, investment, closed user group and other specialist services that are bringing new business to Prestel.

A data display telephone that combines an executive push-button telephone with the facilities of a VDU in one compact case has recently been shown by another General Electric Company subsidiary, GEC Information Systems Ltd. It is being manufactured in small quantities for the company's ongoing development and commercial evaluation program. Designated the Datacom 3000, it can be connected to a local computer via a V24 interface, or via a built-in modem and telephone line to a remote computer such as Prestel. A standard viewdata format of 24 lines with 40 characters per line is provided, operating at the usual 75/1200 baud data rate. When the V24 interface is used, simultaneous viewdata connections and telephone conversations can be made. The telephone portion incorporates a 10-address short code store, and its contents can be displayed on the screen.

This equipment was shown at the recent Communications '82 exhibition, where visual teleconferencing was also demonstrated. A live link between the booth of British Telecom and McMichael⁷ showed the feasibility of the concept. McMichael, working in close conjunction with the Digital Television Group at the British Telecom Research Laboratories, has developed under contract a variety of equipment for visual services.

User trials

These include coding and transmission processing units for both 2Mbit/s digital and 1MHz analog operation, and a 2Mbit/s visual teleconference user trial that began in August. It is envisioned that this trial, which will last about a year, will have 25 companies participating in a 50-terminal network. It is aimed to implement a full service during the latter part of 1983.

In parallel with the UK user trial, European trials will take place employing satellites under the aegis of CEPT.

It is anticipated that encryption for privacy will be available within a year, and that a 1.5Mbit/s, US compatible color code will be available this year.

Although considered by many to be the poor relation of viewdata, teletext

is attracting a great deal of interest because of the opportunities that it brings and the large potential audience. It is understandable, therefore, that the BBC should be closely involved in research and development to provide enhancements to the available facilities.

The BBC recently made the first public broadcast of high quality still pictures by means of its Ceefax teletext system. This was demonstrated to an EBU technical committee, and at a meeting of the Institution of Electrical Engineers, along with other enhancements including improved graphics, redefinable character sets, more readable character fonts, linked pages and broadcast computer software (see **BE**, May 1982, page 84.)

The transmissions were the culmination of several years of work by engineers from the BBC's engineering research department.

The picture to be transmitted was fed from a conventional 35mm slide scanner into the high quality digital picture store. After sampling at the CCIR-recommended sampling rate of 13.5MHz, it was fed to a microcomputer and data generator, which sorted the information into a form suitable for transmission. The special equipment was then used temporarily

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to replace two of the conventional 4-line Ceefax signals on the BBC2 channel for transmission.

The reception equipment was similar to that used for transmission. After the off-air signals had been demodulated, the Ceefax data was fed to a decoder, with the output controlling a microcomputer. This, in turn, fed a digital picture store, where the data signal was reconstituted into the original RGB components before being displayed on the screen with the same high quality as had been seen at the scanner.

The picture used, of the spacecraft Voyager 2, was included in a series of pages that displayed an improved character font. Another improvement in broadcast was *linked pages*. With this facility, the Ceefax editor would decide which pages were associated with each other, and would add extra information to link them together. In the enhanced decoder, the pages would be stored and instantly displayed when the relevant linked page number was selected. This would eliminate the delay currently experienced while waiting for the magazine to cycle round to the desired page.

Transmitting computer programs

For some time now, the BBC Ceefax

unit has been transmitting teletext software in conjunction with several educational establishments in order to see whether it is possible to use Ceefax to transmit computer programs, which could be loaded directly into a microcomputer memory. It has demonstrated that it is possible to download programs without the need to copy the program and then re-enter it via the computer keyboard. It will be possible to use this facility with the BBC microcomputer when the teletext adapter becomes available later in the year.

Most of these enhancements will require additional memory in the receiver decoder and it is not likely that the whole range of enhancements will become available until later in the decade. However, they are compatible with existing decoders. For example, viewers selecting the pages carrying the picture information will currently receive the text without the picture information being decoded, with the characters displayed in the existing format. When the enhancements are transmitted as part of the service, it is likely that the editor will fill in the gaps where the picture would have been with a simple graphic, so that the viewer is not left with a blank on the screen.

Teletext is attracting support from

the European community. The British consultancy Logica⁸ is one of two concerns taking part in a study, backed by the Community's Data Processing Support Scheme, to review the feasibility and design of teletext systems using the full bandwidth of a TV channel. This bandwidth will become available through DBS and cable television. Spare capacity available, during business hours and overnight in many countries, makes it feasible to consider the use of the 625 lines of a full TV signal instead of the four to eight currently used.

The developments reported here were highlighted Sept. 18-21 at the International Broadcasting Convention at Brighton, England. There were 113 exhibitors occupying nearly 120,000 feet displaying and demonstrating their wares.

References

- ¹British Aerospace, Brooklands Road, Weybridge, Surrey KT43 0RN, England
- ²Marconi Company Ltd., New Street, Chelmsford, Essex CM1 1PL, England
- ³British Telecom, 2 Gresham St., London EC2
- ⁴BBC, Broadcasting House, London W1A 1AA
- ⁵Prestel Headquarters, British Telecom, Telephone House, Temple Ave., London EC4Y 0HL
- ⁶GEC Computers Ltd., Elstree Way, Borehamwood, Hertfordshire WD6 1RX, England
- ⁷McMichael Ltd., Wexham Road, Slough, Berkshire SL2 5EL, England
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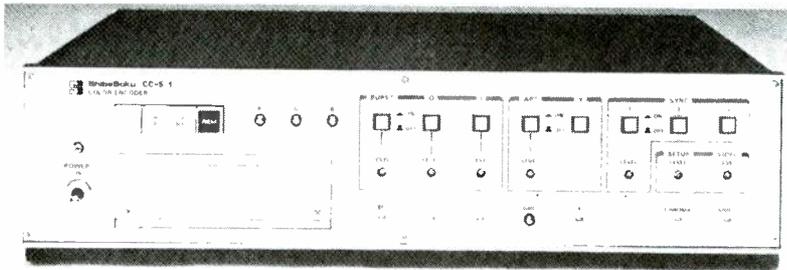
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Business

Continued from page 22

Groups have been combined into the newly formed Systems Group. This reorganization will allow EMCEE to provide complete construction and installation services for TV, radio, MDS, ITFS and OFS, while using equipment manufactured by EMCEE and other suppliers of RF transmission equipment. EMCEE has also acquired a plant in Mountain Top, PA. This facility will house engineering, research and development, final assembly and testing operations for the company.

ABC initiates Satellite Update via land lines



Henry Kavett (left) and Bill Donnelly

The ABC Radio Networks, (Information Entertainment, Direction, Contemporary, FM and Rock), recently began receiving a new technical service for affiliates that is designed to keep them informed about the rapid changes in radio technology and to offer them a forum to obtain information on ABC's satellite development project.

The program, *ABC Satellite Update*, is a special closed circuit feed that features new technology experts and the opportunity for affiliates to call in with questions on ABC's new satellite distribution system. It is hosted and produced by Henry Kavett, who also serves as director of Information and Public Relations at ABC Radio. Kavett and a team of technology experts, including Ron Pearl, ABC Radio Network's satellite coordinator; William Battison, vice president of Finance, Planning, Administration & Satellite Development; and Bill Donnelly, director of Satellite Systems, ABC Radio Networks, answer questions from affiliates who call collect or write in questions concerning the implications of, and possible developments within, the realm of satellite technology. The program will be fed to affiliate stations via the network's current land lines on Mondays and will run for 15 minutes.

The announcement of the new service was made by Battison and Walter

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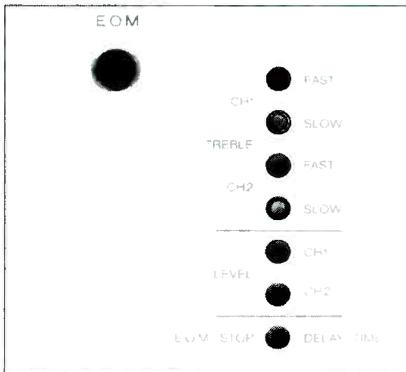
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The Revox Automation Advantage

The new Revox PR99 Playback Only presents a ten point program for more cost-effective broadcast automation.

1. Compatible with Existing Systems—The PR99 Playback Only is fully compatible with practically every existing broadcast automation system. In many cases it can be swapped for existing decks in a matter of minutes.



2. Front Panel Controls—Immediate access to repro levels, EOM stop delay time, and treble EQ for both speeds. Mode switch selects track 1, track 2, mono, or stereo; a calibrate/uncalibrate button switches from front panel adjustable output to standard reference level.

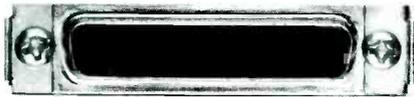
3. EOM Stop Delay—Adjustable from 0 to 24 seconds. Front panel indicator illuminates when 25 Hz signal present.

4. Switchable Sensor Circuit—The 25 Hz sensor circuit may be switched out of the signal path to allow extended bass response.

5. Easy Maintenance—Modular plug-in circuit boards make servicing a breeze. Most parts subject to wear are easily accessible and quickly replaceable.

6. Lightweight and Compact—Weight is a mere 40 pounds. Front panel dimensions are 19" x 15 3/4"; depth is 8". Rack mount flange is standard.

7. All Formats—Choose mono or 2-track stereo; 3.75/7.5 or 7.5/15 ips speed combinations.



8. One Plug Does All—A single Cannon multipin connector carries all the audio, status, and remote signals. These signals may also be accessed through parallel XLR and DIN connectors.

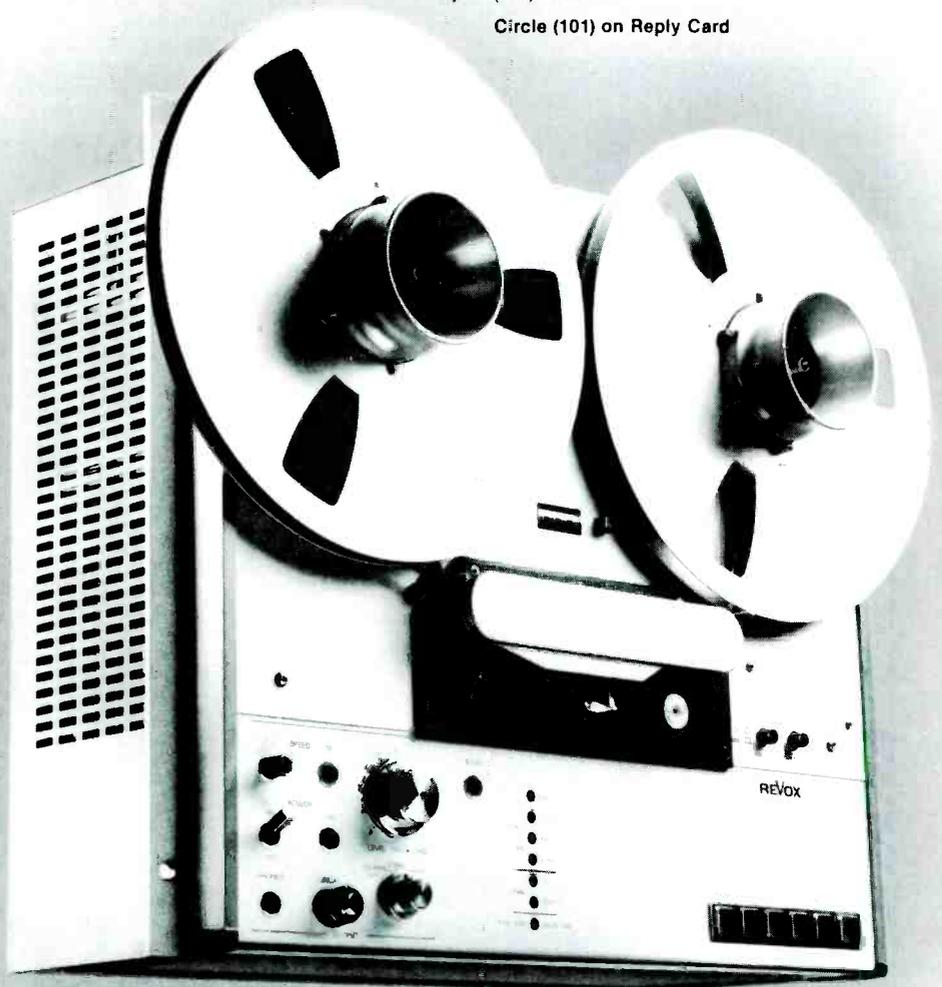
9. Studer Revox Quality—A fully professional machine in every respect, the PR99 Replay Only features die-cast aluminum alloy chassis and head-block, servo-controlled capstan motor, contactless full logic switching, and a Studer-made play head. Careful German craftsmanship shows in meticulous attention to every detail.

10. Attractive Pricing—Best of all, the new PR99 Playback Only actually costs less than last year's best-selling reproducer. So before you order an automation system or replace your present decks, call or write for more details. You'll find that the Revox Automation Advantage was well worth the wait.

STUDER REVOX

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tech tips

The mechanics of videotape

Everyone learned in the sixth grade that wrapping a piece of wire around a nail and attaching it to a battery would turn the nail into a magnet. Bending it would produce a horse shoe magnet and anything metallic passing within the magnetic field would in turn be magnetized. Conversely, if you disconnected the battery and passed a bar magnet between the ends of the nail, electricity would be produced.

Basically, all video or audio recording heads are metallic in nature (ferrite is a mixture of metal and glass) and work on the same principle as the nail horse shoe magnet. Similarly, each particle of ferric oxide on the videotape passing in front of the head serves as a tiny bar magnet. During recording, a current flows through the coil on the record head, creating a magnetic field that fluctuates depending on the strength of the signal. As the tape moves past the field, patterns of magnetism are formed on it that reflect the variations in the original signal.

During playback, the tape, which is not only capable of being magnetized but also of storing magnetism, passes across the playback head and generates, to a lesser degree, the energy that was used to record it.

The process of making magnetic tape, whether for computers, audio or video, is basically the same. Fuji Photo Film Company Ltd. offered a description of the steps in this completely automated procedure.

First, gamma ferric oxide, a substance that is easily magnetized, is mixed in powder form with binder, solvent and additives to create a liquid. This magnetic mixture must be coated thinly and evenly onto a backing material. The coating process must take place in totally dust-free chambers, because any dust particles on the tape could be seen later as "dropouts" (white specs on the TV screen).

The coated tape then passes through a magnetic field (over an orientation magnet) to align the particles in one direction. After going through a drying chamber, the tape is slit into various widths depending on the purpose for which it will be used.

It is easy after viewing a videocassette to leave it without its sleeve on a windowsill until the next time you want to view it. However, this will do nothing to add to the life or quality of that cassette. John Dale, vice president and general manager of the Magnetic Tape Division at Fuji Photo Film USA, recommends the following as standard practice in handling videocassettes:

- Store tapes in conditions comfortable to humans (maximum 70° temperature, minimum 40°; humidity about 50%). Do not place tapes in direct sunlight and keep them away from dust, dirt and moisture.
- Keep tapes away from magnetic fields (for example, motors or transformers) and from heating units.

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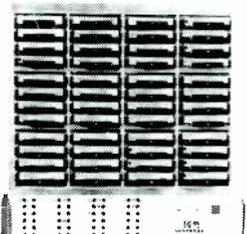
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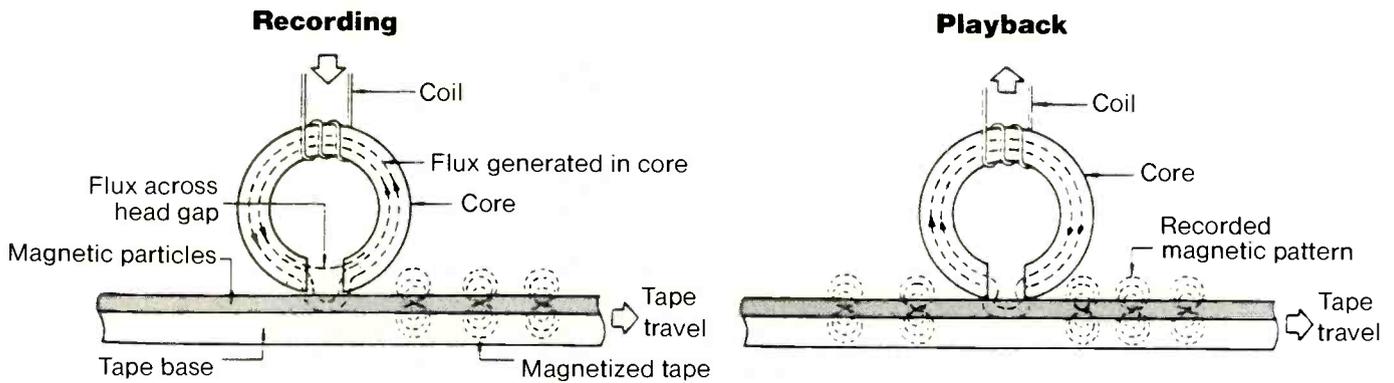
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Courtesy of Fuji Photo Film (U.S.A.), Inc.

- Before storing tapes, they should be rewound or fast-forwarded so that all the tape is either on the takeup reel or the supply reel.
- After using a videocassette, do not leave it in the machine where it can be stretched or can pick up dust.
- Cassettes should be stored in their sleeves, standing vertically.
- Avoid physical shocks such as dropping or hitting the cassette.
- Make sure that the inside of the VCR is kept clean and debris-free. Avoid smoking near machines.
- Before recording, it is advisable to cycle the cas-

sette in fast forward and reverse in order to adjust the tension. The tape may have gone through a temperature change and stretched. Some duplicating houses go so far as to climatize videocassettes before recording on them by leaving them in the same room as the videocassette recorders for a period of 24 hours.

Editor's note:

This tip was selected from *In Sync*, published by L. Matthew Miller Associates. It is printed with permission. Interested readers may submit items for consideration for future *Tech Tips* columns to the Tech Tip Editor, Broadcast Engineering, P.O. Box 12901, Overland Park, KS 66212.



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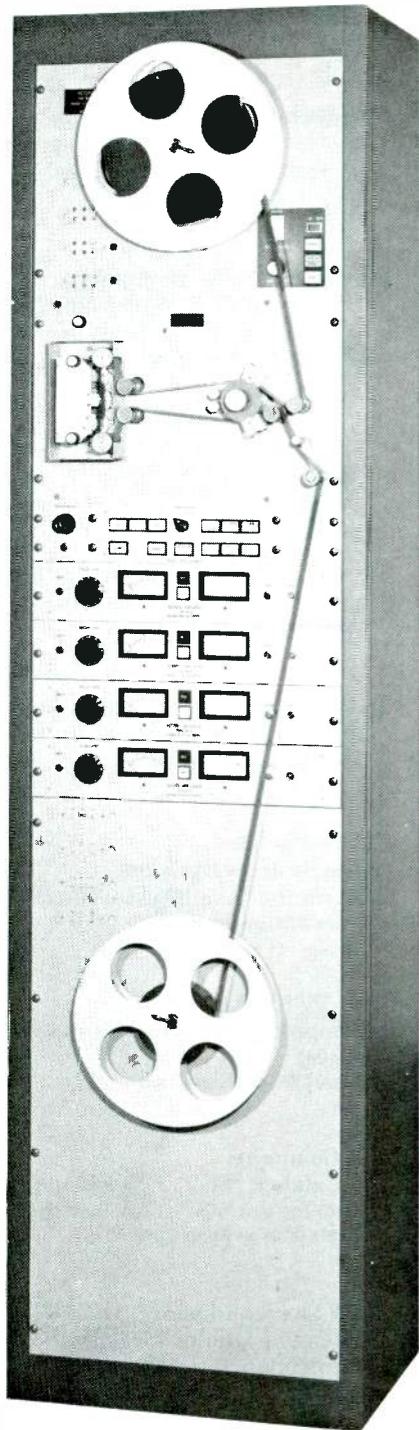
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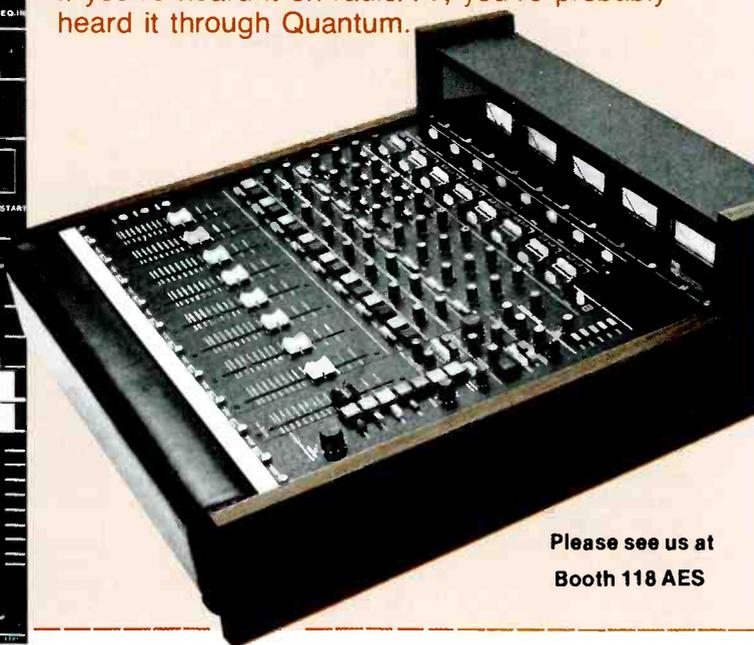
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 - Selection guide: "RF and Power Semiconductors," (22 pages), free.
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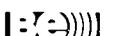
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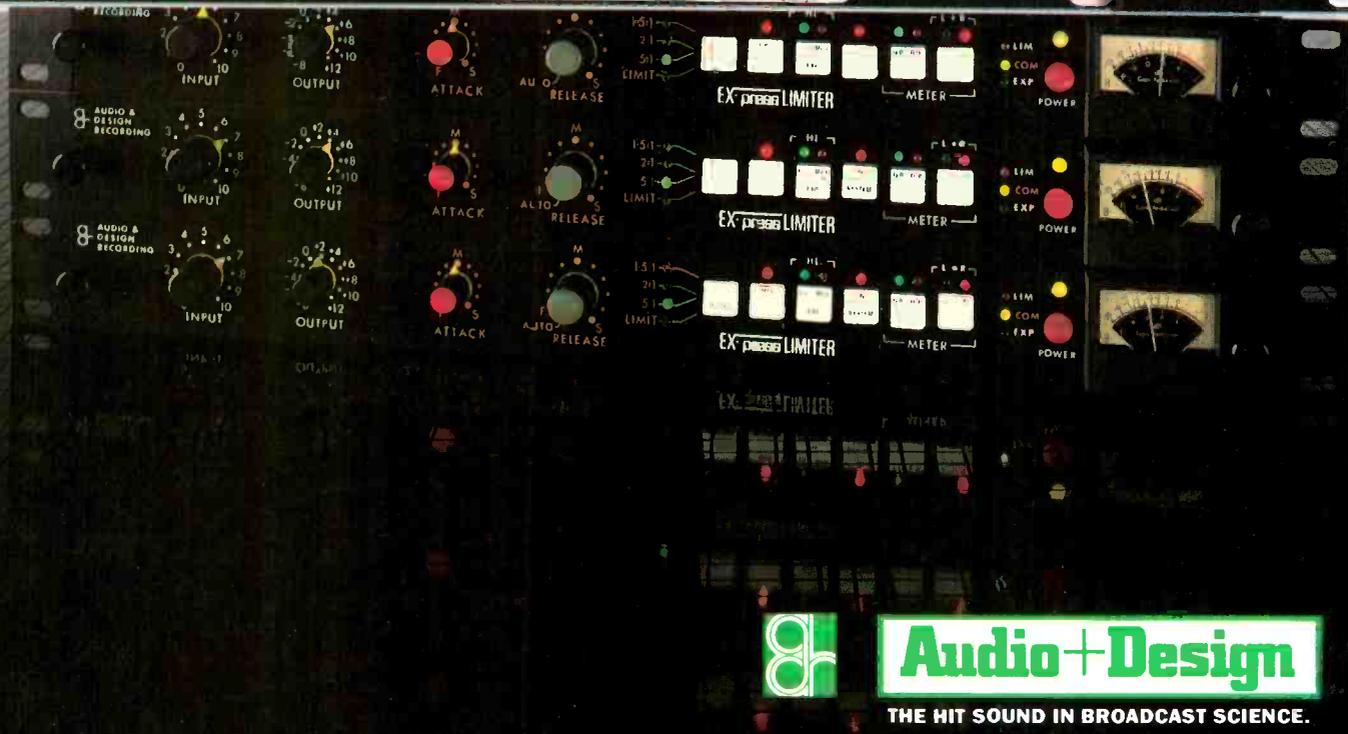
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Computerized test systems

Two new microcomputer-controlled test systems were introduced by Ortofon Instruments A/S at the '82 IBC Convention. The TC 3001 test computer provides automatic or manual determination of all relevant parameters of phono pickups, pickup/turnarm combinations and turntables. Results are printed for future reference.

A second system, the P400 measuring computer, displays test data on a color CRT with applications for production control of speakers, microphones and headphones, as well as phone and tape recorder uses.

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Degausser

The PF-208 head degausser from Nortronics produces a maximum field strength of 1000G. For use on any tape heads, the 12-ounce unit includes an auto-reset thermal protection device that prevents coil burnout.

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Headsets

A product of Racal Acoustic, the Slingard TV cameraman's headset is designed for high noise environments. Independently wired earphones have foam liners and provide 35dB noise attenuation. A noise-canceling dynamic mic is supplied with a passive dynamic/carbon amplifier for carbon intercom systems. Total weight is 13 ounces.

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Monitor speaker

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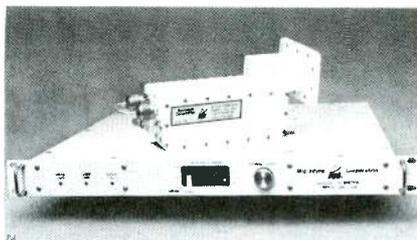
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Line output amp

The A-41 line output amplifier from *Auditronics* is designed to retrofit any *Auditronics* 110 series console. A +30dBm output capability, low noise and distortion, improved phase linearity and flat frequency response are offered.

Circle (299) on Reply Card

Satellite receiver



Block downconversion is designed into the 1100 BDC/1100 DCR system from *Microdyne Corporation*. A 100°K GaAs FET LNA, solid-state polarization selection and double conversion are featured.

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Film laboratory services

Image Transform offers a full range of these services—from 35mm and 16mm negative processing to 35mm, 16mm and Super 8 release prints. The film lab is located in Burbank, CA.

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System enclosure

The model 9101 card enclosure holds any five of the *Broadcast Technology* series 3000 cards to form a line amp, intercom, power amplifier, switcher or equalizer. Screw-type barrier strips eliminate the need for soldering in the field.

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Graphic software

To enhance the graphics from an

Apple-based PGS III system, new software from *Symtec* provides 512x512 pixel resolution and 16 colors from a palette of 4096. Polygon fill, high speed picture load/save, user-definable brush and user-definable color table are some of the features in the system.

Circle (302) on Reply Card

Control system

One MSTC-1 master control module can control up to 64 RSTC-1 receive modules of the Z-80 based *Videomedia* mass transport system. All units use a twisted pair of wires for communications.

Circle (303) on Reply Card

Video filters

The *Matthey* FLW series low-pass video filters present cut-off frequencies from 2.5-10MHz. Flat-pass band, sharp cut-off, good phase equalization, a stop band greater than 45dB to 100MHz and a 70% size reduction are presented in a 12mm high component.

Circle (304) on Reply Card

Reverb/delay unit

The *AKG Acoustics* BX-25E reverb/delay system uses the Torsional Transmission Line technology, extending delay time by 25%, yet reducing package size. Remote decay-time adjustment, equalization adjustment and dry/reverb mixing are provided for each channel.

Circle (306) on Reply Card

Telephone interface

The FB-1 from *International Tapetronics Corporation* allows answer-only access to taped information by connecting a caller to a cartridge machine. It starts the tape and hangs up once the tape is recued. This telephone interface is FCC approved.

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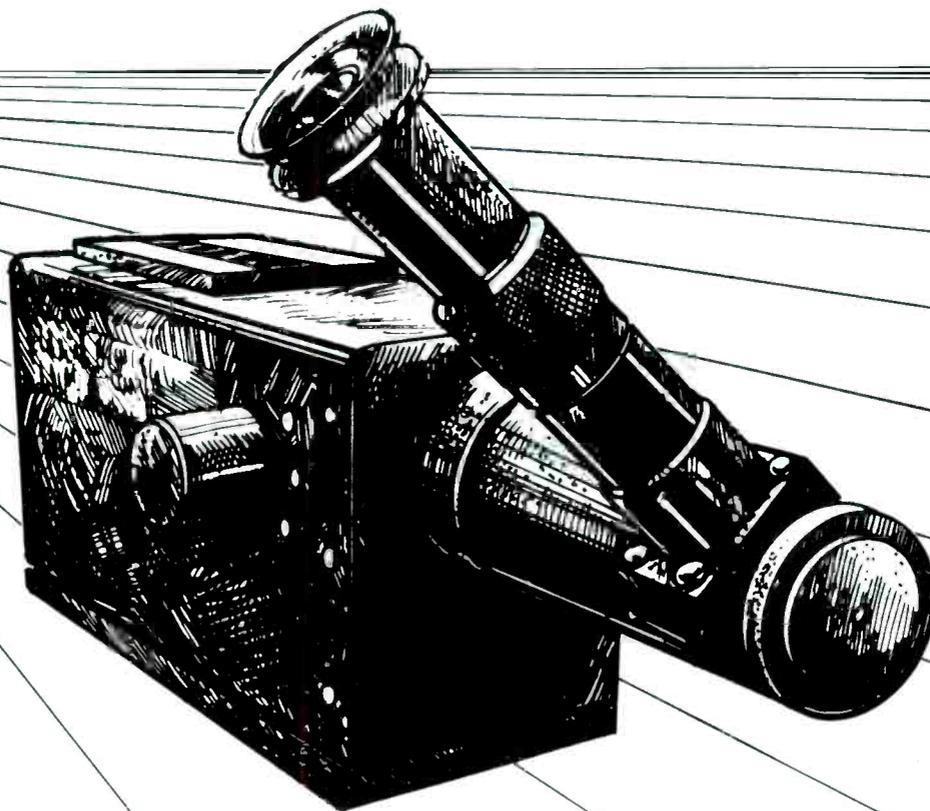
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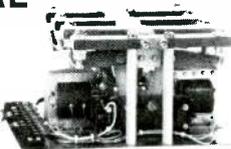
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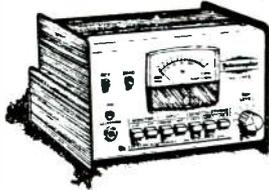
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station-to-station

Extra record lockout for Ampex 1200

By Larry Christensen
 Chief engineer
 Lodes/Peterson Productions, Omaha, NE

The record lockout ring is seldom attached to reels of tape that come into the video recording room. Preventing accidental erasure of master material that comes in on 2-inch or other tape formats for use in production, without removing knobs and buttons from the machines, is essential. The following modification to the Ampex 1200 videotape recorder has saved two masters and several buttons from being lost since its installation.

The tally light in the middle of the transport of a 1200 is often not in use. It can easily be replaced with a lighted

push-on/push-off switch. This switch is wired in parallel to the microswitch on the reel guard assembly. Wiring for the indicator lamp of the switch requires one wire to go to the power supply terminal Block #1, Position 13. The other side of the switch is wired to J2-5 on the transport connector.

This modification allows the use of either the reel guard assembly for automatic protection or use of the push-button switch for manual control. The light in the newly installed switch, as well as the record lockout panel indicator, informs the operator of the machine anti-record mode. When activated manually or automatically, the tape operator has sufficient indication that the machine will not go into record mode if the record button is pressed inadvertently.

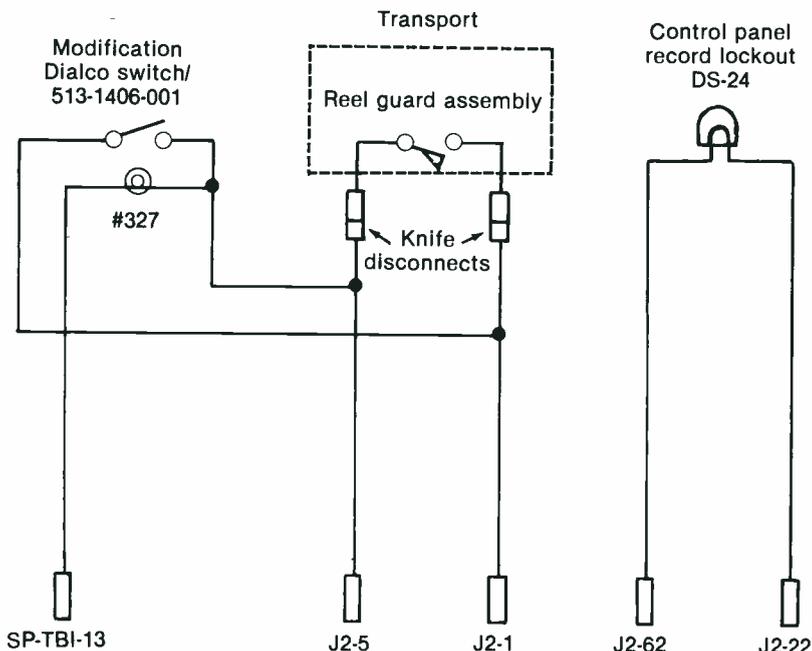


Figure 1. Ampex VR-1200 modification for automatic and manual record lockout

Ampex 1090 velocity compensator

By Edgar Lee Howard
 Supervisor, Special Projects
 WOSU-TV, Columbus, OH

A fault can occur with the Ampex 1090 velocity compensation system, especially when installed in 1200

series machines. The head decoder logic can advance to head position 1 (count zero), just before the head select waveform changes state. This produces very narrow and incorrect head read pulses in addition to the correct ones. Incorrect velocity correction is produced for one or two lines per head pass.

This condition can be corrected by

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delaying the start of the head decoder logic. This is done by shifting the timing of the head switchtime waveform to about a microsecond later than it usually operates, which is done by changing C_6 on board 6, the head

decoder, from 100 to 680pF. However, it is necessary to preserve the proper operation of the gating logic A_1 , so the gating pulse from Q_9 - Q_{10} is widened to overlap the delayed switching waveform by changing C_1 from 100 to

510pF. Restoring the unit to operation completes the modification. There are no adjustments required by this procedure.

||:~(-))|||

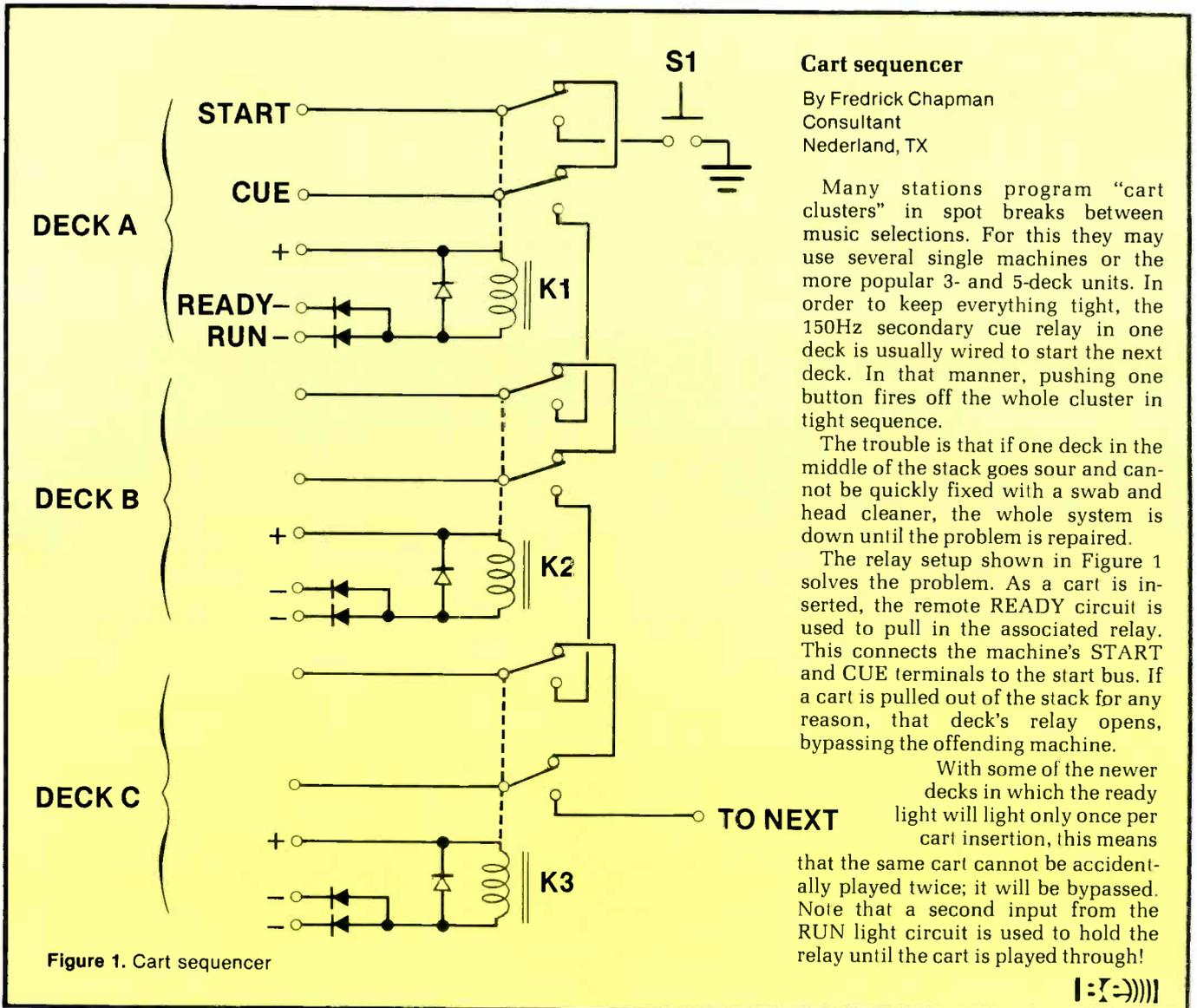


Figure 1. Cart sequencer

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25Hz detector

By Fredrick Chapman
Consultant
Nederland, TX

A 25Hz tone detector may be added to older reel-to-reel decks used for playing automated music tapes. It can also be used with electronically switched cassette decks, which are certain to be used in future automation systems.

The NE-567 detector, which may be obtained in parts stores, is connected to a trigger on the leading edge of the 25Hz cue tone placed at the end of

each music selection. (See Figure 1.) The 10kΩ pot sets the level to provide enough signal for reliable operation without overload. The 10kΩ trimpot (a 10-turn unit) connected in series with the 8.2kΩ resistor and in parallel with another 10kΩ fixed resistor, trims the frequency to 25Hz. The 56μf and 3.9μf capacitors connected to pins 1 and 2 provide enough bandwidth and control time for proper operation. K1 and K2 are low cost SPDT units, such as ones available from Radio Shack. The 6.2V Zener stabilizes the dc supply voltage which, it is presumed, is being "stolen" from the tape deck supply. The proper value of R is

given in Figure 1.

In operation, both K1 and K2 pull in as soon as the 567 responds to a cue tone. K1's wiper connects ground to the output lead, causing the automation system to advance to the next event. When the cue tone ends, K1 drops out at once, but the 500μf capacitor holds K2 for about one second (500Ω coil). This channels the ground through both relay wipers to the STOP circuit in the tape deck. Most decks today use ground to start or stop. If your deck does not, a third inexpensive relay will be needed, operated by the STOP ground to do what needs to be done to stop the deck. The way this circuit is set up, there will be no tone left on the tape to give a false cue the next time the deck is selected.

||:~(=))|||

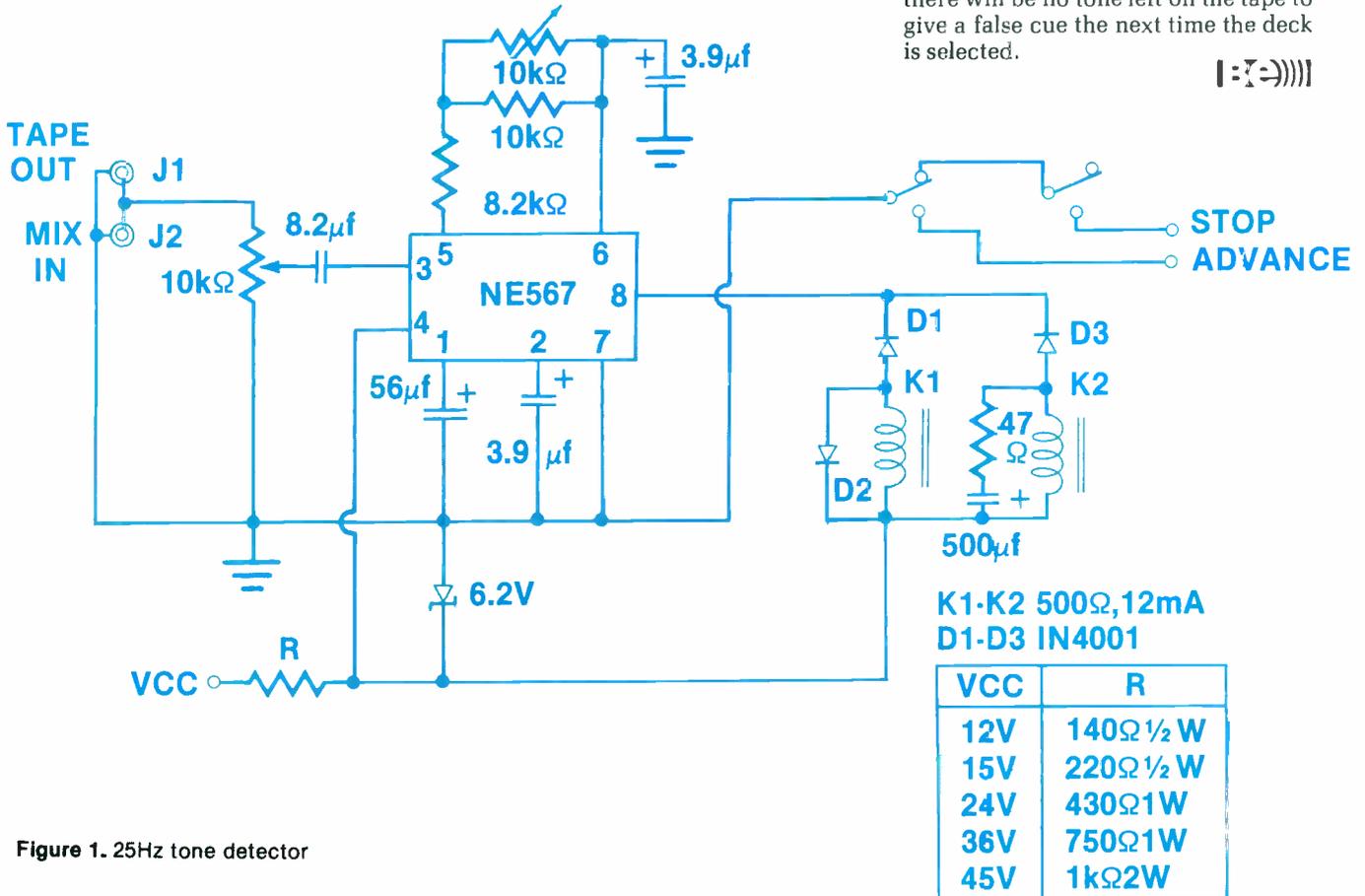


Figure 1. 25Hz tone detector

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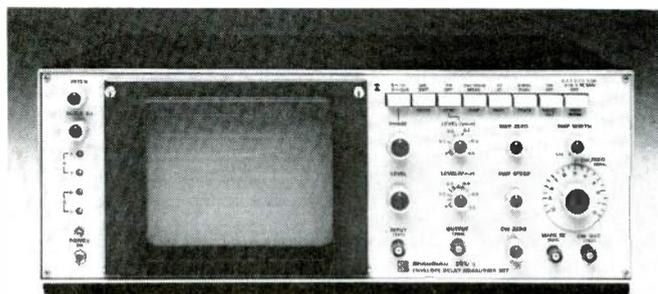
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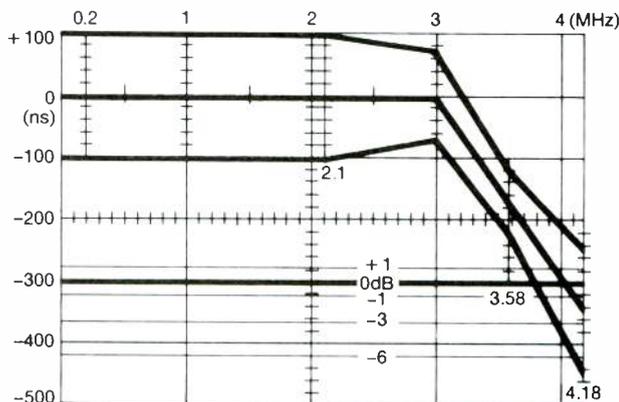


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people

Kazuo Iwama, president and chief operating officer, Sony Corporation, died at a hospital in Tokyo on Aug. 24. He was 63. Since Iwama joined Sony in 1946, he had made many contributions to the company and to broadcasting. In 1953, he headed a special task force to study the development and production of transistors for use at radio frequencies. His efforts led to the production of Japan's first transistor radio by Sony in 1955 and the introduction of the world's first transistorized TV receiver in 1960. In 1979, Iwama received the Medal of Honor with blue ribbon from the Emperor of Japan, citing his leadership in electronics manufacturing, which contributed to the enhancement of management efficiency and the level of technology in that industry.

Robert R. Frederick, formerly executive vice president and sector executive of the General Electric Company, has been elected president and chief operating officer of RCA Corporation. Other appointments include the following: **James S. Griffin**, chief engineer, broadcast video systems, Commercial Communications Systems Division; and **Carleton H. Musson**, director, video systems product management, Commercial Communications Systems Division.

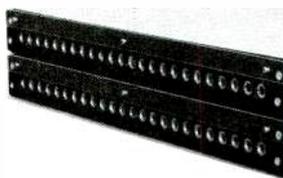
Paul Meeks has been appointed national sales manager of Lang Video Systems Corporation.

Christie Electric Corporation has announced the appoint-

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ment of **Holmes F. Ives** as sales manager. Ives will assume primary responsibility for worldwide sales of a product line including the ReFLEX-20 ultrarapid chargers, nicad battery packs and ac/dc switching power supplies.

Robert Auguste has been appointed vice president of engineering, Cinema Products Corporation. In his new capacity, Auguste will assume responsibility for all Cinema Products' design and development efforts, with particular emphasis on the company's video equipment line.

RMS Electronics has announced the appointment of **Richard M. Oberman** as general manager of its Western operations. Rich was previously the RMS Western distributor representative for 12 years.

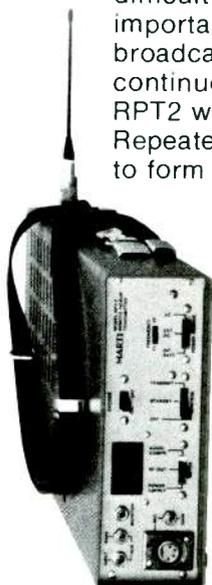
The appointment of **W. Arnold Taylor** as division vice president, marketing, for RCA Commercial Communications Systems Division has been announced. Taylor was most recently group vice president for Compact Video Systems, Burbank, CA, a position he had held since 1981.

Motorola recently announced the appointment of Chris Payne as AM stereo broadcasting manager. Payne comes to Motorola from the NAB, where for the past six years he has served as assistant to the senior vice president of science and technology.

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INTERNATIONAL OPPORTUNITY AUDIO VISUAL

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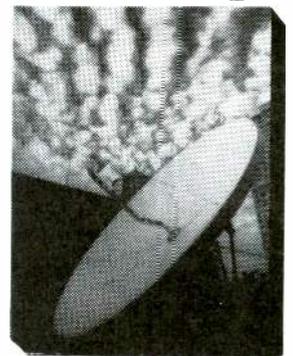
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9-81-tfn

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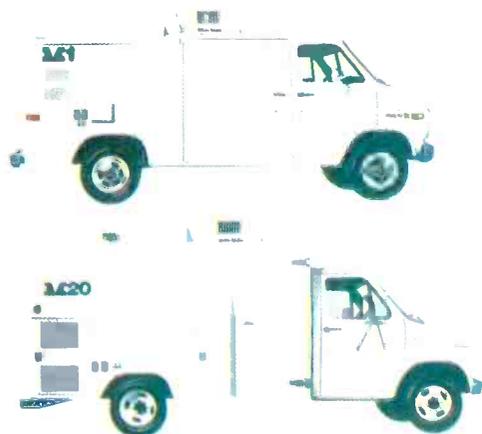
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