

PK

JUNE 1976

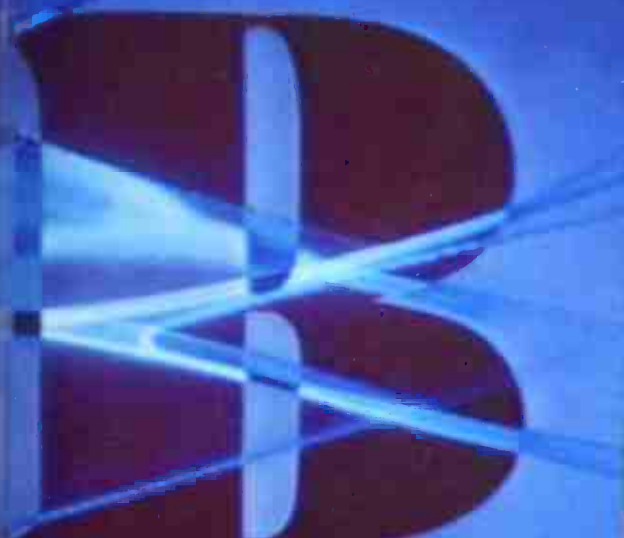
# BME

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BROADCAST



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Including the modular, flexible AutoPro program automation line. And featuring the Generation 4<sup>™</sup> series of transmitters — with the exciter that has set new standards for FM broadcasting. Plus AM transmitters that our customers say sound like FM . . . and consoles with plug-in flexibility to meet your changing format requirements.

But there's much more to Collins than just breadth of line.

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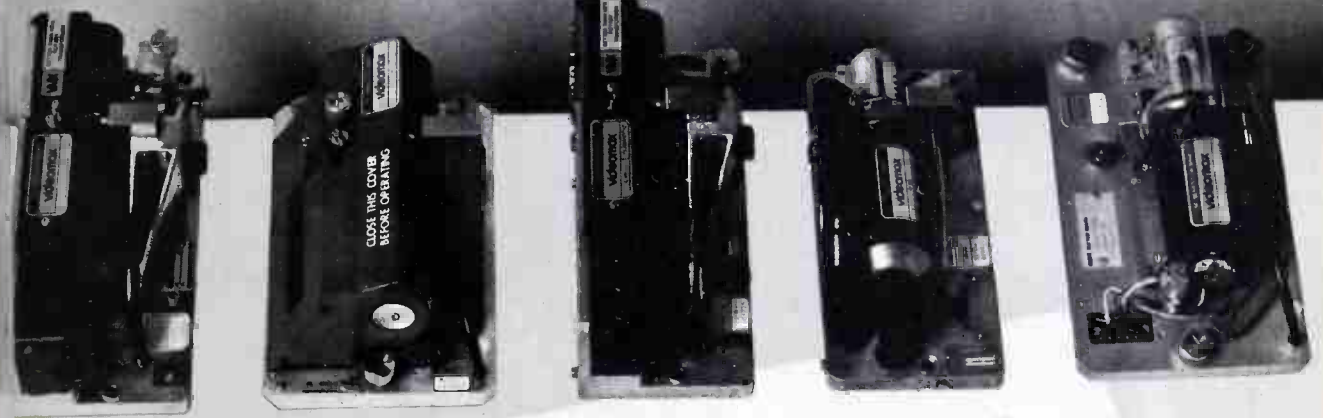
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...where science gets down to business

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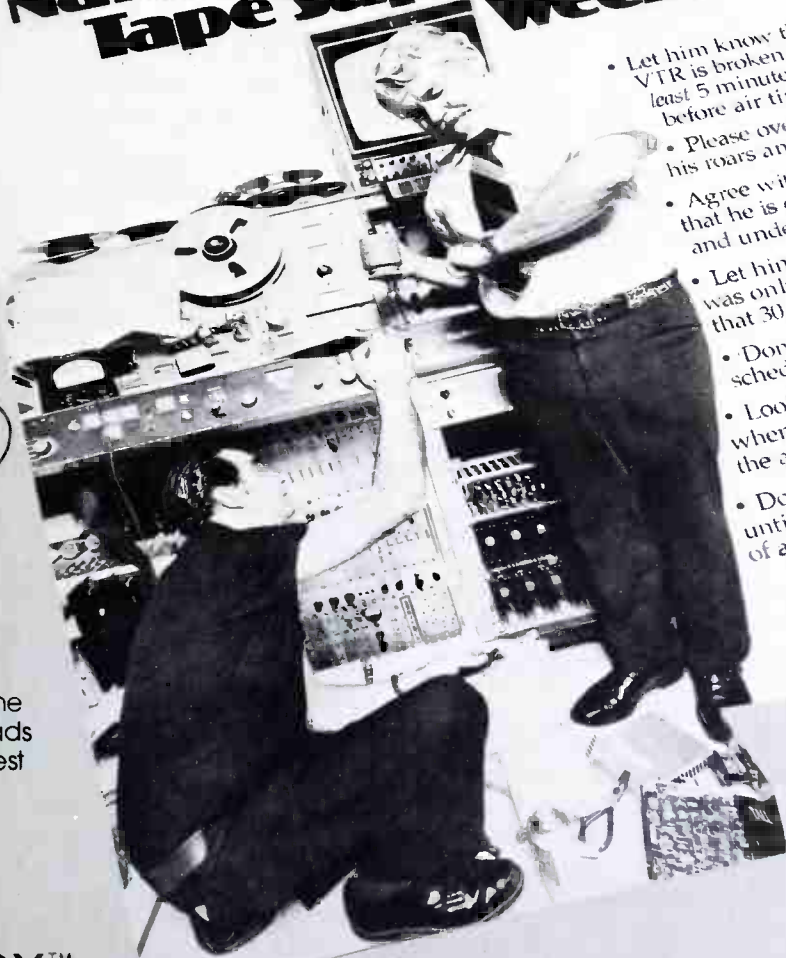


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# BM/E

BROADCAST MANAGEMENT/ENGINEERING



We gave Bill Etra, a Video Systems Designer and Artist, simple white on black letters. He processed these images through his videolab colorizer/switcher, and manipulated them using a Rutt/Etra Synthesizer, Electronic Music Synthesizer, and controlled the process using three mini-computers, programmed by Bill and Lou Katz of Columbia University. The striking results are an example of what Etra can achieve with this prototype for a new computer controlled production system which he hopes to introduce soon as The Intelligent Video System.

**BROADBAND  
INFORMATION SERVICES, INC.**  
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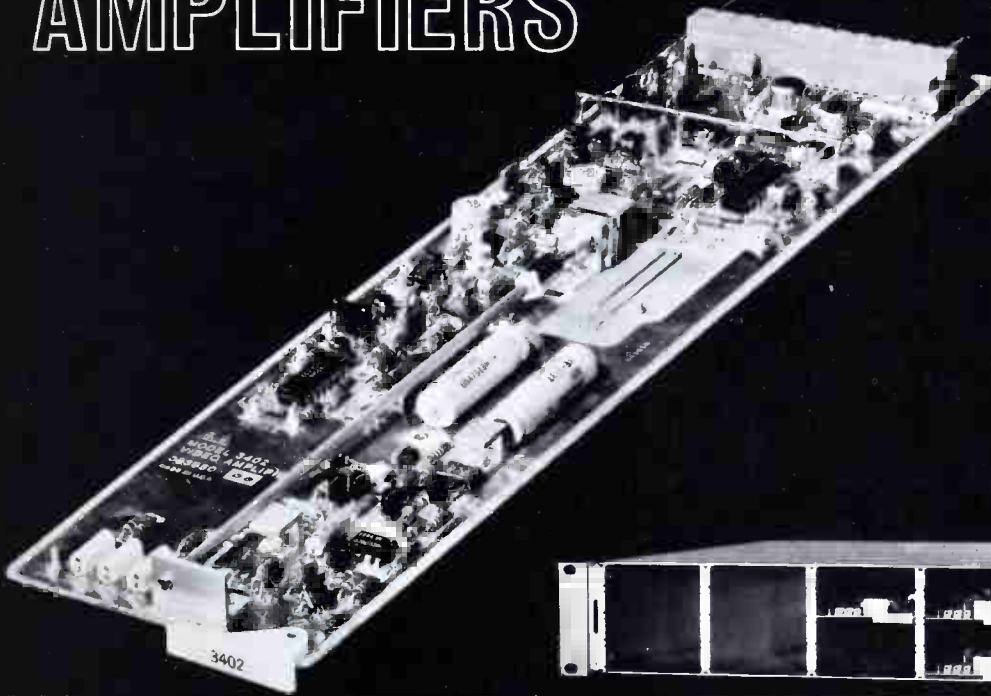
*New and significant products.*

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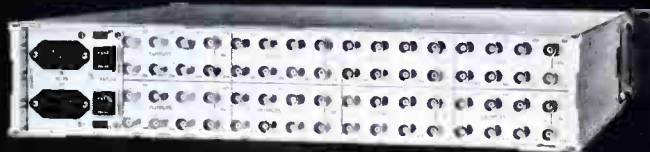
*Useful reading materials.*

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The 3402 gives exceptional performance in the areas of stability, distortion, and noise. Power consumption is only two watts per amplifier. It is an all-purpose

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A two-rack unit mounting tray, illustrated above, accommodates eight 3402 amplifiers and a 3200A power supply, with provision for a second optional supply for emergency protection. A one-rack unit, four-amplifier mounting tray is also available.

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# BROADCAST INDUSTRY NEWS

## Kansas City TV Station To Beam GOP Convention News

With what is believed to be the first transmit-receive earth station ever set up by a TV station, KBMA-TV will transmit GOP convention news, via satellite, this summer.

KBMA-TV, a UHF station in Kansas City, MO, expects to have the earth station operational in time for the Republican National Convention. In cooperation with the Independent Television News Association, KBMA-TV will beam nightly convention news to other independent stations around the country.

The earth station is the result of a joint venture between KBMA-TV and Transcommunication Corp., of Greenwich, CT, which purchased the earth station and will lease it back to KBMA-TV.

## Europe Gets First Quad Broadcast

For the first time in Europe, a quadraphonic broadcast was done using a single transmission facility. Radio Picadilly in Manchester, England, tested the technique as part of its second

anniversary commemoration activities, April 2nd, and 3rd.

Listeners of Radio Picadilly, one of the commercial stations that make up the Independent Local Radio network, received programs of discrete 4-channel tapes and QS 4-channel records broadcast through a system using the Sansui QSE-5B broadcasting encoder. The versatility of the system was demonstrated by synthesizing some stereo programming into 4-channel using the QS synthesizer function.

Throughout England, it is estimated, that only a 1/2 million homes have some 4-channel capability. To properly receive quad broadcast a system should have the Hafler speaker matrix system which is compatible with QS encoding and a 2-channel receiver or amplifier plus a simple resistive matrix network.

Radio Picadilly's stereo listeners, however, did report enhanced stereo reception.

## FM Station Rates Number 1, in L.A.

For the first time in Los Angeles radio history, an FM station is number one in the ratings.

K-BIG FM 104, the Los Angeles "beautiful music" station, owned and

operated by Bonneville International Corporation, achieved the market's highest ratings in the winter survey (Jan/Feb '76) conducted by Arbitron. The station got a 6.5 share of all listening in the metro area.

## Satellite Video Conferencing 'Saves Millions'

The technique of "video conferencing," via satellite can save "American industry millions of dollars a year in reduced travel expenses," according to an RCA executive.

Philip Schneider, President of F American Communications, Inc., says satellites such as the RCA Satcom provide wideband service at a fraction of the cost of terrestrial landlines can reach every place in the country simultaneously. Any company or organization using this video conferencing technique can do so "much more expensively than moving a whole lot of important managers from their offices, losing valuable time in travel, and running up enormous bills and transportation expenses," Schneider.

## Harris Corporation Expands Broadcast Operation

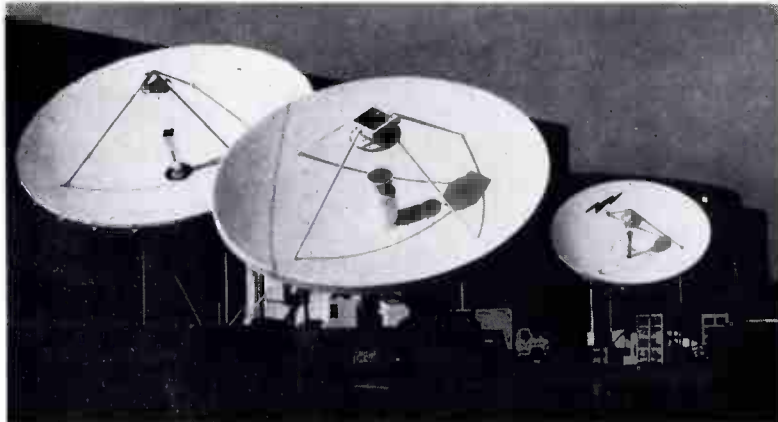
Harris Corporation announced in April, a \$3.25 million dollar expansion of its Broadcast Products division in Quincy, Illinois. The expansion needed, according to Harris, to accommodate the division's growth in sales of radio and television transmitters and related products.

Gene T. Whicker, vice president and general manager of the division, says the expansion would add approximately 85,000 square feet of space to reunite downtown administrative, marketing offices with the manufacturing and engineering operations and aid in the gradual build-up of employment in the Quincy area.

## NY Commission Re-Asserts Rights Over 'Pay Cable' Rates

The New York State Commission on Cable Television reiterated its jurisdiction over rates charged by cable television operators.   
continued on p. 6

## Satellites and Pay Cable Dominated NCTA Convention



No less than three earth stations (of five shown) were pulling in HBO signals at the 25th anniversary NCTA Convention at Dallas the other month. Exhibit floor was filled with converters, addressable taps, and filter traps to deliver pay signals to TV sets. New program packagers showed up and Optical Systems announced it would offer 15 hours daily on two program channels via Westar satellite this September.

# smart switcher



CDL has just raised the standard  
for video production switchers. Again.

The CD-480 is the first totally new full scale  
production switcher from CDL in 7 years.

It offers every wanted feature, from superb  
Chroma Keying to Rotating Wipes with Colored  
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It has applied unique technology to create an  
operator's "dream". A *single* CD-480 Effects  
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## NEWS

sion companies for "pay cable" services.

According to the Commission, this reiteration was prompted by "recent problems in this area." Many municipalities have requested help, claims the Commission because some cable television companies have raised their "pay cable" rates after being denied increases for their "basic" services.

CATV companies have argued that

FCC regulations pre-empt municipal or state regulation of "pay cable" services.

### NAB Wants FCC To Review 'Specialty' Station Decision

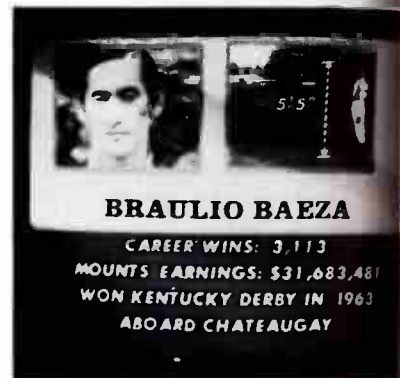
The NAB petitioned the FCC, in late April, to reconsider its decision to permit cable systems to carry the complete broadcast schedules of so-called "specialty" stations.

NAB's petition claimed that the Commission "glossed over the basic

impact issue," and failed to appreciate how program practices of independents vary from those of network affiliates.

According to the petition, the FCC decision, "rests on unsound premises and fails to consider the fact that "fringe time" rather than "prime time" is the crucial period when independents must attract audiences and advertising revenue.

### ABC Sports Uses Frame-Stor



**BRAULIO BAEZA**

CAREER WINS: 3,113

MOUNTS EARNINGS: \$31,683,481

WON KENTUCKY DERBY IN 1963

ABOARD CHATEAUGAY

The under \$15,000 Arvin Echo floppy disc frame slide storage device, Frame-Stor, a new production tool for ABC Sports, such events as Monday Night Baseball and the Kentucky Derby. Photo here shows composite picture of a live camera (left), a still frame (right) run through video compressor and mixed with character generator display. Each recorded still frame (200 per disc side) coded for instant call up. Device fits slow-motion recorder for exclusive sports action shots. As we go to press, ABC plans to use device in Oregon and California primaries and at the "Indy 500."

# GOLD!



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 is the Sparta news for FM broadcasters today!

**You get MORE WATTS PER DOLLAR** with the 35,000 Watt Sparta Model 635 than any competing high power arrangement. It's a fact! 100,000 Watt ERP is achieved with the Model 635, using 3 1/8" line and 6-bay circularly polarized antenna. And just think of the SAVINGS in POWER CONSUMPTION, compared to the dual configurations of other makers!

**You get BUILT-IN HIGH POWER BACKUP** with a 5000 watt driver.

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**You get GROUNDED GRID DESIGN** dependability.

**You get AUTOMATIC POWER CONTROL.**

**You get VSWR protection.**

**You get 10,000 hour pro-rated warranty** on the single final tube, and only three tubes in entire transmitter!

**You get MORE WATTS, and MORE FEATURES** per dollar in the Sparta Model 635!

**Get the FACTS from Sparta.**



Satisfaction GUARANTEED!

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### Christian Broadcasting T Build School

The Christian Broadcasting Network has announced plans to construct a million dollar international headquarters and communications school to teach broadcasting to students from around the world. Dr. M.G. "P" Robertson, President of CBN, started the network ten years ago with three dollar contribution plans to build the complex on recently purchased land in Virginia Beach, Virginia.

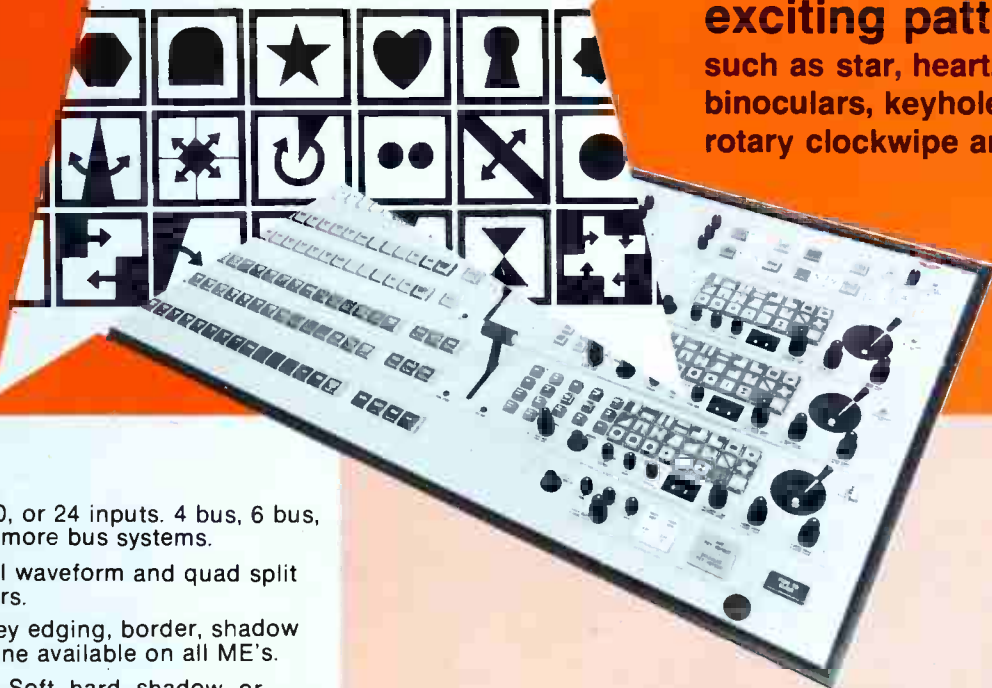
The complex will contain two television studios, a satellite-transmitting facility, an office complex, 2,400 seat conference center, and International Institute of Broadcasting including a School of Theology. When the complex is completed, over the next several years, Dr. Robertson intends "to train Christians from around the world in all phases of the broadcasting industry. . . ." so, "When they return to their home countries, they will be

continued on page



# VIX-114 production switcher with STAR studded features

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



- 12, 16, 20, or 24 inputs. 4 bus, 6 bus, 8 bus or more bus systems.
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- Ready to interface for computer aided operation.
- Many more state of the art and operational features described fully in series 114 brochure.

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

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



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# When we promised a commitment to the industry, we weren't kidding.

## **BVH-1000 High-Band Production Recorder**

This is the most significant high-band recorder ever made by Sony, or anyone else, for that matter. It incorporates amazing signal capability with the economy of one-inch tape. Its transparent picture quality is so crisp and clean, you might even think playback is E/E camera output.

The BVH-1000 is non-segmented. Which means its production capabilities are infinitely versatile. And unlike ordinary broadcast recorders, Sony's unit combines optimum broadcast performance with compact size. It has fast, accurate edit and bi-directional search logic. So it's really suited for the studio as well as remote locations.

No other direct color high-band recorder surpasses the picture quality and production capabilities of Sony's BVH-1000.

## **BVT-1000 Digital Time Base Corrector**

Sony has combined a wide window of  $\pm 2H$  with a unique moving window concept. This means your picture can hold its lock, even though you may have wide error excursions. The BVT-1000 assures you transparent picture quality. It also comes with all NTSC advanced sync, built-in processor and velocity compensation.

When it comes to time base correction, there's no better value than Sony's BVT-1000.

## **BVU-100 Portable U-Matic® Recorder**

This light-weight unit can vastly improve your picture quality. Thanks to Sony's unique SMPTE address track and special comb filtering, your ENG broadcasts can become high-quality broadcasts.

Your picture is sharp and distinct. Sony's BVU-100 is compact, rugged and ready to go.

## **4. BVU-200 Editing Recorder**

Why do so many broadcast engineers consider this unit to be the state-of-the-art U-Matic videocassette recorder? For one thing, it has frame servo editing as well as bi-directional search capability. It too lets you take advantage of Sony's new and unique SMPTE address track. But that's not all. Sony's BVU-200 comes with a stable DC servo system, too.

## **5. BVE-500 Editing Console**

Designed for use with Sony's BVU-200, this new control unit lets you achieve insert and assemble editing too. It also lets you preview as well as review your edit, and trim frames at either end of the edit.

What's more, this system features two separate counters and remote controls. All of which means fast, accurate editing—anywhere, anytime.

## **6. BVP-100 3P Color Camera**

This high-quality portable color camera can do double duty. It's ideal for ENG. And at the same time, it will give you excellent results in the studio.

It features three 2/3" Plumbicon\* tubes. So it's capable of handling just about any assignment with optimum quality.

Plus, other products shown: 7. Camera Base Station; 8. AC Power Supply; 9. Color Pack; 10. Camera Control Unit; 11. Remote Search Control; 12. Remote Control Unit for BVR-510.

These new products are one cornerstone of Sony's commitment to your industry. A commitment that is backed by Sony's new approach to service, training and engineering.

And this is just the beginning.

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**Circle 106 on Reader Service Card for more information.**

## NEWS

both the technical know-how and the Christian commitment to use broadcast for the betterment of mankind."

### NCTA Urges FCC To Act on Pole Attachment Dispute

NCTA, at its annual membership meeting in Dallas, adopted a resolution that urged "Congress and the FCC to take immediate action" to settle the issue of

pole attachment rates charged by utility companies.

The resolution charged that "The policies and practices of utility companies providing pole attachment services have demonstrated a consistent pattern of abuse and delay in such areas as makeready, inspections and other procedures."

The provision of pole attachment and conduit space service to the nation's cable TV operators is completely unregulated at the Federal level and virtually unregulated at the non-Federal level, according to the resolution.

### MPAA, NCTA Agree On Copyrights, Ask Congress To Act

After lengthy negotiations, MPAA and NCTA reached agreement last month on CATV copyright liability and joint in urging the House Judiciary Committee's copyright subcommittee consider this agreement during mark-up of H.R. 2223.

NAB responded quickly by recommending to the Subcommittee that adopt NAB's proposal to permit "marketplace to determine" fees for distant signals.

The MPAA and NCTA deal calls CATV systems to incur copyright liability only for the retransmission of non-network programming from distant TV stations. The copyright fee for these "imported equivalent signals" (IES) will be expressed as a percentage of the cable system's basic subscriber revenues. Systems would pay .6% basic subscriber revenue for the first IES, .425% for the second through fourth IES and .2% of basic subscriber revenues for each equivalent signal in excess of four. National network and noncommercial educational signals would each count as one quarter IES in determining the number of imported equivalent signals.

The agreement retains the System Revenue Adjustment approved by the Senate in its final action on S. 1111 (Hathaway amendment). The adjustment affects systems with annual revenues of \$160,000, reducing the revenue base on which copyright liability is determined. The flat payment of \$30 annually for systems with under \$80,000 on annual revenue is also retained.

Should the Subcommittee not adopt the NAB recommendation, NAB recommends that action on Sec. 111 be deferred, or that the MPAA-NC deal be modified by the Subcommittee in a number of areas. According to NAB analysis of the agreement, it favors large non-grandfathered systems over smaller grandfathered systems.

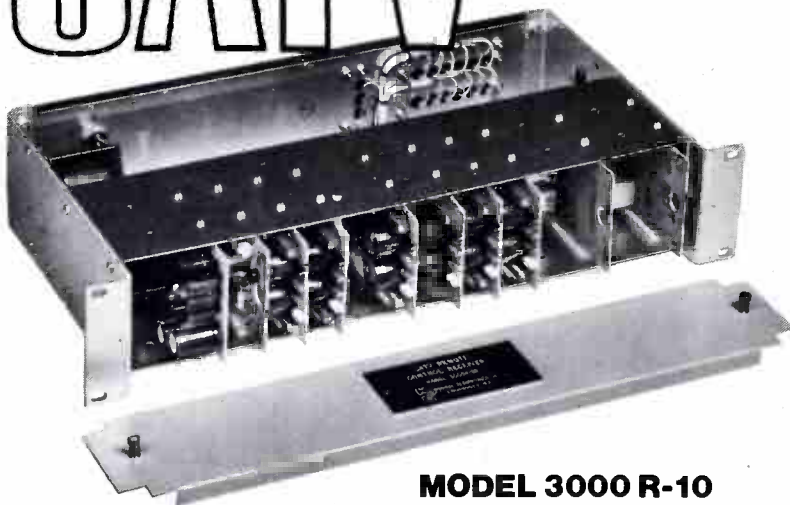
CATA said it was "distressed" by this "secret" agreement and that "rural CATV systems will end up paying more money per CATV hour of service than metropolitan areas."

### Super 8 Film Used For Documentaries

KVIE 6, in Sacramento, CA, will air eight 30 minute documentaries this fall, all produced on super 8 double-system sound film equipment.

The documentary series, produced with a \$40,000 grant from the Corporation for Public Broadcasting and the National Endowment for the Arts, is a

# CATV REMOTE CONTROL RECEIVER - SWITCHER



**MODEL 3000 R-10**

### DOES YOUR COMPUTER KNOW WHEN A BALL GAME IS GOING INTO OVERTIME?

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and was produced by Emiko resident filmmaker at KVIE. Series, called "Equal Time," was shot on a super 8 equipment pack together by Richard Leacock, Massachusetts Institute of Technology and Hampton Engineering.

The biggest technical hurdle, said Engineer Gorman Brown, was getting the super 8 film to quad for playback. "The film projector we were given didn't do the job satisfactorily on our film chain," said

Brown solved the problem by using a Supermatic film videoplayer. "We locked . . . into our film and used it to compile our mixing the super 8 footage with tape, slides and 16mm film." According to Brown, "It is nearly impossible to tell that the original was super 8

## Revenues Topped Two Billion in 1975; Profits Down

Total broadcast revenues of the three major networks (ABC, CBS and NBC) and of their 15 owned and operated stations totalled \$2.1 billion in 1975, up 7.7 per cent from 1974, according to figures released by the FCC in April. But profits before Federal income taxes, at \$314 million, were down about 5 per cent from 1974. The three networks, considered separately, maintained profits even with the increase in sales. ABC reported \$106 million before Federal income taxes, but they had to take in more in sales to do it. The networks had spent about \$160 million on news and public affairs in 1975, up from \$150 million in 1974.

## Actions of the FCC

The FCC's do-it-now FCC is turning out important decisions at such a rate that it is hard pressed for space to print them all. To cover the maximum number of FCC actions, we are presenting them here in abbreviated form, with the Docket or release number so you can get a more detailed story from the FCC—if he wants it. **Used season, again, on AM and FM applications.** Last year the FCC lowered the bars a little on new AM applications, and got a flood of new ones. The 600% increase in AM applications, says the FCC, has clogged the books for both AM and FM actions (same personnel work on both). Accordingly, new or major-change AM and FM applications are *banned* after June 30, 1976 and December 31, 1976. (FCC Release #76-395.) **Applications allowed more time for political spot commercials.** The "advertising" policy on commercials, 18 minutes in each hour, with 20 minutes


in no more than 10% of the weekly total, and 22 minutes if the excess is political advertising, is changed to allow four "extra" minutes, rather than two, for political spot ads. (FCC Release #76-360.)

**Better usage of non-commercial channels.** A notice of proposed rule-making, Docket 20735, asks for comment on a wide range of questions relating to non-commercial FM (Channels 201-220): standards governing classes of educational stations; protection to be afforded; interference on TV channel 6; requirement that non-commercial sta-

tions have a minimum on-air time, and concentrate on educational and cultural material; change in 10-watt assignments, if they are blocking higher-powered, more useful stations; and many others.

**Ascertainment for non-commercial stations.** Beginning with non-commercial stations whose licenses expire August 1, 1977 (who must file for renewal April 1, 1977) non-commercial stations must file a list of 10 important community problems and indicate how they addressed those

continued on page 14




# FM

## BROADCAST TRANSMITTERS

### 3, 5, 12 and 20 KW

*DEPENDABLE, AND EFFICIENT,  
WITH INNOVATIVE DESIGN  
FEATURES FOR TODAY'S  
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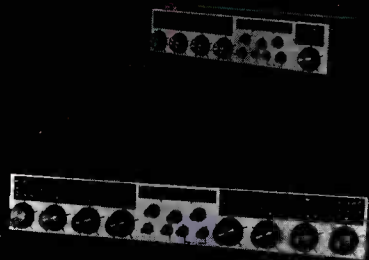
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## NEWS

problems during the year; non-commercial radio stations must ascertain continuously throughout their license term by any reasonable method, and keep a narrative of it on public file; non-commercial TV stations must document leadership interviews throughout the license term. (Docket 19816)

**Inquiry into entertainment formats upheld.** The FCC has reaffirmed its inquiry (Docket 20682) seeking guidelines for FCC action relating to stations proposing to change entertainment formats. A group called the Citizens Communications Center had attacked the inquiry as an abuse of FCC discretion and on other grounds. The FCC pointed out that the US Court of Appeals, in the WEFM case, ruled that the FCC must consider the possible "rights" of an audience to an established format; this court ruling effectively requires FCC inquiry into the matter.

**Changes in cable technical standards.** The FCC proposes to change the rules to make the measurement requirements apply to a single physical plant, rather than in each community served; to relax frequency standards for signals picked up from a translator so they don't exceed the translator standards; to substitute a converter frequency stability standard ( $\pm 250$  KHz) for the present frequency accuracy standard. (Docket 20765.)

**New Jersey does need local TV service, but how to get it?** A long-standing "gripe" on the part of New Jersey residents, that they have no decent local TV service because New York and Philadelphia stations pre-empt the air space, received the explicit assent of the FCC in Docket 20350. The Docket asks for comments on a long list of proposals for remedying the lack, including a New Jersey "presence" for one or perhaps all of the VHF stations whose signals cover the state. Dropping in a New Jersey station on Channel 7, often proposed, is rejected as technically not feasible. Comments by May 3, replies May 24th. (Likely to be extended.)

## FCC Briefs

Addressing what must certainly have been the oldest unresolved matter before it, the FCC settled a controversy going back to 1941 over **clear-channel operation on 770 KHz**: WABC, New York, got day and night Class I-A use of the channel; KOB, Albuquerque, must file for a nighttime directional pattern for Class II-A operation . . . . The FCC has received a report "**Determin-**

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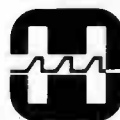
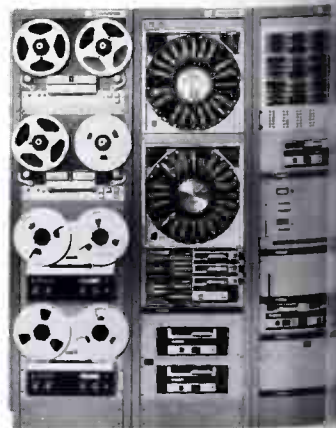
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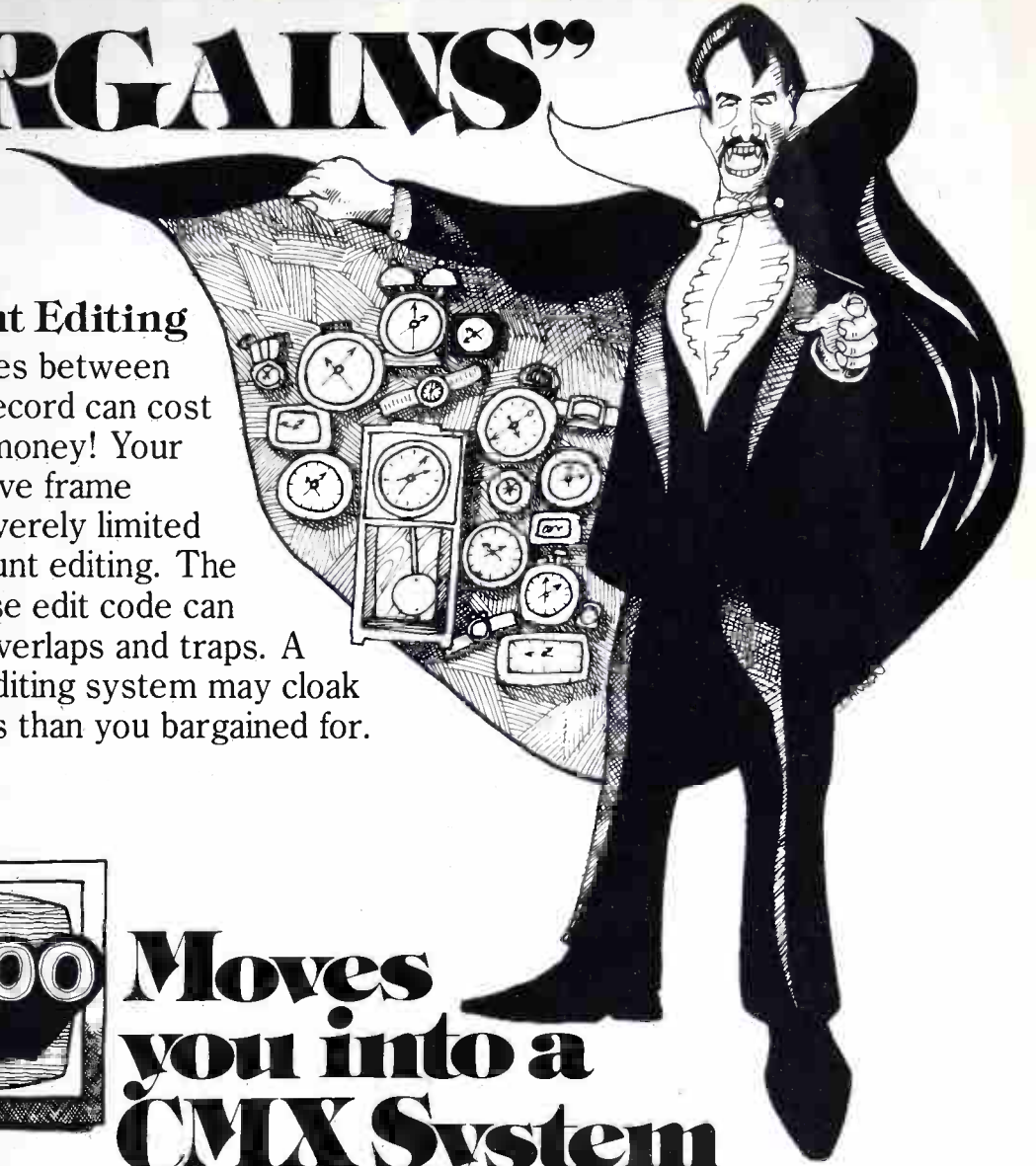
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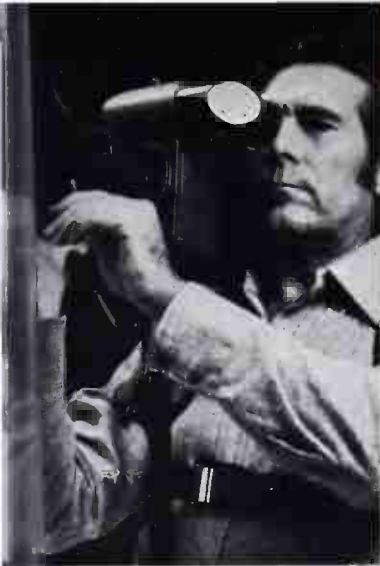
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## NEWS

**ing Coverage by FM Stations,"** describing how FM coverage area maps were developed for the entire US; both report and maps are available in the Public Reference Room of the FCC, 1919 M St., NW, Washington.

The rules for applying terrain roughness in predicting FM and TV field strength contours have been suspended until May 1, 1977, while further studies are made to eliminate "anomalies" . . . . A broadcaster is not responsible for "indecent" language picked up in live on-the-spot news broadcasts, says the FCC; this contrasts with the censure of WBAI for language ruled "indecent" in a recorded comedy program . . . . All FCC forms should be requested from the FCC Forms Distribution Center, Room B-10, Washington, D.C. 20554; copies of the FCC Rules and Regulations come from the Superintendent of Documents, US Government Printing Office, Washington, D.C. 20402.

### News Briefs

**Hughes Television Network and Western Union's Westar** satellite system helped to make hometown fans happy on May 1st, by telecasting the away games of Boston, California Angels, Pittsburgh, Houston, and the Chicago Cubs back to local fans in those cities . . . . **RCA's Satcom II**, which was launched by NASA on March 26, aboard the most powerful Thor/Delta rocket ever built, is scheduled to become operational this month, doubling the capacity of the nation's domestic satellite system . . . . **Western Union** announced that it has put 11 more American cities "on line" with its Westar satellite system. The new cities are, Boston, Buffalo, Philadelphia, Baltimore, Cleveland, Cincinnati, Detroit, St. Louis, Kansas City, Milwaukee, and Wilmington . . . .

**CSI Electronics, Inc.** 2607 River Road, Cinnaminson, N.J., announced that the FCC has issued type acceptance on new CSI FM transmitters . . . .

**International Video Corporation** announced the first installation of its IVC-9000 broadcast videotape recorders in Canada. The machines were installed at **CKWS-TV**, Channel 11, in Kingston, Ontario and **CHEX-TV**, Channel 12, Peterborough, Ontario.

**Bruce Merrill**, president of **American Cable Television, Inc.**, and a recognized national leader in the CATV industry, has formed a new corporation, **Tele-Features, Inc.** which introduced a new Super Channel ser-

continued on page 18

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## NEWS

vice to CATV viewers in the Phoenix area. Super Channel will present a double feature each day and a triple feature each Saturday and Sunday.

NCTA's Board of Directors at their meeting in Dallas, unanimously approved a resolution reaffirming NCTA's commitment to equal employment and ownership opportunities in the CATV industry. An industry committee is planned to meet EEO objectives . . . . **Kal Raasch**, president of the **International Industrial Television Association**, announced the formation of a Government Utilization Committee as an ITVA Special Project. **Lieutenant Commander John S. Ton**, USN, is chairman.

## People

**Robert D. Pabst** has been named president of Electro-Voice, Inc. **Dielectric Communications**, a division of Sola Basic Industries has named **Charles D. Brown** Chairman, **John L. Hutson**, President.

**Harold L. Green**, has been named pointed manager, operations and engineering for Kaiser Broadcasting Company . . . . **Martin Gittleman** joined the staff of Quad Eight Electronics as vicepresident and director of engineering.

**Raymond Yorke** has been named general manager of WL FM . . . . **WNOE AM/FM** announced the appointments of **J. Fred Rile** Chief Engineer and **Bill Massey** a Director of Engineering.

**Albert H. Chismark** was appointed manager of technical services. **Steven Smith** was named director of television engineering by Mer Broadcasting, which also announced that **Thomas J. Durney** has been named general manager of W Radio, Syracuse.

Teleprompter Corp., announced appointments of **James H. Miller** as associate director of programming and **Stanley J. Sols** Director, Management Information.

**John S. Auld** has joined W Cable Corp., as vice president. **Stanley J. Rejniak** has been named vice president of marketing. **Stephen A. Merrill** was appointed General Manager of Tele-Fea Inc.

continued on page

The NCTA headquarter's telephone number has been changed to 457-6700. The new number with a modern Centrex phone that will give each person his own direct dial, four digit number.

# DJ'S



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Ventilated foam cushions eliminate perspiration and let you hear ambient sound and are interchangeable with ear-enveloping cushions.

Weight: 8 ounces. Practically unbreakable components. Optional cough switch.

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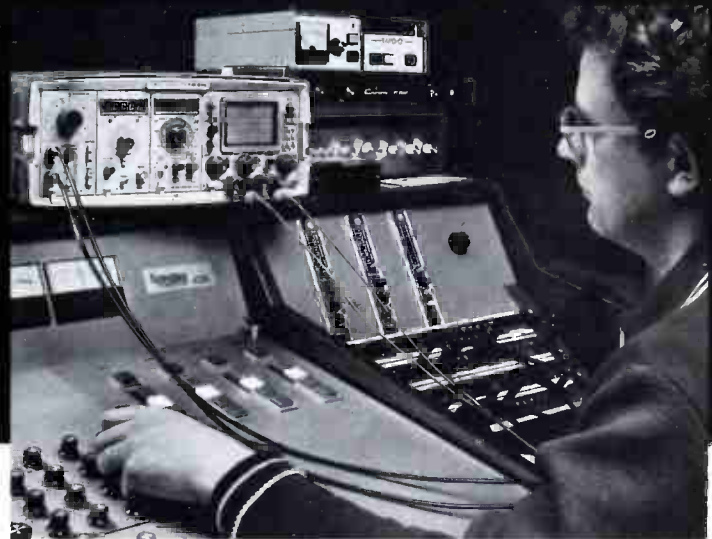
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triggered capability with a tone-burst signal. A rear interface circuit board in the TM 515 Mainframe lets you interconnect the plug-in instruments for applications such as gain, loss, or response measurements—at the touch of a push-button.

The TM 515 Traveler Mainframe looks like carry-on flight luggage, but it's really an electronic instrument mainframe and power supply that operates from 48 to 60 Hz, 100 to 240 V ac with a quick-change line voltage selector. **It's designed to put lab-quality modular instruments conveniently on the road**, to make them easily movable from room to room, useable on a small surface or on end on the floor, or to be easily stashed in the corner out of the way.

**Should you have special needs** requiring different instrumentation, you can select from the more than 35 plug-in modular instruments of the continually growing TM 500 Product Line. For example, the AF 501 Tunable Bandpass Filter selects a narrow band of frequencies for oscilloscope observation and frequency or level measurement. The AM 502 Differential

Amplifier adds balanced input capability, and its high gain extends noise measurement floors. The sophisticated new FG 504 40 MHz Function Generator features log sweep over the 20 Hz to 20 kHz spectrum and full tone burst capability for delay measurement and transient analysis. The Product Line also includes calibration instruments, power supplies, a logic analyzer, and two sizes of blank plug-in that you may use to build in your own custom circuits. **Just pull one or more of the Audio Travel Lab plug-ins from your TM 515 and insert the appropriate instrument.**

To get full specifications, applications recommendations, and prices, send for the TM 500 Catalog. Circle the reader response number or write or call: Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97077, (503) 644-0161 ext. 5283. In Europe write: Tektronix Limited, P.O. Box 36, St. Peter Port, Guernsey, Channel Islands.



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# INTERPRETING THE **FCC** RULES & REGULATIONS

## Commission Reconsiders Fairness Doctrine

By Frederick W. Ford and Lee G. Lovett

Pittman, Lovett, Ford and Hennessey, Washington, D.C.

The Commission took another look at the Fairness Doctrine and reaffirmed it on all counts.<sup>1</sup> The Commission denied petitions by the Media Access Project and The Committee For Open Media for reconsideration of the 1974 Fairness Report.

The Commission also declined to follow the suggestion of Chairman Wiley that the Fairness Doctrine be experimentally suspended in major markets which characteristically contain a plethora of media voices.

The general provisions of the 1974 Fairness Report, as modified by subsequent cases, is discussed below.

### The Doctrine's Underpinnings

The Commission is prohibited from censoring broadcast programming in any manner.<sup>2</sup> At the same time, the Commission is charged with overseeing the allocation and operation of the electromagnetic spectrum in the public interest. One of the Commission's goals is to promote, to the greatest degree possible, an uninhibited, robust, and wideopen debate on public issues.<sup>3</sup> While free speech and open debate on public issues is best fostered by a "hands off" policy by government toward the print media, the scarcity of the airwaves dictates otherwise for broadcast media. The government must, to some limited extent, "interfere" with broadcasting to promote discussion on the important issues of the day by broadcasters. This limited interference with broadcasters' programming discretion is embodied in the Fairness Doctrine. The right of the public to hear contrasting viewpoints concerning important public issues outweighs the broadcasters First Amendment right to freedom of speech (e.g., freedom from government interference in programming decisions).

<sup>1</sup>Memorandum Opinion and Order on Reconsideration of Fairness Doctrine, 36 RR 2d 1021 (1976).

<sup>2</sup>U.S. Const. amend. 1; Communications Act of 1934, as amended, Section 326.

<sup>3</sup>New York Times v. Sullivan, 376 U.S. 254, 270 (1964).

### The Doctrine

A "cut and dried" definition of the Fairness Doctrine is impossible to formulate. The Commission has devised a workable definition by breaking the Doctrine into duties:

- (1) The broadcaster must devote a reasonable percentage of [its] broadcast time to the coverage of public issues; and
- (2) [Its] coverage of these issues must be fair in the sense that it provides an opportunity for the presentation of contrasting points of view.

The first Fairness Doctrine duty does *not* require a broadcaster provide *equal time* for discussion of contrasting views. Rather, the broadcaster must provide *adequate time* for discussion of same. Further, the Commission eschews the task of determining just what "adequate time." This is a duty for the broadcaster, must make a "good faith, reasonable judgment" as to what constitutes adequate time.

A broadcaster does not meet the requirements of the Fairness Doctrine by "passively" complying (e.g., *not refusing* to permit spokesmen offering contrasting points of view of respond to controversial issues arise fortuitously). Rather, a broadcaster has an *affirmative* responsibility to provide a reasonable amount of time for presentation of programming devoted to discussion of public issues.

When reviewing the adequacy of a broadcaster's public issue programming, the Commission will not substitute its judgment for that of the broadcaster. The Commission will only address the *reasonableness* of the broadcaster's public issue programming choices.

The second Fairness Doctrine duty requires broadcasters to provide reasonable opportunity for opposing viewpoints. Most Fairness Doctrine complaints are a violation of this duty. When confronted with a requ

continued on page 22



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KBWD's Jim Laird explains what Precision Monitoring can add to broadcast capability



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"When you've got an opportunity to get the best, why not go for it. I've read the broadcast books for a long time, and it seems that TFT gear is above the rest. You get what you pay for, and they (TFT) just put it more into the system."

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### On Accuracy

"... very darn good when it comes to proof of performance. If I have an error, I look at the transmitter, not the TFT monitor... I have the utmost confidence my TFT is telling the truth."

### On Design

"... they seem to be more easily operated as far as the way you set the thing up. And the fact that they can be located right here at the studio is one thing we really like."

### On The Frequency and Modulation Monitor

"... FM was a new adventure for us, and I needed good readout of our pilot. The TFT 723 was right on the money then and we're using it all the time now."

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"... It does have the extra human engineering to make it easier to operate. I feel the thing is considerably more stable than others too."

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"... well, we got our FM gear based on our experience with the TFT AM monitor. Now, after checking out the FM, I envision having TFT at all the stations we own."

### On Price

"... sure it costs more, but even if I'd been on a tight budget, I wouldn't have scrimped on the TFT monitors... it's the only way I can keep my transmitter honest... do everything I want it to do and get a little bit more out of it."

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## FCC RULES & REGS

make a Fairness Doctrine response, a broadcaster should ask two questions.

*Question 1: Is the matter a controversial issue of public importance?*

There are several factors which must be considered in answering this question. Mere broadcast or newspaper coverage is not enough, itself, to make an issue a matter of significant public importance. The degree of media coverage can be considered as one factor in determining a particular issue's importance. The primary factor is whether a broadcaster *subjectively evaluates* that the issue will have a *significant impact* on the community as a whole.

In determining whether an issue is controversial, the degree of media coverage is a much more important factor to be considered. Additionally, the attention paid to an issue by community leaders and elected officials must be factored into this determination.

As a general rule, private controversies among individuals do not invoke the Fairness Doctrine. Public controversies often do (e.g., a local school bond issue).

*Question 2: What specific issue has been raised?*

It is sometimes extremely difficult to pinpoint the issue raised. An often-cited Commission example of this problem involves a controversial bond issue to fund teachers' raises and facility improvements. The bond issue, itself, might be controversial in the community; teacher raises and facilities improvements may not be. Broadcast of a discussion of the need for new school construction would not raise Fairness Doctrine duties.

The Fairness Doctrine refers to local, regional and national controversial issues. Of course, an issue may be controversial in one community, but not controversial in another community.

Broadcasters need not present *all* sides of a controversial issue either (1) when first airing the controversial issue of public importance or (2) when permitting presentation of opposing viewpoints. As with other aspects of the Fairness Doctrine, the Commission defers to the discretion of the licensee. The Commission's policy is to refrain from even a semblance of control over program content. The broadcaster is expected to "make good faith, reasonable judgments" in presenting the major viewpoints in the spectrum of opinions concerning a particular controversial issue. The Commission has declared that it will not review a broadcaster's "reasonableness" based upon the handling of one particular issue in one particular program. The broadcaster's "overall performance" will be considered. A broadcaster can rebut a Fairness Doctrine complaint with a listing of programs that have presented opposing viewpoints and have been aired either *before* or *after* the complaint was filed. For this reason, it is recommended that licensees retain detailed listings of all programs presenting particular views of controversial public issues. When a complaint is received, the licensee can simply draft a list of all the opposing viewpoints presented over the station to rebut the complaint.

The choice of spokesmen for opposing viewpoints has not been strictly defined by the Commission. On the one hand, it is clear that a licensee cannot have a neutral party (e.g., one of its own employees) attempt to present all sides of controversial public issues. On the other

hand, broadcasters are certainly not expected to permit any "crackpot" who walks in off the street to present opposing views. Broadcasters should permit "responsible party spokesmen" to present opposing viewpoints.

Once a broadcaster has met its affirmative duty of providing adequate air time for discussion of public issues, it has several means of assuring that opposing viewpoints will be aired. Before or after the broadcast of controversial issues; many broadcasters insert announcements soliciting opposing viewpoints from responsible spokesmen. Many controversial issues are clear cut (e.g., in the 1960's, the Viet Nam War) and a broadcaster will have no trouble in simply contacting organizations known to have opposing viewpoints.

A broadcaster may at times fail to locate a responsible spokesman for opposing points of view in spite of good faith efforts to do so. In such an event, a licensee is excused from presenting an opposing point of view. However, the Commission requires that broadcasters make diligent searches for persons espousing opposing views, including *specific offers* of air time to individuals known to the spokespersons for those opposing viewpoints.

When a spokesman for an opposing viewpoint is put forward, a broadcaster may not refuse air time simply because the spokesman lacks the ability to pay. The broadcaster can certainly negotiate for full or partial payment; but if the spokesman is financially unable, the broadcaster must be provided air time free—unless another more affluent spokesman for the *same* viewpoint can be located.

### Standard Product Commercials

The Commission reaffirmed its position that the Fairness Doctrine will not be applied to standard product commercials. One public interest organization has petitioned the Commission to apply the Fairness Doctrine to product efficacy advertising. The Commission rejected this suggestion, reiterating that its inclusion of cigarette advertising within the parameters of the Fairness Doctrine was injudicious at best. Also rejected was the mandatory allocation of broadcast time for free spot messages by spokesmen for opposing points of view.

Editorial advertising continues to come within the constraints of the Fairness Doctrine. Thus, if a protection group buys time to broadcast an editorial, the Fairness Doctrine comes into play for the broadcaster concerning competing viewpoints. As in other areas of Fairness Doctrine regulation, the Commission will not review a broadcaster's actions in terms of what the Commission would have done; rather, the Commission will simply determine whether or not the broadcaster exercised reasonable, common sense judgment in providing for opposing viewpoints.

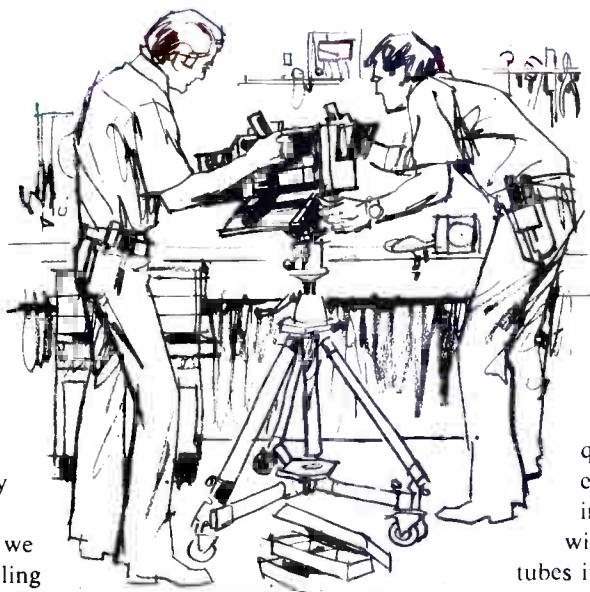
The periphery of editorial advertising causes broadcasters untold problems. For instance, during the energy shortage, many of the larger oil companies aired commercials discussing the opening of the Alaskan oil fields and construction of the controversial trans-Alaskan pipeline. The question arose as to whether this constituted a discussion of a controversial issue of public importance or was simply an advertisement aimed at enhancing the company's public image as a leader in developing energy sources. The Commission has declared that the Fairness Doctrine does not apply in such a situation.

continued on page



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## FCC RULES & REGS

the ad bears only a tenuous relationship" to debate concerning the controversial issue.

In this situation, too, the Commission will limit its review of a broadcaster's decision not to treat the issue as a controversial issue of public importance to whether the licensee made a good faith judgment.

In sum, the Commission will apply the Fairness Doctrine to those commercial advertisements which discuss public issues in an *obvious* and *meaningful* way.

### Fairness Complaints

Licensees should be cognizant of the specific information that must be included in any Fairness Doctrine complaint made to the Commission:

1. The station or network involved;
2. The specific issue of a controversial nature broadcast (complainant should include an accurate summary of the views broadcast by the station or network);
3. The date and time when the issue was broadcast;
4. The basis for the claim that the issue was controversial and of public importance;
5. Reasonable grounds for the claim that the station or network broadcast only one side of the issue in its overall programming;
6. Copies of correspondence between the complainant and the station and/or network, and
7. Whether the station and/or network has afforded, or expressed an intention to afford, reasonable opportunity for the presentation of contrasting viewpoints on the

issue.

The biggest shortcoming of all Fairness Complaints is the failure to make a specific enough identification of the controversial issue broadcast. The Commission has indicated that it will not assume the task of defining the specific issue involved based upon material submitted by the complainant. It is the complainant's responsibility to specify the issue. The complainant also bears the burden of demonstrating a "prima facie evidence of violation of the Fairness Doctrine. If the complainant does so, the Commission will solicit the broadcaster for a justification of its actions. The licensee need only show that it acted reasonably and in good faith. The Commission will not substitute its judgment for that of the broadcaster.

### Conclusion

As might seem apparent, the complainant normally labors under a heavy burden of proof in demonstrating a prima facie case of violation of Fairness Doctrine obligations. Broadcasters who 1 study the 1974 Fairness Report, 2 maintain a complete list of all discussions of controversial issues (including day and time of broadcast as well as the particular viewpoint voiced) and 3 follow some of the procedures noted above, insulate themselves, to a significant extent, from adverse Commission action on Fairness Doctrine complaints.

The entire scope of the Fairness Doctrine is fraught with difficulties and underdefined gray areas. This article has not attempted to thoroughly cover every facet of Fairness Doctrine application. Communications counsel should be consulted frequently to assure compliance with Fairness Doctrine obligations. **BM**

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## Sharp panel debate—

# Can A Radio Station Afford A High-Quality Signal?

Some stations can, and do put out a good signal. But if the competition is hot and heavy, especially with pop music, the level has to be kept very high, and dynamic range and cleanness are likely to suffer. Broadcasters tell audio men at AES Convention those are the facts of life.

A group of broadcast engineers exchanged barrages with a roomful of audio professionals at a panel session of the Audio Engineering Society Convention in New York in November, on the topic of the audio quality of broadcast signals: why it is low (if it is) and what if anything can be done about it.

The broadcasters told it straight out, what they were doing and why, and the audience responded with a flood of comments, disagreements, questions, right up to the closing bell. The overall result was probably a clearing of the air; a number of comments from the floor indicated that the audio men appreciated the bind the broadcasters described. The session ended with some tentative guidelines for a better future.

Moderator of the session was this magazine's own James A. Lippke, Editor. On the panel were: William McCarren, assistant director of AM transmitter engineering. CBS Radio Network; Ted Ronneburger, chief engineer of WXLO-FM, New York rock station, affiliate of WOR; George Endres, chief engineer of WRVR-FM, New York jazz station; Bob Deitch, assistant chief engineer of WABC-WPLJ-FM, more New York rock stations; and Dick Sequerra, audio consultant, designer of super-quality FM tuners, general gad-fly. Bill McCarren started things off by noting that the antenna and transmitter must be carefully adjusted for even loading through both sidebands or the signal quality will be hopelessly compromised. He said there was no question that heavy use of processing would make the signal "loud"; but if such processing is to be used, proper side-band adjustment of transmitter and antenna was needed more than ever to avoid signal degradation.

Bob Deitch said that he felt the WABC signal, noted for being one of the "loudest" in the city, was pretty clean. He said the "garbling" Jim Lippke complained about was actually very fast speech delivery of the station's disc jockeys. He said there are no "black boxes" at WABC, the processing is all with commonly used equipment, in standard application, including a UREI Model LA3A limiter set for 7 to 10 dB of levelling, then a Gates limiter at the transmitter, set lower than that. An AGC amp is also there for errors: it doesn't react to normal ups and downs.

Deitch made an interesting point on reverb: he believes a major part of the station's "loudness" comes from the use of an EMT reverb unit *after* all limiting. Reverb ahead of the limiting, he said, will change with level and that is annoying to the listener. With the reverb at the end, it tends to keep the level "even," filling

"holes" so the apparent loudness stays up.

He said he felt the use of carts was a disadvantage to signal quality: "This might, indeed, worsen the signal-to-noise ratio." He said it was necessary, when running at a very high level of average modulation, to have plenty of reserve in the power supply: WABC uses a supply line for a 100 kW transmitter on its Harris 50 kW transmitter.

Ted Ronneburger laid on the line the difficulties of being the engineer of a station in hot competition. His top rock-and-roll sound must be competitive with that of Bob Deitch's WABC, a tough assignment. His processing equipment is similar to that at WABC—a LA limiter, then a Gates FM limiter at the transmitter. He said the program department was constantly pushing for ½ dB more of level to beat the "other fellow." It resulted in a signal he was not necessarily happy with, but he saw no way of changing things.

George Endres put himself right beside the others when Jim Lippke asked if his reportedly very "clean" signal was therefore not very loud. Endres counted down: "No, we are a little dirty and pretty loud." He said he used much the same approach as Ronneburger at WABC (Endres was formerly chief engineer there). WRVR, however, uses AGC which goes to about 10 dB and then quits (much less than some stations). He said one difficulty was that his combo operators often set the level above or below zero on peaks; if they are low, the signal is weak; if high, it is too compressed.

Endres praised the use of a graphic equalizer to level everything in the audio line "flat" before processing is applied: the line is set up at 27 points across the spectrum, using broadband noise and the Belar method. Tests are made at a very low level, 30-35 dB below peaks, so all compression and limiting are out. "This has been very helpful to us in improving our signal," said Endres.

He expressed even greater unhappiness than Deitch with the quality of cart equipment. "Something has absolutely got to be done about stereo cart machines," Endres, calling them the worst "sin" in present day broadcast station equipment. He asked for some form of cassette or other equipment that can handle tape more precisely. "The mono mixdown is poor at many stations. 'The single biggest problem,'" he went on, "is that every time you slam the peak limiter you lose highs."

Dick Sequerra, moving away from the specifics of broadcast practice, said the industry must get back to basics to solve the contradictions evident. That means

continued on page 24



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## HIGH-QUALITY SIGNAL

said Sequerra, defining what a radio station is supposed to be, what the program material is. He said the AES could do a big thing by setting guidelines for technical excellence in broadcast signals; for example, defining in descending order of excellence various grades of signal. Then we would know what a "transparent" station is. Station audio processing should not enter the equation. A main problem is that we don't know what we want. What is it our processors are trying to "fix up"? Are our statements about broadcasting really true? We must define desirable bandwidth, dynamic range, S/N of a complete system, including the receiving system.

Endres responded that this makes theoretical sense, but in real life what we have is a highly differentiated audience, characterized, for example, by the 1-inch car radio speaker at one end of the spectrum, and the fine hi fi speaker at the other. Why not set our sights on a "target" audience that we actually have, try to satisfy them?

Sequerra said, yes, define the market, but this doesn't define the system nor the characteristics of the audio processing—that must be done from technical points of view.

Several questions from the floor made it clear that the audience had got the message of (a) the problem of the differentiated radio audience, with many levels of receiver quality, and (b) the difficulty imposed by the loudness problem in competitive markets. Two speakers on the floor, both associated with college stations, told similar stories of greatly improved audience response, not only on campus but throughout the community, with sharp improvement in dynamic range, lower distortion, etc.

Bill McCarren said yes, many stations have done it when there was no one else to take the audience away from them. He cited the case of the CBS station in St. Louis, a 50 kW clear channel with no community competition, where the engineering department is under no pressure to "hype" the modulation, sets signal quality by other considerations. Boston is entirely different, with five 50 kW stations within reach. And New York is perhaps worst of all: New York cannot tolerate dynamic range. "It's a fact of life we have to recognize," said McCarren, "given two stations with the same format, maybe playing the same records, and with equal signal strength, then the station with the least dynamic range is always going to come out with the highest ratings."

A couple of speakers from the floor again made the point that stations with a hi fi audience, or in some cases with progressive rock, have been under pressure from listeners to "clean up" the signal (earlier stories in *BM/E* have described several such situations). The point was clear that, yes, there are a number of situations in which a station, not competing for the mass top-40 audience with other stations, has served its economic interests with "better" rather than "louder" sound. The growth of "hi fi" consciousness in the listening public has had a definite effect. But most or all such stations use *some* limiting to make sure of reaching the community fully.

Victor Campos of KLH, familiar as a gad-fly at earlier AES meetings, expressed from the floor in forceful terms the unhappiness of audio professionals with much of the



The Audio Engineering Society panel on audio in broadcasting fields questions from the floor. From left: J. Lippke; Bill McCarren; Dick Sequerra; George Endres; Ronneburger; Bob Deitch. Photo courtesy AES.

signal quality on radio. He cited his experiments to show that even with "very modest" receiving equipment, was capable of "very, very good sound." But he acknowledged that many FM broadcasters are in a bind: commercials have to be heard as widely as possible.

From the floor, too, came a statement with an interesting twist from Mark Xenakis, chief engineer of New York (again) classical station, WNCN. When the station turned to classical music after its fling with rock, WQIV, Xenakis was told by the management, he should eliminate all audio processing, feed the turntables tape directly to the transmitter: the station's listener said management would not put up with any kind of AGC, limiting, etc. (This must be the *only* case in which a station *management* demanded that the engineering department cut out processing totally.) Xenakis said he did exactly that—and listener complaints started to pour in from White Plains, Poughkeepsie, etc., where they were getting a poor signal. The management got highly perturbed. Xenakis said he made the listeners, and so management, happy by slipping back in about 15 to 20 dB of compression!

Xenakis got considerable flack from the floor. George Endres on the panel backed him up by pointing out that two classical stations, WGMS in Washington and WFMT in Chicago, were both getting good results with "very carefully applied AGC." He said "beyond argument" that on FM radio the classical format—or any other kind—needs some amount of audio processing.

Dick Sequerra then made a statement that provided a useful and suggestive finish. He said the way to determine the kind of audio processing needed was not in terms of how many listeners complain. He agreed that every station needs audio processing. But he suggested that audio processing does not need to garbage up the signal as it does in too many cases. "The way to define (the amount of) processing is in terms of the capability of the program material under average receiving conditions . . . do you want the processing by accident or by design?"

This thought will be explored further in an upcoming issue of *BM/E*, which will survey the available audio processing equipment, including such new units as the Optomod and the new Volumax which are aimed at providing lower distortion than was common in the past.



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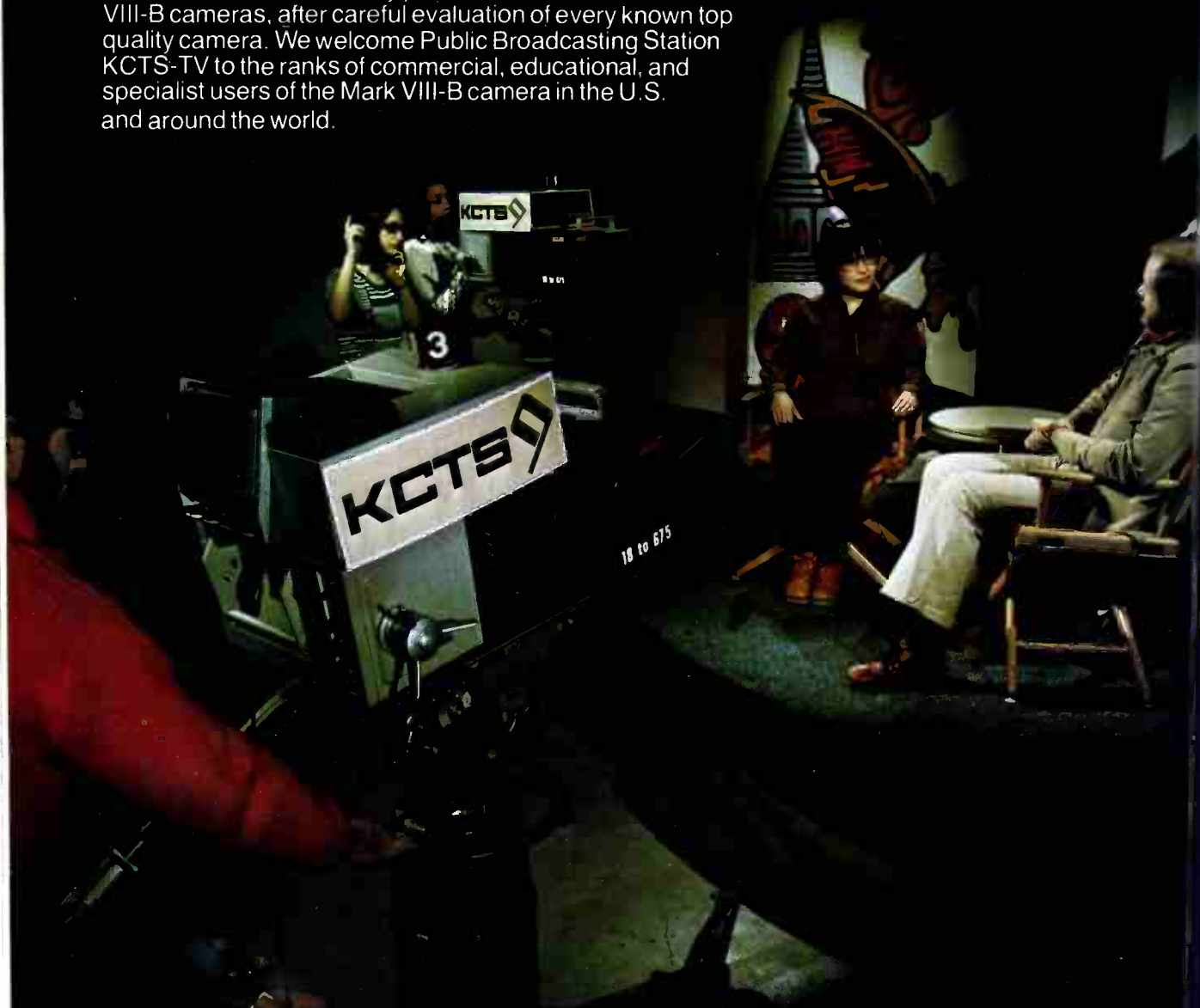
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# Microphone Technique: It's Alive And Well On The CBS Radio Hit Series, "Mystery Theater"

The "old fashioned" microphone techniques used on the CBS radio drama revival could enliven and enhance many current radio programs, live or recorded—and often save time and money to boot. Here is how a highly expert team puts together the radio series that has grabbed an army of addicts right out of the television generation.

Scene: Two actors are standing in a radio production studio facing each other, speaking a very romantic dialogue into a single microphone that is between them, but on a level with their heads. As the emotion grows, the man moves a trifle closer to the woman and the microphone turns more directly toward it. He reaches with his non-script-holding hand over to the woman's shoulder in a direct expression of "affection." She moves in a trifle closer too, and her voice registers sharply a response to the man's gesture. In the control room that looks down on the studio, two men smile as everything is up to standard in the production of the fifteenth radio drama for the CBS hit series, "Mystery Theater."

One of the men, of course, is Hi Brown, producer of a number of the most famous radio dramas of the 1930's and 1940's, who refused to stop plugging for a revival of the form he helped create. Three years ago, CBS agreed to gamble on a revival series produced and directed by Brown, and the result is radio history. Mystery Theater is running for an hour every day of the week on more than 200 stations, and has a fanatic following of some 2 million listeners.

Mystery Theater fans agree: Brown has won handsomely on his contention that well produced radio drama can stimulate the imagination in a way television cannot. The listener himself creates a more fearsome fear, a more glorious joy, than can ever be "shown" to the eye. The other man in the control room is Fred Himes, technical director, artist with microphones, responsible for the technical end of getting each show on the tape with the sound that works effectively for the atmosphere and action of the story. The romantic scene described above illustrates clearly his basic method.

As can be seen there, (it actually happened), he does not use today's predominant technique of close-miking, with a mike for each actor, recorded on a separate track with the show "assembled" in post-production. That would mean, says Himes, that the actors would be tied to the mikes and isolated from each other, whether sitting at a table or standing in the room at a distance apart. Brown and Himes want the actors to move, to express emotion with their bodies as well as their voices, and especially to interact directly with each other, as the two "lovers" did in the scene



Technical director Fred Himes adjusts "cast" microphone for taping of Mystery Theater drama. Much of dialogue is recorded with this single mike, with actors in the two lobes of figure-8 pattern. Higher mike gets more reflections, can put "room" around actors.

described.

"Separate" miking would break down, too, when the actors shout, which they obviously must do from time to time. There would be heavy leakage from one track to another. It is far better to have everybody on one track, able to shout, move, interact.

That motion and interaction give the show its life. Another example: in a recent show there are three murders in rapid succession. The actor "murderer" actually lunged toward each "victim." That lunge helped him express hate and violence with an intensity he could never have achieved sitting at a table, tied tightly to a mike pattern.

Moreover, the listener hears real bodies falling onto a real floor. The effect could be simulated in a mix-down with various kinds of audio processing, but at much greater cost in man-power and time (more on that presently). And further, the motions of the various participants with respect to the mike help give the listener a sense of the motions in the story. With careful handling,

continued on page 32

## MICROPHONE TECHNIQUE



*In control room producer-director Hi Brown signals actors to start scene. Himes rides gain; frequent adjustment of level is needed. Brown can stop tape to correct a scene, then re-do it, but no changes can be made in a "mixdown" because there is none; all recording is in full-track mono.*

motion in and out of the mike can be used to reinforce aurally the story motions.

A considerable part of many shows is done with the single mike used in the opening scene—it is a Neumann U67, with a figure-eight pattern. An omni mike would get too much room sound. Thus, in most face-to-face dialogues, there will be one or more actors in each "lobe" of the mike.

The Neumann hangs near the center of the studio, away from the walls, so that the ratio of direct to reflected sound is high, and the listener does not get a strong sense of a room around the actors. Then the sound effects and dialogue can create a "setting" out of doors, in a street, etc.

Himes sometimes puts a second omni mike right next to the Neumann, or "cast mike," at 90° to it. With filter/reverb added, this can be used for "ghost" voices, without serious leakage of the "ghost" into the cast mike.

There is another mike several feet higher and looking down at the cast mike, which gets a much higher proportion of reflected sound. To put a "room" around the actors, Himes can mix this mike in—or use it for the full pickup. Other mikes are used from time to time in the corners of the studio, even occasionally in the corridor outside, for various special effects.

But no matter how many mikes are used, they are all mixed in *before the program goes on the tape*—recording is in full-track mono. Also mixed in to the single track are the sound effects and the background music (of which more in a moment).

Himes does use audio processing for certain effects. He has used a "flanger" on a voice channel to get a fluttery, science-fiction strangeness in the voice. He has two channels of reverb he can add to voices to make them overfull, grandiose. For telephone quality, he uses, literally, a telephone, in a sound-proofed booth at the rear of the studio; it is open so actors can duck in and out with no door sound.

A Pultec can be switched in to help, for example, in indicating that an actor has moved from indoors to out: at



*In studio, two actors do a scene from opposite sides of a mike. Note beginning of man's punchy gesture. Beyond actors is "telephone booth," into which actors can duck make call on a real telephone. Sound effects man Pete Prescott, right rear, works right in studio with actors.*



*Prescott, about to close his "door," gives timing cue to actor in foreground. Bottles on sound effects stand were used for pouring drinks in front of mike, for convincing party sound. Crumpled newspaper was left over from scene in which murderer ransacks a living room, looking for hidden recorder.*

the right moment the Pultec takes out a carefully determined amount of bass, leaving that flat, non-reflected, bass-weak quality characteristic of out-of-doors sound.

But a considerable part of the "naturalness" of a punch come from expert use of the microphones. For example, a nurse is frantically looking for a child who turns out, has climbed a tree and can't get down.

The nurse's calls to the child are "on mike," up close with the gain down so she seems right next to the listener; the child's voice is made to seem far away by having her about eight feet from the mike, but speaking directly into it to minimize the reflections that would be unnatural in the "setting."

A somewhat similar mike technique made the actor seem "natural" when an actor was supposed to be speaking across a small lake.

Here are a few more examples of the ingenuity Himes must come up with for one script after another. An actor has been transformed into a spider and is speaking inside a bottle. Some experimentation led to a person can over the mike, with the actor speaking directly into the bottom of the can from a few inches away with some filtering in the mike channel.

For an actor speaking on the far side of a closed door, Himes made a device of several painter's masks together, with felt between each "layer." The actor holds this over his nose and mouth while he is supposed to be beyond the door, drops it when he "comes into the room."

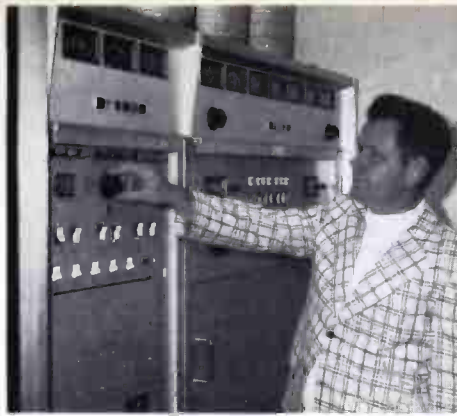
Himes agrees that for many kinds of program production... continued on page



# WEDH-TV

## W RCA ANTENNAS AND TRANSMITTERS BRIGHTEN THE PICTURE FOR TWO VERY DIFFERENT STATIONS

WEDH-TV, Tucson, Arizona, and WEDH-TV, Hartford, Connecticut are as different as two TV stations could be. The first is a highband commercial station; the second, a public TV outlet. What they had in common was the need to improve their transmission facilities in a way that assured stability, low maintenance and improved picture quality. RCA helped both stations attain their objectives. Here's how:



### RCA TT-25FH TRANSMITTER "AN ALL AROUND PERFORMANCE WINNER," SAYS GLEN HILLS, KGUN-TV.

"Our 25 kW RCA transmitter has been operating for well over a year now, from the top of 8500-foot high Mount Bigelow," reports Glen Hills, Chief Engineer, KGUN-TV. "The

**"...improved our picture quality substantially."**

transmitter has been reliable, very stable, and has improved our picture quality substantially.

"With only two broadband stages, the TT-25FH is easy to tune, but that's rarely necessary. Ours goes three or four months without more than a touch-up. The automatic controls minimize the need for constant tweaking.

"Sometimes in the summer, lightning storms turn Mt. Bigelow blue, but we've had no lightning problems. It doesn't affect the transmitters' solid state circuits. Our picture even looks good when we're

**"...just sits up there and runs!"**

transmitting with our emergency diesel generator—and the transmitter seems immune from generator effects.

"The TT-25FH just sits up there and runs. It's a winner!"



### "TOP-RATED TRANSMISSION ON A BUDGET," SAYS JACK KEAN, VP/ENGINEERING, WEDH-TV.

"Public television needs a quality picture as well as worthwhile programming to get and hold audiences," says Mr. Kean.

"Our RCA Antenna/Transmitter system was installed in 1973. It has given us excellent coverage and signal strength—to the point where WEDH is currently the top-rated Public Television UHF station, and #5, among all Public TV outlets.

"Our new TFCU-20J omnidirectional antenna resulted in a phenomenal

**"...phenomenal improvement in signal clarity."**

improvement in signal clarity, in null areas and giving us excellent reception to all of Hartford, minimizing the need for roof-top antennas."

The new transmitter for WEDH was an RCA TTU-60BX with an economical standby power option. It is a single-ended 60kW transmitter with a klystron switching arrangement that permits one of the visual klystrons to function as an aural amplifier in the event of an aural klystron failure.

"The TTU-60BX transmitter is remote-controlled from the studio, and its redundancy features are

**"...support as outstanding as the equipment."**

excellent. The spare exciter with automatic switchover gives us full protection—and we no longer have to man the transmitter site.

"RCA support has been as outstanding as the equipment."



## MICROPHONE TECHNIQUE

tion today—large-group music, rock and roll, material with very many far-out sound effects or synthesized music—multi-track recording and mixdown are advantageous and are here to stay. But for his kind of show, and at least as a supplement on many other kinds, he believes that the old “pure” mike techniques can do things better, more effectively, and faster (see below).

The sound effects, naturally a vital part of each show, are a story in themselves. In charge of sound effects is Peter Prescott, another veteran of the “old” days in radio. He has a sound effects stand on the opposite side of the studio from the control room.

Prescott has all the traditional sound “tricks” that have been described scores of times—the gravel bag, the horse-hoof cloppers, etc., etc., and two microphones to pick them up. He has an actual door (four feet high) to slam, or open, or shut stealthily, with a microphone to get the bass “wump” of the door and another for the high pitched sounds of latch and lock. He has a large repertory of sound effects on carts, and records, plus six cart players and two turntables.

To put it all together, he has a small subsidiary mixer panel right in his sound effects box. He sends his sound effects by cable over to the main console, where they are mixed into the program before it goes on the tape, as already noted.

That means Prescott has to do his work in real time, right along with the actors. As Fred Himes points out, again there is genuine interaction, in this case between Prescott and the actors, and it puts a lot of life into the show. Prescott can time his door, for example, to exactly the right moment in the dialogue as it is spoken. The actor, for his part, can respond directly to any sound that Prescott sends over.

Having the sound-effects operation right in the studio

at some distance from the actors and the cast mike only allows the actors to hear the sound effects acoustically, for direct timing, but also, says Himes, improves the naturalness and “punch” of the sounds as recorded. The combination of main pickup with a mike right on a sound-effect stand, plus a low leakage of sound effect into the cast mike about 20 feet away creates an enhanced naturalness far superior to that of pre-recorded sounds.

Himes has some advice for anyone who wants a sharp pistol shot, recorded with a real pistol: turn off but one mike. If several mikes are used, the shock wave from the shot will reflect to one mike after another in multiple-shot recording that has a blobby, blunted effect. By the same token, if you want a fusillade effect, use a multi-shot device in a long corridor, with two or three mikes spaced very far apart. Then the reflections at the end of the corridor will multiply six or eight times into a volley from a full battalion.

Many sound effects come from doing the thing for itself—when an actor says, “Put those groceries on the kitchen table,” Prescott is ready with a heavily loaded paper bag he puts down in front of his mike; when an actor says, “How about another drink?” Prescott gets water from a bottle into a glass; the gurgling and splashing are totally convincing.

But when they needed the sound of a car falling from a bridge into a river, large objects into a large tub of water didn't do it: it took water poured into the water!

The last element, background music, comes from a library of about 500 carts that are stacked up just behind the console operator's position. These have been intensively classified and labelled so that Brown Himes, can put his hand quickly on the kind of recording needed for any part of a show. If music of the wanted kind is not already on hand, CBS is asked for it ahead of time. The console operator is handed the carts for the show with a cue sheet.

Himes points to another area in which his tech-

## Ampex Introduces Radically New Audio Machine



A new audio tape machine by Ampex with radical advances in tape handling and electronic design was shown to radio and recording professionals for the first time at the Audio Engineering Society's 1976 Convention in Los Angeles, May 4 to 7. Called the ATR-100, the machine, said Ampex, is ready for immediate delivery at prices that begin under \$5000.

Tape handling on the ATR-100 does not depend on pinch rollers in pulling tape, but uses a closed-loop electronic servo system that controls capstan and both together to put exactly even tape tension on both sides of the capstan. The servo is driven by digital computer logic that senses the motion of the capstan, the direction of motion, the size of the heads and width of tape, the amount of tape on each reel. The logic puts them together so that the motor drive on the reels can control the tape at all times, maintaining constant tension on the heads and capstan. This provides, says Ampex, “even tape motion that, along with the improvements in electronics, “permits the most accurate reproduction of original and recorded sound ever achieved on tape.”

The totally new signal electronics, says Ampex, performance specs that are as much as 10 dB, or an order of magnitude, better than any audio recorder now on the market. Signal to noise ratio is rated at better than 80



Methods are vital to the show: economics. Brown processes about 195 shows a year, four every week. Stations run four new shows and three repeats a week. Unless the shows were made swiftly and efficiently, the project would be impossible.

And they *are* made efficiently: Himes reports that the taping of a show rarely runs to the full three hours of the "all" for the actors. The actual drama runs about 45 minutes with introduction and postscript; five commercials for CBS, and five for the station (the commercials do not come in the middle of the drama), bring it to 53. A seven-minute newscast completes the hour.

The usual procedure is for the actors to have a single run-through with the script and the sound effects, and then the actual taping starts. This superspeed production is possible because the actors Brown uses are generally highly experienced radio "voices" who need only one run-through to get at the guts of a drama. And they are microphone-wise: they know that up close to the mike and low is "intimate"; if they are going to shout they have to pull back a little, etc. A very similar situation prevails in pop music recording: veteran jazz "sidemen" can come into a recording studio, pick up a piece of music they never heard before, and play the heart out of it after one or two run-throughs.

The taping of Mystery Theater usually ends with a number of segments of tape, as many as a hundred, which represent the stopping and restarting of the show to eliminate some "clinker" or other. Himes and his crew assemble these into a finished show after the actors leave; it usually takes no more than a couple of hours.

Himes concludes: "If we had to put the show together, get the 'sound' with fancy processing in a mixer, it would take three times as long as what we do, and cost three times as much. And the show wouldn't be any better—it wouldn't be nearly as good! All of us who work on Mystery Theater feel we are doing something worthwhile and artistically satisfying—and it is a success wherever." **BM/E**

... track at 30 ips), combined record and reproduce response is  $\pm 3/4$  dB, 100 Hz, to 15 KHz at 15 ips (compared with the generally claimed  $\pm 2$  dB of most top-grade audio machines).

The control panel is a matrix type with all buttons in an area about the size of a pocket calculator. It can be on the right or left side of the machine, or separate from the machine in a remote-control version. Other standard features are PURC (Pick Up Recording Capability), an electronic tape timer, an editing knob that allows the operator to move the tape exactly to a wanted edit point, and tape heads with a one-year guarantee. The machine can be used with any two of the four standard speeds (not necessarily adjacent), 3 3/4, 7 1/2, 15, and 30 ips. It can handle 14-inch reels for six hours of playing time at 3 3/4 ips, suitable for radio automation systems, says Ampex. Arthur H. Hausman, president and chief executive officer of Ampex, said: "The ATR-100 is a milestone in practical sound recording that spans nearly 30 years of pioneering leadership in audio engineering and incorporates modern computer technology." He pointed out that, along with a number of other Ampex audio and video innovations this year, it results from research and development investments of more than \$70 million since 1959. **BM/E**

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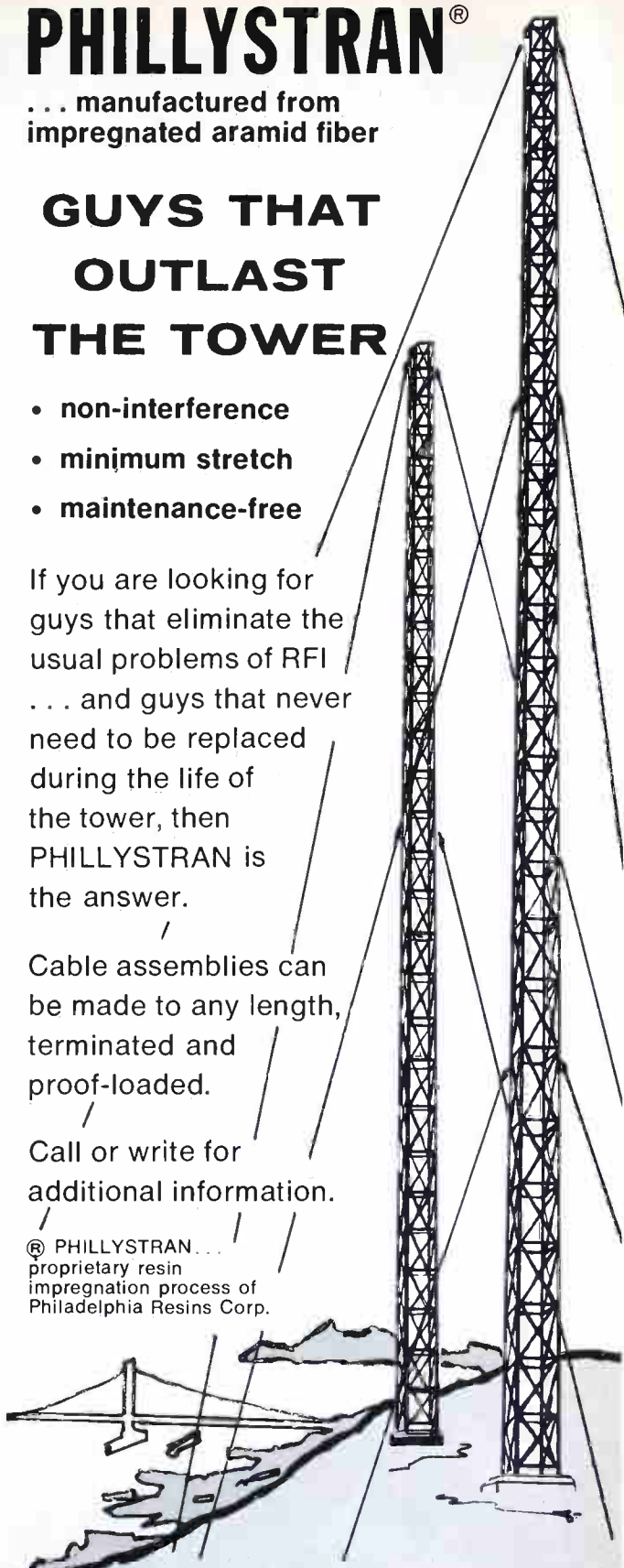
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# Two Production Techniques Give New Versatility to Videotape Recording

With a few modifications, Teletronics has achieved the long sought after goal of "The Film Look," and changed the video engineer to "video colorist." Windsor Total Video uses standard production techniques to "animate" Ad agency storyboards. Both techniques can increase the productivity of television studios.

Despite the technological advances in videotape there are still two areas in which film is considered, commonly, to have domain: Animation. And that unarticulated notion called, "The Film Look."

Two New York companies, however, have gone a long way toward dispelling even these vestiges of film superiority. Windsor Total Video, using a simple process it has dubbed Videomatics®, has produced more than 300 test commercials using ordinary studio equipment, to achieve highly animate test commercials on videocassette for New York City's top advertising agencies.

Teletronics International, Inc., although using some fairly sophisticated editing equipment, has done wonders with slightly modified production equipment in achieving the "film look." According to Dan Rosen, vice president of Sales for Teletronics, there are basically four major elements required to achieve the "film look."

At Teletronics, said Rosen, "our thrust was always toward people of film orientation. The idea was to get our single camera units and shoot film style." The first necessary step, then, was to modify a Norelco PCP-70 to take 35mm film camera type lenses.

Although there were initial problems, Teletronics was eventually able to locate a lens mounting adapter that allows them to use a variety of lenses such as a 25-250

Angenieux, 16mm wide angle, a 155mm macro a battery of five or six fixed Nikors. With the adapter some modification to the PCP-70, Teletronics was able to permit the film director to work with lenses of choice, without having to relate his objectives to video lenses.

The second and third elements for achieving the "film look" are perhaps, the most important: Lighting what Teletronics calls their video "colorist."

Lighting for video was always considered as, "so how different," then lighting for film, according to Rosen. "Part of that," said Rosen, "was because video was thought of as a television broadcast medium most of the people who were in it were technicians."

Videotape was alright for the six o'clock news, Rosen, or for doing the "Beachcomber Bill" show some of the kiddy shows, but there, they always had a very flat look." Rosen attributed this to the necessity of lighting for multiple cameras and the lack of production time available to the average broadcast station.

"Whereas," said Rosen, "when you're into the commercial area," like Teletronics, which produces hundreds of commercials a year, "you are into very high production values."

In commercials, "you're dealing with people who are relying upon film and very fine, subtle lighting, where each frame you shoot is very important," said Rosen. "So what we try to do," he added, "is eliminate the technician mentality; to get our whole way of operation to build up a rapport with film people and to stay away from rigid lighting requirements."

Rosen said, "Our big sales idea was to be able to talk to a film director or cinematographer, just light the way you normally light for film."

It is at this juncture that the video engineer's role becomes critical. One of the things Teletronics did to take creative advantage of their engineers was to simply change his title to "video colorist."


We take the term, "colorist, very seriously," said Rosen. "Traditionally, the person who controlled the camera with regard to color and density was referred to as the video engineer, or more commonly, the man," according to Rosen.

"The way we presented ourselves," said Rosen, continued on page



One of the keyboard edit systems at the new Teletronics Video Center. Living room atmosphere supports optimum creativity.





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When the FCC authorizes the use of CP-TV antennas JAMPRO will be ready with the only patented Circularly Polarized production line of TV antennas — low band VHF, hi band VHF and UHF.

The first circularly polarized omnidirectional TV broadcasting antenna in the world was installed in May, 1975 at KLOC-TV UHF channel 19, in Modesto, California, under a STA from the FCC. This time tested, spiral antenna is mechanically symmetrical. It is available for all TV channels.

Antenna power gains vary from 2.2 to 7 for VHF channels with input power ratings of 35 and 100 KW. UHF power gains are 16 to 32 with safe input powers up to 220 KW. Its comparatively modest wind loading will permit replacing existing antennas without tower changes, in many cases. Write on your letter head stating your requirements. A quotation and a copy of the propagation test results comparing standard and circular polarization will be mailed to you without charge.

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## PRODUCTION TECHNIQUES

"was to get away from that 'Technician/Engineering' mentality, so our phrase for that person is video colorist, which is what he is." Teletronics presents the "colorist" as, "a very key creative advantage, for which there is no analogy in film production."

What appeals to a lot of people, said Rosen, is that you are able to mix your color, and "control your density while working with the person doing the lighting, so as to achieve the aesthetic goal." Rosen pointed out, that one of the key advantages for the director is that he can see exactly what effects he is achieving while on the set or location. A director, cinematographer, and a colorist, working together, "can really paint the hell out of a picture," said Rosen.

Though the use of the colorist at Teletronics has been described as "taking the color lab with you," Rosen explains that, "On a higher plane he (the colorist) is more than a lab timer. He is part of the production advantage of that shooting pool. He can be, and I think in our case, he is, a very creative part of the job."

The "video colorist" at Teletronics works with the production team from the very beginning and for that reason, according to Rosen, there is very rarely a need for post-production color correction. When the need does arise, however, the "colorist" works very closely with the post-production people and can perform extensive color correction, "after the fact."

The fourth element in obtaining the "film look," is the use of optical effects. "Optics," said Rosen, "are the same," for tape as they are for film. "Whatever a director would want to use on the lens, whether it be vaseline, silkstockings, diffusion filters, fog filters, you get the same result with tape as you do with film, except that you see the results immediately."

In addition to the four basic elements: The use of 35mm film lenses, film lighting techniques, the use of various filters, and the redefining of the role played by the video engineer, Teletronics also attributes much of its success at obtaining the "film look," to creative use of its sophisticated editing systems.

Teletronics uses three types of CMX Editing systems,



Teletronics has separated VTR equipment from the editing rooms so that the latter are quiet and distraction free.



Engineers at Teletronics are creative video colorists.

all computer assisted. Each system, whether it is a light pen system, the keyboard system, or cassette editing system is capable of providing frame by frame editing.

Moreover, the editing rooms are separate from VTRs and computer hardware, so that the editor and director are free to turn all of their attention to the process of achieving their desired goals. Because of the speed of these editors, and the creative environment, Rosen pointed out that the director is more likely to pursue ever more refined editing effects.

Though Teletronics has gone a long way to "achieving the film look," most commercials are still shot in film.

"One of the things that technicians reinforced with videotape," said Rosen, "was that you were into extensive limitations with regard to lighting and that you have to have 'x' amount of footcandles, but that's not true." According to Rosen, videotape, "is a better medium than film, but to this day, the myths, in quarters, persist."

Regarding contrast ratio, Rosen pointed out, that though film does have an almost unlimited contrast range, if it is intended that the final product is to be used for broadcast, the film will still have to be processed to conform, "to the TV system."

Everything Teletronics does to achieve the "film look" conforms to broadcast standards," said Rosen, "and broadcast standards provide considerable latitude for creativity."

### Videomatics bring life to static artwork

Animation, which has traditionally been the province of film, is also yielding to pressures from video technology. Though computer assisted animation and synthesized video have been around for some time, film is still the medium of choice for most types of animation because it has been cheaper and simpler.

One type of animation, however, as practiced by Windsor Total Video, uses video for what it does best: permit instant viewing of results.

In the high pressure world of Madison Avenue advertising, many agencies wish to present a concept to a client in a more animate form than the traditional storyboard. They also want to get that idea to the client as quickly as possible.

continued on p



## Dolby Noise Reduction

# The First Successful Decade 1966-1976

Dolby noise reduction has staying power. It has been around for ten years.\* If you have read our technical papers and otherwise followed our progress, you are probably familiar with the reasons for this success. Here are ten quick reminders.

The Dolby system works like a constant-gain amplifier in two critical dynamic regions—low levels and high levels. Error-free signal handling is ensured at the dynamic extremes. Compression and expansion occur only at easy to handle mid-levels, between  $-20$  dB and  $-40$  dB.

The system employs a simple adding and subtracting scheme which automatically results in mathematically exact complementary compression and expansion. There are no approximations, so the signal must come out the same as it went in. (Just check the Dolby Level now and then).

The compressor overshoots with high-level transient signals are suppressed without audible distortion, because of the basic system layout (dual signal paths). Since there are no overshoots or clipping by the recorder, there is no impairment of even the most delicate transient signals.

**4** The freedom from overshoot is a result of system philosophy, not an ultra-short attack time. Relatively gradual gain changes are used, yielding a compressor output which is remarkably free from modulation distortion. There is no need to depend upon cancellation of modulation products by the expander (thereby relaxing recorder performance requirements).

**5** The reproduced dynamics of low-level signals are essentially immune to rumble in the input signal and head bumps and other frequency response errors in the recorder—the system has a solid low-level 'gain floor' below  $-40$  dB.

**6** The system gives a pre-determined amount of noise reduction which is realistically useful.

**7** The noise that remains has a subjectively constant level. Noise modulation effects are almost non-existent.

**8** The principles and parameters used in the Dolby system result in a high margin of safety. The system works well with all types of audio signals—speech, music, effects—and with practically all types of noises. High noise levels (from multi-generation copies, for example) do not impair performance.

**9** The system functions reliably on a day in, day out basis, with real workaday recorders and other equipment.

**10** All of the above have been proved in ten years of dependable service to the industry—25,000 professional channels in use by well over a thousand studios in more than 50 countries around the world.

*The first five A301 units were delivered to the Decca Record Company, London, on April 14, 1966.*

Dolby noise reduction now looks forward to

# The Second Successful Decade 1976-1986

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## PRODUCTION TECHNIQUES

The solution worked out by Windsor, is a process they have dubbed Videomatics®. Videomatics is a method of "converting artwork to a moving image," recorded by standard studio gear, according to Ken Lorber, vice president of production for Windsor Total Video.

Windsor asks a prospective client, usually an ad agency, to provide two things: artwork completed on 9" x 12" board, and a ¼" audio tape of the voice and/or music track.

The artwork can be on almost anything though they prefer the 9" x 12" size. It can even be on slides and they have shot from artwork as small as 2" square. Though the audio track is usually completed outside by the agency, Lorber points out that Windsor is equipped to record that stage as well.

Once the artwork and audio tape arrives, the audio is transferred to one inch videotape. Then, using the storyboard, and sometimes a shooting script, the visuals

are assembled.

The most common set up involves the use of two cameras, the switcher, lights, and Windsor's one VTR.

The artwork is set up on easels and illuminated cameras are focused on the artwork and the camera operators follow directions for pans, tilts, zooms, and provided by the director.

The method of recording, said Lorber, "pretty parallels normal live action shooting."

The artwork is changed according to the script storyboard and each "frame" is assembled onto video tape so that it corresponds with the audio track.

In addition to the camera moves, Lorber added they also use, "keying, supers, wipes, split screen any of the special effects needed to add to the quality of the spot."

"Although we coined the phrase 'Videomatics' Lorber said, "the process actually started out at agencies. They would use b&w videotape to record  
continued on page 42

## Creating Video Graphics With A Light Pen

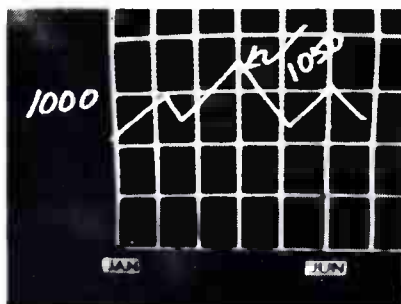
INTERAND's Telestrator provides an unusually simple and versatile way to write graphics directly into the video image. The electronic pen and tablet are used like a pencil and paper. When one writes on the transparent tablet, the added marks, strokes, or drawings are superimposed on the background image and the combination is seen on the monitor directly beneath the tablet. Thus, the impression of writing directly into the video image is created. The pen can be turned into an "eraser" (a recent development), by merely pushing a selective erase control button and placing the pen on the spot to be erased. Thus, errors or changes may be selectively erased without erasing the entire screen.

Pre-programmed symbols of any size or orientation may be instantly placed at any point on the screen by selecting the symbol and touching the pen to the desired location. A complete screen of graphics can be built up quickly using symbols. Telestrators also have the capability of putting circles or any symbol into a cursor mode, so that the viewer's attention can be

brought to particular points on the video image.

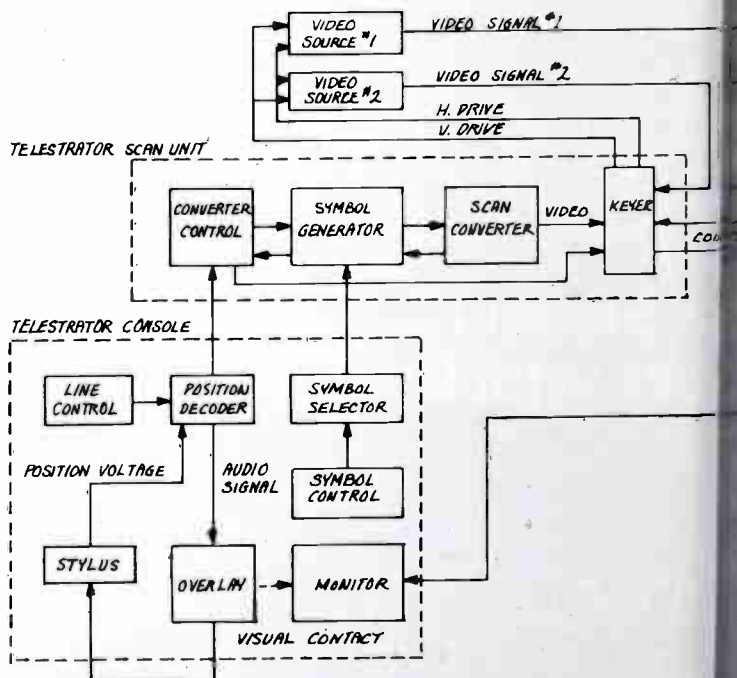
The Telestrator is now utilized in many broadcasting applications. In its latest form one can write and store at the same time. Some of the standard broadcast users are illustrating news, sports, and weather productions. The Telestrator has also been used to animate studio card material, add "life" to still photos, make station announcements such as weather warnings, station logos, announce audio failures, and elaborately edit video productions. This method of graphical presentation can increase the viewer's interest in the broadcast, but it is not without pitfalls. If too much graphical information is presented at one time, the video image becomes cluttered. The personnel using the Telestrator can, however, judge for themselves the amount of graphics that will enhance the production, because they can directly see the effects created as the graphics are added to the video background.

One example of how the Telestrator can assist in  
continued on page 42



Typical graphics written with a light pen on Telestrator.

Block diagram of Telestrator.





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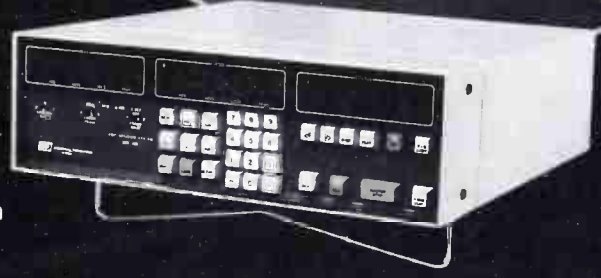
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racy. Performs Insert, Assembly and  
n-Ended Edits. Offset audio edits can be  
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## PRODUCTION TECHNIQUES

frame of their storyboard and use a professional voice/over for presenting concepts to clients."

"All we did," Lorber continued, "was take the idea a couple of steps further and add the host of special effects and quality appearance that agencies were not equipped to provide."

The results of the Videomatic process have been so good, that although Windsor does not normally shoot these spots for broadcast, a couple of them have been used as regular on-air commercials.

Lorber points out, that when shooting low budget commercials, set design and talent quality often suffer. But, Videomatics can offer, especially to retailers where turnaround time for sales and such is important, an effective and superior low budget approach.

The real key to doing Videomatics is working closely with the agency. Frequently, the art director or illustrator needs consultation on how to prepare the artwork to

achieve certain effects.

"Sometimes," said Lorber, "if the client wanted glass to fill or a car to appear as if it's moving down a road, we might have to explain to the illustrator how to prepare a piece of artwork for keying or suggest how a piece of clear acetate might be used to permit us to use some colored paper behind the glass to make it appear to fill."

All and all, the process is "amazingly simple and productive." In just the 18 months that Windsor has been engaged in Videomatics, it has completed more than 300 individual spots for at least "eighteen out of every top twenty ad agencies in New York," according to Lorber.

The most remarkable thing about both of these techniques, "the film look," and "Videomatics," seems to be that neither technique has required any space-age technology or electronic wizardry. Instead, each technique has resulted from careful experimentation with existing technology and ardent pursuit of solutions to common problems.

## Creating Video Graphics

continued from page 40

making a clear and concise presentation is in graphically showing the stock market reports. The charts that are used are simple studio cards and do not have motion or animation. Most newscasters simply show the chart and deliver the narrative. Their viewers have the feeling that they are looking at a still slide and the presentation can be dull. One alternate approach is to use a rear screen or "reveal" which is time-consuming and can tie up an extra camera. A second method is to use a Telestrator. The same charts are broadcast. But now the newscaster can write or draw on the charts: highlighting, pointing out specific points, writing the numbers on the screen, and creating eye-catching special effects as he desires. The feeling of looking at a still slide is gone since the broadcast picture is continually changing. The presentation becomes more interesting and informative to the viewer. The accompanying photo of a TV receiver illustrates this. The newscaster has just finished the last short feature and is ready to begin the market report. The stock market performance chart is broadcast and the newscaster begins the narrative.

"The Dow Jones Industrials closed down 3 points today at 944."

As he talks to his audience, he writes in the number 1000 on the graph and finishes the last segment of the graph.

"The performance of the market is down from a high of over 1050 in early April, but some indicators are pointing to a recovery period within three months."

As the number 1050 is spoken, the newsman writes in 1050 and then draws an arrow showing the time period of early April.

A cursor arrow could be also selected and the newscaster points at the somewhat cyclic dips in the past performance. The figure below shows the arrow pointing to one of the dips.

The key features of the Telestrator are the ease of use and the capability to generate complex animated graphics for many types of productions. Alternative methods usually involve far more time, trouble and practice and also tie up both studio facilities and crews for far longer times to achieve the equivalent effects. The system costs \$12,000 in its base form. Expanded symbol generators or special effects can add up to another \$6000.

### How it works

The Telestrator consists of two units, the Scan Unit and the Console Unit. The components of the console unit, usually housed in close proximity, are the monitor, transparent overlay, stylus, console controls and position decoder. The scan unit includes the scan converter, symbol generator, converter control and keyer.

The operation of the Telestrator can be traced as follows:

A signal from one or more video sources is fed into the keyer and the resulting composite picture is displayed on the monitor.

At the same time, an audio frequency signal is generated by the position decoder and applied to the position-sensitive overlay. A set of diodes alternately directs the current to the X and then Y directions of the overlay.

The overlay is coated with a transparent, conductive coating. When current flows in the X direction, the X position can be determined by the proportion of the measured voltage at a point in the X direction to the total voltage drop across the total X length. The Y position is measured with the same procedure. The position decoder also decodes the combined X and Y position information into separate X position and Y position signals.

These signals are fed through the converter control, which contains the circuitry for varying the line widths. A sine-cosine generator varies the X and Y voltages in a circular pattern around the X and Y position defined with the stylus to create a wide line. The line control generates the control signals for the converter control.

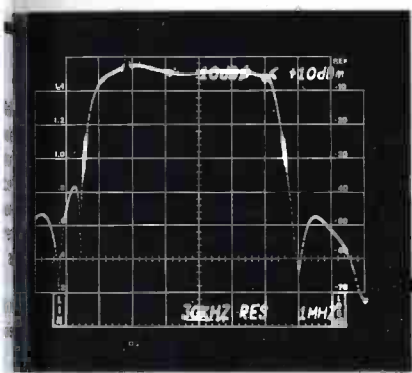
The X and Y signals are passed to the symbol generator. The symbol generator has symbols stored in ROM's. The information in the ROM's control current integrators used to create straight-line segments which are stored in the scan converter. The symbol generator passes the X and Y signals directly to the scan converter when a symbol is not selected. The size and orientation of the symbols are determined by the symbol control and the symbol selector addresses the appropriate ROM.

After the desired changes are made to the original X and Y position, the X and Y signals are written and stored on a scan converter where they can be retained until completely erased or selectively erased. This image is converted to a standard television image in synchronization with a background video signal. The scan converter output can be used to key in a white or dark level or another camera.

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April 23, 1976

Mr. Paul Warnock  
President  
TeleMation, Inc.  
P. O. Box 15068  
Salt Lake City, Utah 84115

Dear Paul:

The new TeleMation TCG3000 Character Generator has proven to be a very delightful surprise. It seems to measure up to just about all of our expectations and then some. I thought you would like to know that it has generated more genuine excitement and enthusiasm on the part of our employees than any other piece of equipment that I have purchased for the station in the last seven years.

May I extend our thanks to you and to those members of your staff who have contributed so much in the preparation, design and provision of this forward looking equipment and especially to Dennis Fraser, Tom Meyer and Leo Lewis. It was great having those people work with us on this project and we hope that they will continue to support us as we come to be more knowledgeable and familiar with the equipment.

I just thought you might appreciate our words of thanks.

Sincerely,

R. C. Smith  
Chief Engineer

RCS:rg



Introduced at the '76 NAB, the first **Compositor I** Titling/Graphics System was delivered to Time-Life station WOTV, Grand Rapids, Michigan, on April 17.

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WOTV Chief Engineer R.C. Smith writes that the **Compositor I** "has generated more genuine excitement and enthusiasm on the part of our employees than any other piece of equipment that I have purchased for the station in the last seven years."

We wish to thank Mr. Smith for his appraisal, and extend an invitation to all Broadcast Managers and Engineers to compare these **Compositor I** features with any other multifont character generator:

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# Buying A Switcher For That Best-In-The-Market On-Air Look

A production switcher is a more critical component than the camera, the VTR or studio staging in determining your on-air look. You've got the right switcher when a creative production director and a conservative chief engineer agree on the same unit.

You don't lay out \$50,000 or more for a new production switcher just to make your creative production department happy. Such an investment may be well worth it, however, to improve the presentation of news shows, to dramatize the coverage of sports or to sharpen your ability to produce commercials. Your real reason for buying a new switcher, therefore, is to make your sales manager happy. You get a production aid tool\* and a sales tool at the same time.

But in buying a new switcher, you may be giving your engineering department a headache. On the one hand, the chief engineer has to make sure the production manager will be satisfied but on the other, he has to be sure the switcher he selects will be reliable. There have been plenty of miracle devices ordered in the past that simply have not measured up—or didn't get delivered in the first place. Notwithstanding the checkered past of some suppliers, now is not the time to be timorous. There are excellent proven switchers already on the market that can help you and there are exciting fourth generation\*\* devices now appearing. If your present switcher is over five years old, you need a new one to get that contemporary look.

Be prepared to pay the price of a Grass Valley 24-

## Teleproduction Aids—Curtain is Rising on Future Theatre

The subject of teleproduction is vast. We could have reviewed the subject of editing and particularly the likely impact of expandable editing systems. The new Datatran Tempo '76, for example, permits the user to start with a pulse counting approach and to expand to a SMPTE time code system capable of working with an intermix of cassette-, helical-, and quad-VTRs. We could have explored the likely impact of the new one-inch helical VTRs, discussed last issue, that offer quad performance plus such features as slow-motion or freeze frame. We might have dug into the future role of graphic arts generators. We could have revealed how the computer is now being used and what is likely to happen in the near future as a result of the avalanche of minicomputers descending upon us.

As a matter of fact, we did start to prepare articles on some of these subjects, but we couldn't achieve "closure." There just isn't enough field experience around to do more than speculate. Not that we're against speculation. Indeed, some mind expansion is a prerequisite to the new theatre. For this issue, however, we're concentrating on here and now hardware that you can get delivery on and a few concepts that have been working. Stand by for future episodes.



Production switchers were a big drawing card at the recent NAB Convention as this photo of the Vital booth shows.



Grass Valley put its 1600 J7 through the paces at NAB demonstrating how to put together a super news show.

input, 8-output 1600 7J with options. Indeed, don't be surprised if this switcher is the one recommended to you by your staff—it has been the first choice of most stations out to buy the best. But make your guys pick it—in terms of "Yes, it's exactly what I want to do for creative things (production manager);" "It's the best value for the money (chief engineer);" "It's the best value for the money spent (production manager and chief engineer)."

We are not trying to suggest the GV 1600J7 (or similar model) won't meet these tests. We are suggesting that there is some keen competition out there in switchers from American Data, Central Dynamics and Vital Industries' chief rivals. There's a second tier of competitors too: Computer Image, Richmond Hill, Telemet, and more recent newcomers Ross and D.

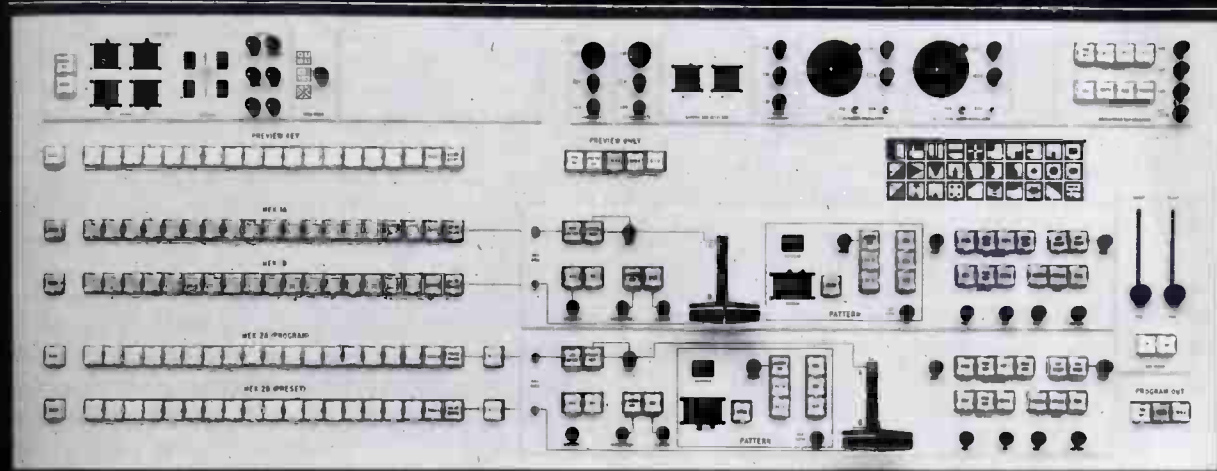
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\*Bob McCall, Vital Industries' Northeast regional manager, likens a production switcher to the film man's scissors: to get the Hollywood look on TV you need to rely on a \$5 pair of shears—\$50,000 is the more likely figure.

\*\*First generation switchers were simple additive mixers handling one bus. Next came a special effects generator with output re-entered into one bus. Second generation devices saw combined mix-effect devices designed. Third generation introduced proportional control for key etc. Fourth generation is four-level amplifiers reducing the need for triple (8-bus) M/E amplifiers.



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- Mix to a Bordered Key
- A-B Mix Behind a Chroma Key
- A-B Wipe Behind a Chroma Key
- A-B Wipe with Borders Behind a Chroma Key
- Mix-Wipe or Bordered Wipe to a Preset Wipe Behind a Chroma Key
- Mix or Dissolve to a Luminance Key Over a Chroma Key
- Wipe to a Luminance Key over a Chroma Key
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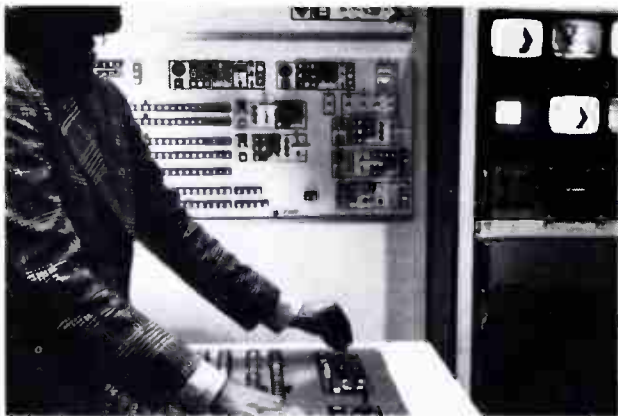
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## "BEST" SWITCHER

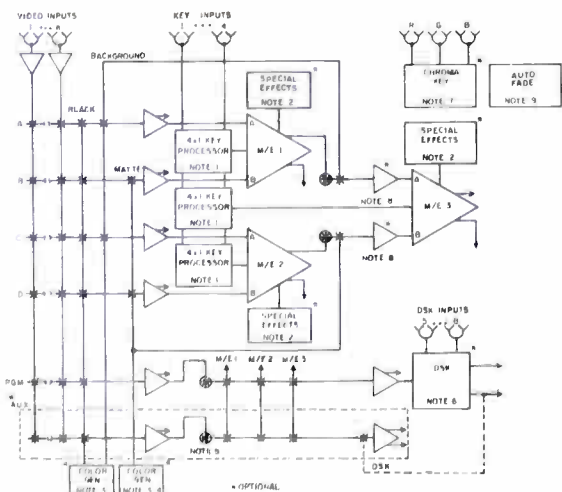
Richardson, to mention only those who make big full-production boards.

Recent developments make the right choice somewhat difficult. The big news at the NAB 1976 Convention was the introduction of some new concepts in switchers; either in internal organization or how the board is arranged—or both. The standard approach has been two buses feeding a mix-effect amplifier. To get top versatility, big boards have been using three mix-effect systems. Thus, eight buses are needed—six to feed the three M/Es and two others—one for program and one for preset. At NAB, American Data demonstrated the 558 which uses a four-channel parallel video processor. Multiple functions can be accomplished simultaneously in a single M/E without requiring extra buses. Central Dynamics introduced at the show what it called the sequential effects amplifier. One such amplifier can do production sequences that can't be done on a triple effects conventional switcher.

In working with four signal levels simultaneously, two can be used for keying (cut dissolves, wipes) to and from processed signals. Levels three and four are used for background video signals with the ability to cut dissolve or wipe between them. How the CD 480 system is or-



Computer Image showed how to get special effects easily at the NAB Convention.



Computer Image pyramids M/E amplifiers to control a number of video signals with only four buses.

ganized and how it achieves some of the effects contained in a separate accompanying section, pages 51-52.

There was another new switcher from a new com in the wings of the NAB convention. Duca Richardson showed in a private suite at McCormick Inn wh called a state-of-the-art switcher. By being able to over with either the A or B bus, it in essence, offere capability of a third bus. This switcher was desi with the requirement of a Live Action camera news s in mind. Inline keyers to buses give a titling capab behind the chroma key so that title keys can be wipe mixed as transitions are made from bus to bus. The grams, page 52, show what effects are possible.

All operating controls in the D-R switcher are loc in a subpanel that controls a function module. experienced operators can learn the board quicly. We include a separate section on the new switcher s ing on page 50.

What Duca Richardson offers is an extension of ca bility pioneered by Computer Image—use of logi to achieve many effects easily. In a general sense, switc manufacturers are somewhat characterized by their emphasis in the past. Thus Duca Richardson and Comp Image are known for their computer oriented thinki Grass Valley and Central Dynamics have been kno for their solid engineering approach. Vital has ma name for itself by stressing creative production ca bility, particularly digital effects. But these linea blurring as each manufacturer borrows a bit from other.

Because of these past propensities, certain switc tended to be somewhat higher priced. Central Dyna for example, was always considered a high-pri switcher manufacturer. Now, as emphasis shift to newer techniques to accomplish special effects, generalizations don't necessarily hold. That is to one shouldn't now compare switchers by how r buses they have or how many fader levers but rathe what they can do.

In the past, switchers have often been specifi reflect the personality or ego of the buyer. Inputs stations are, of course, essential and, indeed, the ne switchers have been designed to offer the custo what they want. But one can go overboard in getti custom designed switcher. Custom features do add and could lengthen delivery. With the flexibility today's switchers, a standard model may be quite quite.

### The capability of today's switcher is quite fanta

The top of the line of "third generation" devices the initial offerings of fourth generation offer a lo capability. More changes are coming. But, you afford to sit by and see what will happen—not ur your competitors have the same attitude. This is likely to happen. Thus one must buy now and prob buy more capability than one knows how to use—sin as a hedge against the future.

continued on pag

\*Formed by former Computer Image employees.

\*\*In making this statement, we recognize that it could be interpe being unfavorable to those suppliers who have geared their comp especially cater to clients wanting custom service or customer service. Vit prided itself on meeting the needs of its customers and this is an ex reason for picking a supplier. Computer Image got into the marketp offering an expandable system. You buy what you can afford but y pre-wired in accommodations for what you may want to buy tom Such an approach is certainly valid.

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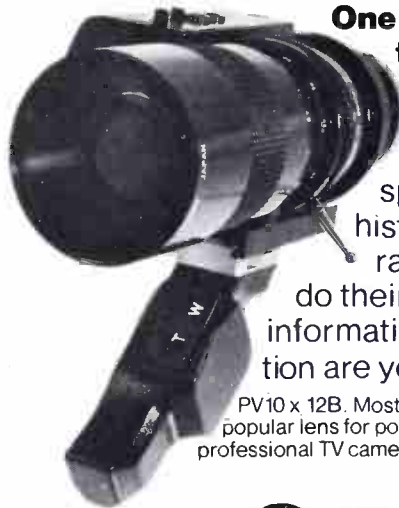
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## "BEST" SWITCHER

There is, of course, the danger of buying so much capability you won't know how to handle it. Not everybody can handle a big board. Vital, for example, openly acknowledges this fact and has been offering computer assisted production as one way of coping with the problem. You work out your sequences by previewing them. When satisfied, you store them in memory. Upon command, the computer will then execute them regardless of their complexity, with precision. Grass Valley says it also will be offering this kind of capability this fall. This computer-assisted production should not be confused with master control operations automation. CAP is achieving special effects and involved transitions within an event—not switching between program log events.

The alternative, of course, to computer assisted production as a means of getting the most you can without losing control is to opt for the new three-and-four-channel mix/effect amplifiers systems. If you have the pioneer spirit, you will take this route. If you want to play it safe, you will stay with the tried and true.

As you evaluate the options, you do not have to concern yourself as to whether or not new switchers are coming. They are. It is just a matter of whether the first of the new crop offer you what you want. Neither Grass Valley or Vital, for example, are panicking because of

### Hints to Production Switcher Buyers

- Think through what you want to do in terms of putting on your news show, covering sports or producing commercials. Tell prospective switcher suppliers what you want to achieve. Let them suggest how you can accomplish your ends the least expensive way.
- Buy the most capability you can afford—or have the option to buy more capability later. If you can do something your competitor can't, you've got an edge.
- Through the use of particular digital logic control, some switchers may be easier to operate than others. But technically they may be more complicated. Study the design to make sure you know what you are buying.
- Check cross fade linearity—not all switchers may measure up to your standards.
- What is the total delay of the switcher? This spec is not usually given, but the smaller the delay the less likelihood of any timing problems and the less chance for signal degradation.
- Analyze carefully the board's layout—can non experts run it?
- Through how many crosspoints (mixing junctions) must the signal pass to end up with the desired effect? Can another switcher do the job with fewer crosspoints? Remember the more crosspoints the greater the opportunity for signal degradation.
- Check out those special features offered by various suppliers. If they eliminate or minimize the chance for error or on-air mistakes they have real value.
- Investigate how features are accomplished technically. For instance, not all quad splits are generated the same way.
- Check out signal stability carefully. Does it vary with time and temperature?
- Selling switchers is a price competitive business. Try to determine what compromises might have been made in components, circuitry, or construction quality to offer so many goodies at a competitive price.
- Check the reputation of the supplier. Best bet is to talk to both recent and long-time customers.

the new competition. As a spokesman for G-V says, "We're perfectly happy to Monday-morning quarterback the game as it is being played this year. The switchers that will be delivered in 1977 are likely to differ from those shown at NAB, '76."

Whether you opt to the familiar or the new, there are some guidelines that you can follow. The accompanying box "Hints to Production Switcher Buyers" raises important questions for testing both existing and new systems.

Each individual switcher manufacturer will be glad to add other suggestions to our list. These will include points in which they will score better than their competitors. Our advice: don't ignore them—check them out.

### Duca-Richardson Processes A Keying Mode And Two Buses Simultaneously

The new Duca-Richardson 4000 Series of video/audio switching systems was designed to realize three objectives—greatly expanded performance capability, simplified operation, and provision for field installation of all optional components.

The first of these goals has been achieved through a completely new and innovative approach to the keying effects system. In the 4000 Series, each system is designed to process a keying mode and two switcher buses simultaneously. However, inline bus keyers, border capability, interposed between the background videos and the transition control make possible the addition of bordered captions or chroma keys to either both backgrounds prior to a transition. Each background, therefore, may represent composite information from up to three video sources.

Any of nine key sources, including insert video, can be selected for the keying modes and mix, wipe, non-destructive mix, wipe key, mix key, and mix to preset line are available for A/B transitions. Keys can be outlined with key video or matte, and bordered with symmetrical or dropshadow borders—hard or soft, black or white. This increases the capacity of a single M/E switcher to the extent that such switchers with 2 buses are the equivalent of conventional switchers with 5 or more buses.

Fig. 1 shows a mix/effects system and a sequence of typical effects. Backgrounds are selected from video sources feeding the A and B buses. Captions, graphics, and chroma keys may be inserted over the backgrounds by inline keyers ahead of the transition control. Following the transition control, a third keyer permits keying over either background, or over transitions from one to the other. Thus, captioned backgrounds may be mixed and wiped behind any key source selected for the third keyer, including chroma keys.

In DRC systems, switcher operation has been simplified by grouping all controls on a single unified panel, or function module, and arranging them for greatest ease of manipulation. The most important feature of the function module, shown in Fig. 2, is the keyboard. With only fifteen buttons, the keyboard provides access to 99 patterns for the pattern generator, 99 automatic

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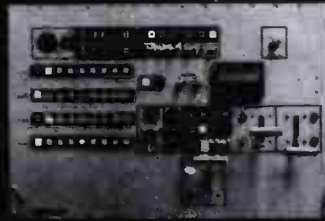
# e Video Controller family...

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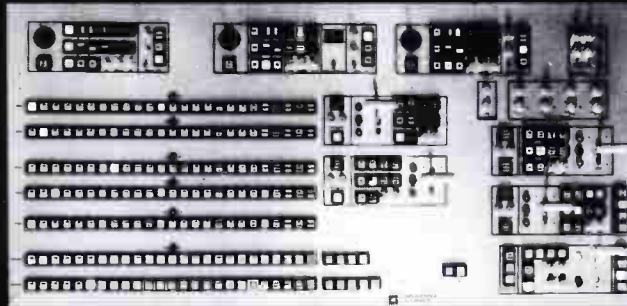
## MASTER CONTROL MODEL

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KARK TV, Little Rock, Ark



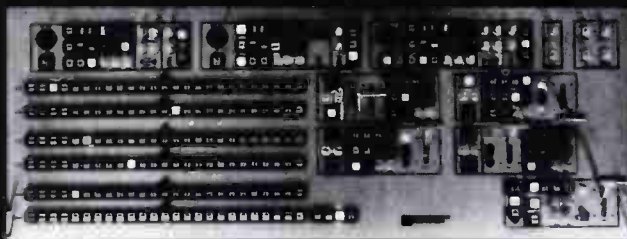
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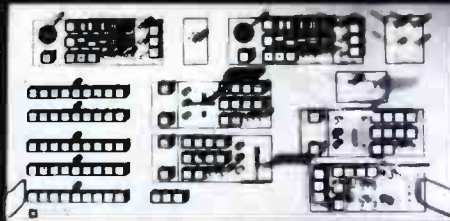
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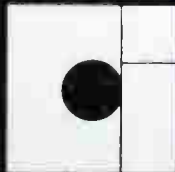
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## "BEST" SWITCHER

transition durations from 0.1 sec to 9.9 sec, and nine key sources.

To enter a command on the keyboard, a function button is first pressed, followed by selection of a one- or two-digit designator for the particular effect desired. For example, pattern 26 is entered by pressing PATT, 2, and 6. The selection appears in the REGISTER for visual check and may be corrected if an error has been made. Depressing XFR shifts the designator from REGISTER to function storage and enables the switcher to respond to a command to execute the function. In the example, the register clears to 00 and 26 appears in PATTERN storage; when the fader lever is moved, pattern 26 will be produced if the switcher is in the wipe mode. In a similar way, key sources and transition rates may be preselected and transferred to storage for future use. Selections may

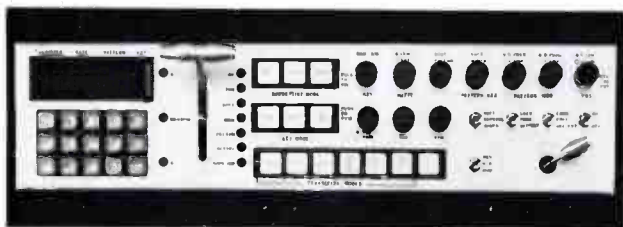


Fig. 2. Duca Richardson function module features only 15 buttons to create 99 patterns.

be changed at any time up to actual use and automatic transitions even can be changed during use, i.e., a transition can start with one rate and finish with another.

Keyboard control also has been applied to two options: the downstream keyer and the quad split generator. In the case of the former, pushbutton selection of key sources and of separate automatic transition for fade key and fade to black increase considerably the versatility of this useful option. Equipped with complete border control, downstream keyers also may be specified with program bus genlock and pulse and subcarrier outputs. This feature is important when it becomes necessary to key over nonsynchronous sources. For this situation, the downstream keyer genlocks the switcher to the incoming nonsync video, and provides a source timing signals for character generators or other peripheral equipment.

The keyboard for the quad split quadrant selector permits a choice of nine sources to be preassigned arbitrarily to any of the four quadrants and stored as needed. A second arrangement of the same sources, a set of different sources, then may be selected and retained in a preset condition until a new program display is required. Two formats and complete border control are standard.

In addition to the keyboard-controlled downstream keyer and quad split generator, the usual complete conventional options is available. All are supplied in standard drop-in subpanels which fit designated slots. continued on page

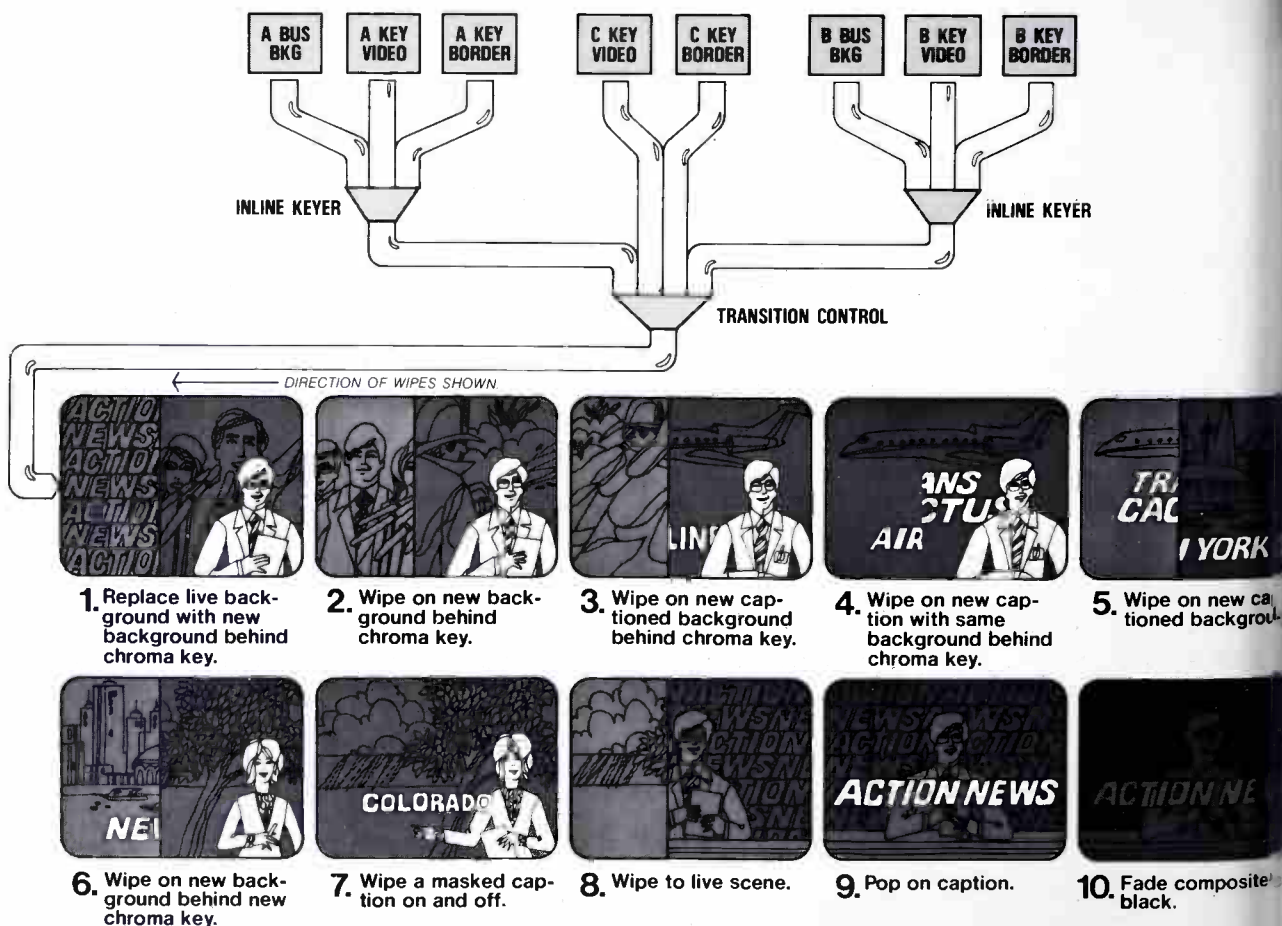


Fig. 1. Sequence of effects with one function module on Duca Richardson switcher. For simplicity, the transitions shown here are wipes only. However, they also could be mixes or wipes with hard, soft, hard-colored, or soft-colored borders.



# Here's how WXYZ-TV uses film to keep on top of the news and the ratings.

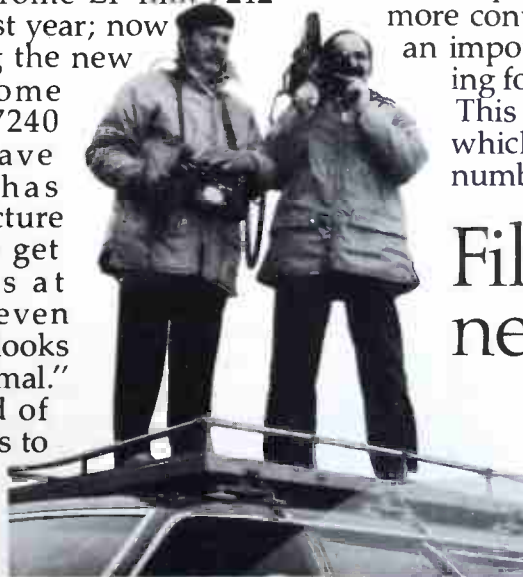
In the Detroit market WXYZ-TV's early and late news shows are number one.\* A lot of credit goes to film teams headed by Joe Doneth of the News Film Department. Says Doneth: "We film



Joe Doneth, head of the Newsfilm Department, shown with one of the teams that originates up to 24 stories a day.

practically everything in single system sound. Most times we use a cameraman, soundman and reporter with CP-16 cameras and wireless mikes; we get a lot of flexibility and mobility this way when covering a story.

"We had been getting excellent results with Kodak Ektachrome EF film 7242 (tungsten) for the last year; now we have been using the new Eastman Ektachrome video news film 7240 (tungsten). We have found that 7240 has superior grain structure and definition. We get excellent results at E.I.250, 500, and even 1,000. At 250, 7240 looks as good as 7242 normal." Dean Erskine, head of the film editing, edits to eliminate lip flutter and other major editing problems. We are



death on talking heads, so we use B rolls on most every story to show what the conversation is all about.

Mike Kalush, another member of the WXYZ-TV team, feels that his staff has been in the forefront of developing 7240.

"I've shot with 7240 when I literally could not see through the viewfinder and the picture showed up just great.

Like the time we were doing a five-part documentary on industrial thefts for our Action News Show. We spent the night on top of a switch tower overlooking a railroad car. We had a CP-16 camera and no illumination but a



Dean Erskine, head of the Film Editing Department.

red flare. We 'captured' the gang of car thieves on film. Then we force-processed the film one stop, and had a great story for our Channel 7 Action News audience." Joe Doneth and Mike Kalush agree that as their work with Eastman film 7240 progresses they are more and more convinced that film will remain an important factor in news reporting for years to come.

This could be one of the factors which makes WXYZ-TV's News number one.

## Film is good news.



\* Source NSI Detroit market Jan. 76—DNA ratings. Hones subject to qualifications available on request.

## "BEST" SWITCHER

the main switcher control panel. Since electronic frames are prewired for all options, they may be ordered at any time and are easily installed in the field.

### The American Data Model 558 Features Parallel Processing

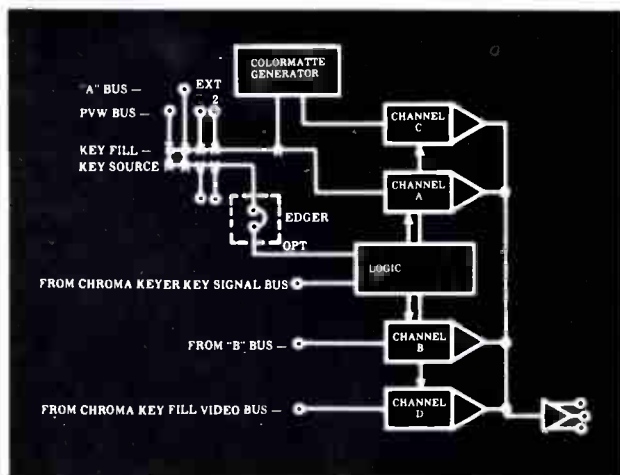
The heart of the American Data approach is the new "Quad EVA" control element which is actually a four-channel video mixer. The four signals into a mix-effect amplifier include the A and B switching buses, the output of the colorizer associated with the particular M/E amplifiers and the video from the "chroma key fill video bus." The outputs are combined depending on the logic commands received, as entered by the operator—mix, wipe, key, chroma key, etc. Since the logic system is not interacting, multiple functions can be achieved on a single M/E amplifier. Thus it is possible to do:

- A-B wipe with border
- A-B wipe through 100% border
- Mix or dissolve or wipe to a preset wipe
- Mix or dissolve or wipe to a key
- A-B mix behind a chroma key
- A-B wipe behind a chroma key
- A-B wipe with borders behind a chroma key
- Mix, dissolve, or wipe to luminance key over a chroma key
- Mix, wipe, or dissolve to an electronic spotlight behind a chroma key
- Mix or wipe to a quad split, with or without borders, behind a chroma key
- Luminance key over a quad split behind a chroma key.
- Etc.

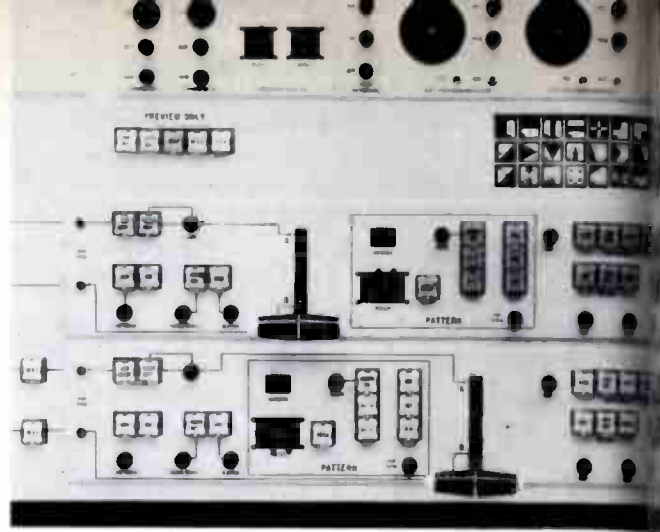
The American Data one-bus-quad split feature enters the matrix as a primary input and allows the above function to be done over a quad-split on either mix/effects systems.

Each M/E system, the quad split and optional downstream keyers incorporate independent color background generators allowing different colors to be used as borders, backgrounds, mattes and edges.

Conventional cascaded re-entries are used too in the



Block diagram of the ADC four channel parallel video processor. Several customers are now using the 558.



Closeup of ADC 558 Mix/Effects control panel.

558 along with program output switching to replace the output of M/E-1, M/E-2, or M/E-2 "A" bus directly on line. To fully understand the capability of this switcher, ask ADC for a copy of "Fourth Generation Switching."

### The CD480 "Smart" Switcher

Totally new operational concepts are employed in the new CD480 8 video production switcher. As a result, the Model 8 can do some things that other large production switchers can't. A single CD480 Sequential Effects (SFX) amplifier permits production sequences that cannot be performed even on a complete triple mix-effects switcher of conventional design.

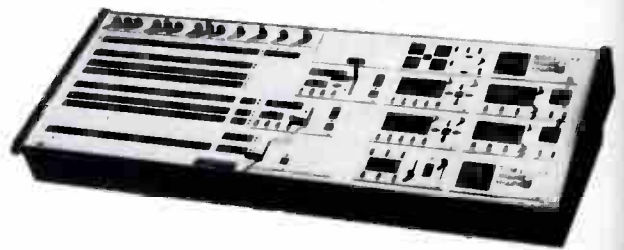


Fig. 1. Full view of CD 480 8 switcher. Note complete functional modular construction. First has been sold to KSD, St. Louis.

Current video production switchers have severe limitations when called upon to do complex production sequences. Frequently the whole sequence must be planned in advance to ascertain the correct point of entry into the sequence. The conventional arrangement of cascading mix/effects groups necessitates the use of one bus for each reentry. The CD480 can duplicate today's production practice with fewer buses. It represents a definite advance to the state-of-the-art.

For patent reasons, we can't reveal just how the SFX amplifier works in handling four inputs. You will be able to appreciate what it can do, however, by visualizing how the board is arranged and how sequences are effected.

The CD480 Model 8 consists of an 8-bus primary matrix with a ninth reentry bus, feeding into two SFX amplifiers and a master mix amplifier. The buses (Fig. 1) are designated:

- Utility (key, preview)
- X-1 Foreground
- X-1 Background program
- X-1 Background preset
- X-2 Foreground
- 6. SFX-2 Background program
- 7. SFX-2 Background preset
- 8. Master Mix B
- 9. Master Mix A (reentries and black only)

A single SFX amplifier gives complete control over signal levels. In a simple situation this means a foreground, background program, and background effect bus plus a utility bus (e.g., character generator) will be controlled independently or in conjunction with all others.

Control can be done from the preview bus and the foreground bus with full transition control (cuts, dissolves or effects) to or from the processed signal. As a matter of fact, two chroma keys can be controlled by one SFX amplifier simultaneously while on the air.

Take a look at the diagram of the board's functional layout, Fig. 2. Opposite the three buses is the SFX MODE amplifier control module. To the left of the fader arm (between the three buses and the arm) are the three TRANSFER MODE switches labeled BKG, KEY 1, KEY 2. Suppose a background scene (Cam 1) is on the air and you want to wipe to a composite comprising a title keyed over a newscaster (Cam 3) keyed over a new background (Cam 2). You simply press the three transfer mode buttons. The composite picture of sources selected appears on the preview monitor. If you like what you see, then select the effects mode, such as mix or wipe, and move the fader arm to the opposite position.

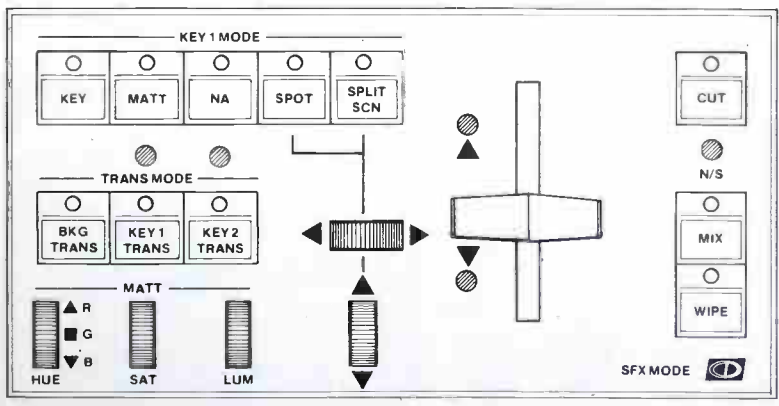
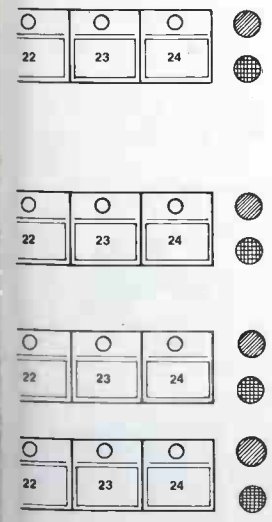
If the wrong title was up on the preview monitor, you can correct it by selecting a new title source on the utility key bus—it would appear automatically on the preview monitor. You have positive assurance that the transition will be to the correct source.

Fig. 2 shows monitor shots of a typical newscast along with a partial drawing of the CD 480 switcher console.

Monitor 1 represents the scene presently on air. To put the scene in Monitor 4 on the air, the following operation sequence is used. Select BKG TRANS on the SFX MODE control panel and the new background source on B 1 PST bus. Select KEY 1 TRANS (for chroma keying) and the appropriate newscaster source on F 1 (foreground bus). Select KEY 2 TRANS and then the title source on the UTILITY KEY bus. All three sources are now automatically on the preview monitor (No. 2). We then select the effect transition, WIPE, and move the fader arm to the opposite position (this movement, incidentally, clears the three TRANS MODE selector buttons). The transitional effects stage is shown on Monitor 3.

To continue with the program sequence, suppose we want to change the background behind the announcer. Simply select BKG TRANS, then the new background source on B 1 PST bus, the appropriate effect transition (mix or wipe) and move the fader arm to the opposite position. Result is shown on Monitor 5. The next sequence is to remove the title. Select KEY 2 TRANS, the effects transition, and move the fader arm, Monitor 6. Such sequences could be continued ad infinitum. To the right of the SFX MODE control panel is the KEY MODE panel for setting up the two keyers plus border keys. The WIPE MODE panel, next over, contains pattern selection buttons, positioner and modulator controls. (See Fig. 1.)

To accomplish the above sequence on a triple M/E switcher, the chroma key would have to be set up on M/E 1, the title on M/E 2 and the wipe transition performed on M/E 3. The complete switcher is now locked-up as shown in Fig. 3 and cannot perform another complicated sequence without going to black and quickly setting up the next shot. Fig. 4 shows the set-up required to change the background behind the chroma key and title. Note the buses used for Bkg 2, Chroma



Typical sequences for a newscast that can be set up with a single SFX Amplifier. With two keyers, even more involved sequences can be achieved.



## "BEST" SWITCHER

Key and Title all had to be rearranged.

**Quadraplex.** An optional quadraplexer includes 4 × 4 input selector which receives its signals from primary buses 1, 2 and 3 and the output of SFX-1. The output of the quadraplexer reenters the inputs of SFX-2 and the Master Mix amplifier. The Master Mix amplifier feeds the system output via an optional downstream keyer.

**Wipe Patterns.** Each CD480 SFX Amplifier is equipped with a group of standard wipe patterns including circle, square and diamond. The basic patterns may be multiplied in both horizontal and vertical directions, by operating the appropriate pushbuttons, to provide a large variety of specialized patterns. Still further patterns are available by using the integral pattern modulator. The modulator may be phase locked to station sync to provide absolutely stable edge modulation. The modulator function generator may be switched between sine wave, square wave or triangular wave edging. The

optional CD480 multi-pattern generator provides a large variety of rotary wipes such as fan and windshield wipe patterns.

All patterns may have soft and/or colored border edging. The degree of softness is adjustable over a wide range and the border edges are adjustable for both width and color.

**3D Effects.** A new and entirely unique CD480 option is the 3D Effects system. The 3D Effects system uses digital video and microprocessor techniques to create the illusion of the picture rotating about an axis. Picture compression and perspective correction while the video is in a digital format combine to create the illusion of rotation. Many different rotating effects may be performed such as the picture seeming to open like a set of barn doors to another picture. Rotation about a central axis to another picture is a common effect used by the film industry—now available for the first time for the electronic video medium. In addition to the rotating (video compression) effects, the CD480 3D effect system can slide one picture off the screen while sliding a second picture on (so called "slide-change" effect).

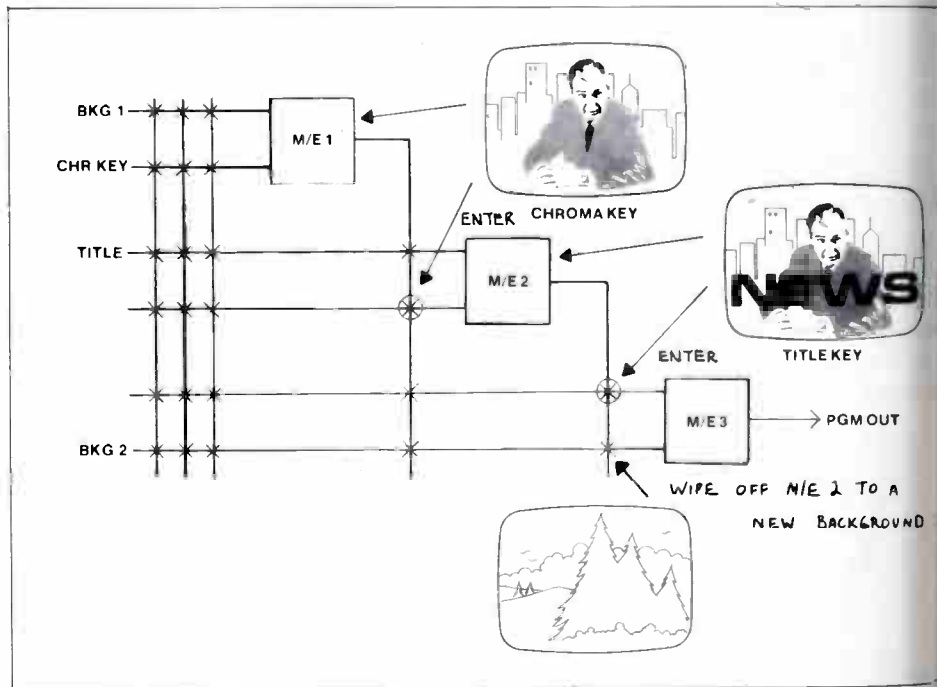
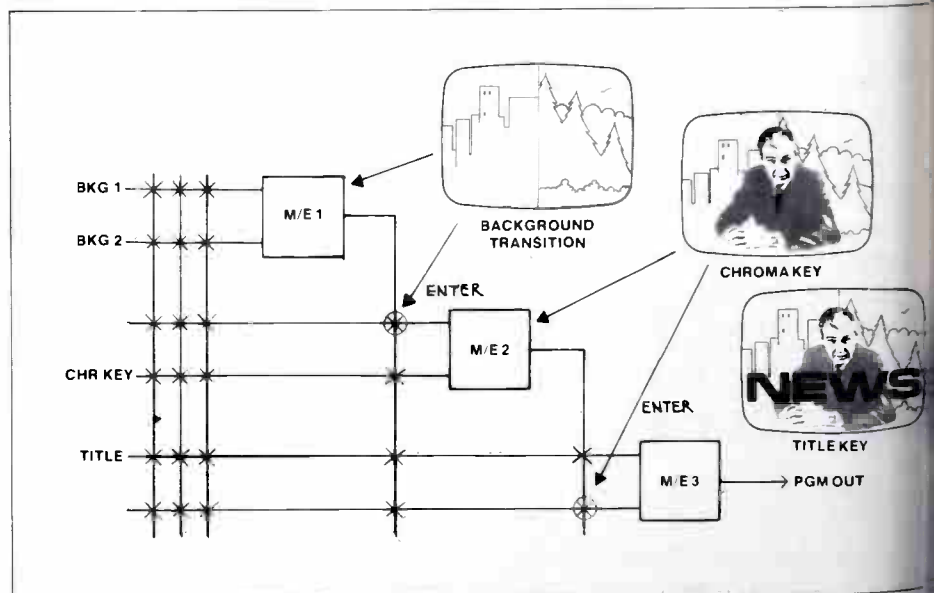


Fig. 3. All three M/E amplifiers would be required on a conventional switcher to accomplish the initial transition (monitor 4) shown in Fig. 2, then wiping to a new background.

Fig. 4. To continue the sequence shown Fig. 2, (change the background behind a chroma key with title keyed over chroma key) a triple effects switcher would have to go through a complete re-setup.



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With a special dual function transition, you can display a CHROMA KEY in the foreground, AND

independently controlled MIXES OR WIPES, in the background. INLINE KEYERS added to the buses give you a titling capability BEHIND the chroma key so that title keys can be wiped or mixed as transitions are made from bus to bus. Bilevel techniques eliminate the halos and edge noise and allows you to chroma key on very thin shadows.

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# Producing A Syndicated News Feed With ENG Mini Equipment

By Barry Rebo

Time Life Television's MONEY NEWS INSERTS is now in over 45 markets and growing. Production of the series is a fascinating proving ground for new mini equipment.

Time Life Television entered into the syndicated news service field at a time when the success of such operations were dubious. Television News Service had ceased operation after an unsuccessful effort to provide local TV news departments with a selection of national and international news feeds on a wide variety of hard news topics. Notwithstanding, T-L decided to move, electing to pursue the one specialized area that affects every individual American: personal economics. How to best maximize the efficiency of one's own dollars would be the theme. David Burke, formerly a producer with Metromedia's WNEW in New York was brought in to formulate the new series, which operates under the working title of "Money News Inserts."

Burke designed a news feed to provide each station with five 90- to 120-second "economics" stories per week for inclusion in the stations' evening news program. The station has a choice of taking the reel with a pre-recorded narration, or of personalizing it by taking a version with wild sound only over which the local consumer or "action" reporter can re-record his own sound track (from a T-L provided script). The local news operation can thus either take credit in full or use the T-L



Portable equipment can be easily carried in a station wagon for on-location shots. Author is operating camera.

narrator and give credit to Time, Inc., if they feel the latter course would lend additional credence to the report.

Original budget considerations were based on using the existing standard of TV news production, 16mm film. Burke's desire to produce a high quality video product dictated a documentary approach utilizing high quality, double system sound and extensive post-production effort to incorporate super's, ID's, and graphics. A-B dissolves, split-screens and a 'news' look quality were desired since the product would have to fit well within the context of a local station's own news operation.

During the formulation period of the news series, ENG was the glamour topic of the trade. Live coverage with a "Mini-Cam" was being promoted to the viewing public and the opportunity was ripe to capitalize on this new look in TV news around the country. Since distribution plans already called for playback for a week's stories on quad, why not investigate if this newest syndicated feed could not also be the first to be totally ENG-produced? (Indeed, T-L sales personnel later reported stepped-up interest from news directors when they learned this was to be a tape-produced product.)

Burke then contacted Barry Rebo, of Rebo Associates

continued on page 59



Equipment can be rolled down the sidewalk. Here David Burke, Money News producer, does an on-the-street interview at St. Petersburg, Fla.

Mr. Rebo is head of Rebo Associates 148 East 28th New York City 10016.



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<b>Up to 12.5 kW</b>	10,096 hrs.	10,525 hrs.
Type 8891	9,402 hrs.	
Visual service		
<b>Up to 17.5 kW</b>	16,600 hrs.	18,300 hrs.
Type 8807	29,800 hrs.	21,200 hrs.
Visual service	30,100 hrs.	20,400 hrs.
<b>Up to 27.5 kW</b>	9,778 hrs.	9,776 hrs.
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Visual service	10,799 hrs.	

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## ENG MINI EQUIPMENT

to discuss the feasibility of such an involved series. Rebo along with Chuck Edwards, now working exclusively with the new generation of 3/4-in tape equipment, were intrigued with the project and met with Burke to develop a production design for a pilot in order to demonstrate the "look" for Time Life executives.

The following serves as an up-to-date review of their findings since the project was commissioned in November '75.

### Production, post-production and evaluation of pilot

The pilot program was shown on Rebo Associates' existing field production unit consisting of a Sony VO-3800 VTR and a Sony DXC-1600 camera outfitted with a Canon F1.6 18-108mm lens. Support equipment used included Cine 60 power packs, F&B/Ceco fluid head tripod, Lisand shoulder pod, and a selection of Sony and Shure microphones, both hand and lavalier types. Also, a 5" Sony battery-operated color receiver modified for line video feeds was used in stationary setups, i.e., interviews, checking lighting, color rendition, and exposure values. Lighting equipment was either Lowell 'D' Heads or Lowell Tota-Lights, both with Umbrellas, and a selection of 500, 750, and 1000 watts lamps.

Since the project is national in scope, extensive air travel would be required, consequently, shipping cases were acquired that allowed all of the above equipment to be packed into five containers all of which are man-

ageable. None exceeds the domestic carriers' seven five pound limitation. In practice, the case which contains the camera head, lens and the color line monitor is hand carried since it contains the most critically aligned items. This case is designed to fit under a passenger seat. Test equipment is limited to a 3/4-in standard test tape. Routine checks of the VTRs speed and servo system are to set up the monitor with color bars since the camera control unit had no such provision.

The first field trip was a five day jaunt to south Florida, returning north to Boston, Mass. and back to New York. Everything functioned as designed and tapes were prepared for editing.

Teletronics International handled the editing of pilot after its subsidiary, S/T Duplicating performed step-up to quad (utilizing a Sony VO-2850 modified direct color playback through a CVS-504 TBC). Program audio had been recorded on track one and time code was recorded on the second cassette audio track simultaneously as the transfer was being made. Editing decisions were made viewing the cassette masters on CMX-50 systems. The quad masters with time code were then conformed on line with the CMX-300. Teletronics' editor Ruth Neuwald cut the programs to a pre-recorded narration.

Evaluation of these initial programs led to the decision to proceed with tape but it was decided that the S/T camera with its inherent vidicon problem of retention "lag" would have to be replaced.

The project required a broadcast quality three-lens camera of high reliability, great sensitivity and low weight. A comparison of the readily available camera

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Rebo sets up ASACA camera at EPA Test Center in Arbor, Mich.

at this time presented the choice of Ikegami, Fernseh, and the Asaca ACC-3000. Familiarity with the Asaca 5000 and its low lag Chalnicon tubes prompted a trip to Chicago to examine the 3000 first hand. This camera was then accepted as the new production camera. A critique based on the past month usage will be offered later.

#### Producing the real thing

Story assignments for money news insets are dispatched from Burke's office at T-L Television in New York to the crew which consists of Rebo, Edwards and another producer. Depending on the geographical area of location that is being worked that week, the crew will either fly to location or use Rebo's already set-up van. The vans are either held for the duration of the trip or can be shipped back to New York for preparation for editing—

stepped up to quad, and scripting. Teletronics main studio is now setup to dub to quad using an Ampex TBC-800 and a Sony VO-2850A.

When the two-inch quad tape is recorded, time code is added. The original cassette tape is sent back to the T-L office where the narration script is written. T-L also decided rough edit points and what graphics should be added. All this then goes back to Teletronics editor (Ruth Neuwald) who has the narration recorded on another piece of two inch tape. The editor then picks the best footage to match the narration. The story is then assembled on line using the CMX-300 system. The five pieces for the week are then dubbed for shipment to the subscribing stations. Along with the deck goes artwork, slides for chroma-key insert, the written transcript of the narration for those wanting to add their own local narration (four out of five subscribers). Included also is specific information on certain stories that are germane to individual markets.

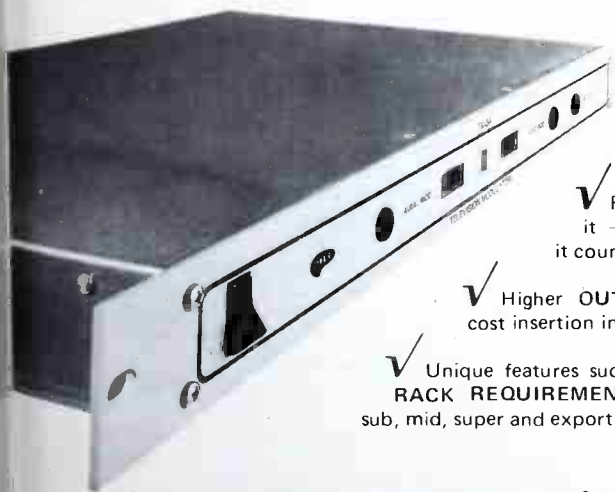
#### Evaluation of the field hardware

Six months and approximately fifty-five thousand miles after, the following observations can be made on the status of the hardware used on the Money News Project.

**Asaca 3000.** The decision to upgrade the field unit to incorporate the 3000 was an excellent choice. The Chalnicon tubes have eliminated all problems of lag and the general sensitivity is remarkable. The majority of footage is shot with available light and whatever supplementary light that is added is done without destroying the

continued on page 62

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## ENG MINI EQUIPMENT

ambience of the room. Normal footcandle rating for an interview situation is approximately 60-80 footcandles. The 3000 uses a Canon F-2.2 12-120mm power zoom lens. The ability to manually control the iris from the CCU has also been highly advantageous as it allows Edwards' the combination audio/video recordist, to monitor the levels while viewing the color line monitor. The reliability of the camera has also been outstanding\*. The crew operating is responsible for the set-up and routine maintenance of the camera on a daily basis during their travels. This basically entails adjusting color-balance, fixed pedestal level, auto white set and

\*Rebo Associates does not have an engineer on staff. When passing through Chicago, Asaca shows up at the airport and gives the camera a once over. All problems so far have been trouble-shoot via telephone.

registration. These procedures are checked and adjusted as needed with conclusion of the days shoot using lightweight Philips PM3226 dual trace scope, variable PortaPattern charts, and a Panasonic B/W unders monitor.

The power supply for battery operation of the camera is a Chiles belt but the AC unit is used when there is a series of interviews to be shot in the same day. A single belt will drive the unit for up to ninety minutes. It must be used judiciously since it can take up to forty-eight hours to fully recharge. Obviously a series of quick charge belts is needed but this seems to be a problem with the higher powered ENG cameras in general. It was necessary to modify the Lisand shoulder brace in order to get the camera seated further back on the shoulder for better weight distribution and subsequent balance due to the weight of the Canon lens. Nonetheless, the 3000

### Stabilized Mobile Video Camera System for Jitter-Free Shots

The CP/TK-76 is a Cinema Products modification of RCA's lightweight TK-76 color video camera incorporating the radically new Brown Stabilizer.

In hand-held operation, the system permits the recording of extremely steady images of studio-quality smoothness. It is ideal for taping "on-the-spot" television commercials, documentaries, and other special coverage as well as sports events, news interviews, etc.

The stabilized camera system permits the camera to move freely in all directions—up, down, and all around, in any number of angles, as if suspended freely in mid-air, yet completely balanced at all times. For example, a cameraman can run very fast (even up and down staircases) while shooting, or sit in a helicopter . . . or on the back of a flat-bed truck and shoot in any kind of rough terrain, and still deliver completely jitter-free shots of "dolly/track quality."

The CP/TK-76 is primarily intended for use in its stabilized mode. It is, however, readily convertible to



*Bright 3-in. monitor can be viewed while on the run.*

either tripod or "on-the-shoulder" modes of operation.

The complete system consists of a body brace, with a support arm attached to the body brace at one end, and (through a free-floating gimbal) to the camera system at the other end. A special 3" high-intensity monitor is attached to the camera for convenient two-eyed viewing in all ambient light situations. At the bottom of the video camera, in a T-bar type of arrangement, is the monitor power supply module and battery pack powering the camera. (The CP/TK-76 battery pack is a 6 ampere-hour nickel cadmium unit rated at 12 volts. Two battery packs and one charger are supplied with each system.)

The special 3" monitor, designed and manufactured exclusively for the CP/TK-76 features a high-intensity kinescope tube, with a special filter with multiple layer anti-reflective coatings on its surface, that permits the operator to perceive a bright, high resolution picture even with direct sunlight impinging on the face of the tube. Before filtering, the CP 3" monitor delivers in excess of 4000 footlamberts on the screen of the tube—at least ten times (10X) the brightness one would get from a standard monitor. The video camera and the CP 3" monitor are easily detached from the rest of the system for tripod or "on-the-shoulder" operation.

The body brace and support arm weigh approximately 13½ lbs. The CP/TK-76 video camera (including Canon 10.5-105mm video zoom lens, CP 3" monitor and power supply) weighs approximately 30 lbs., all comfortably supported at the operator's hips due to the human engineering and special configuration of the body brace and support arm.

The Brown Stabilizer, invented by Garret Brown, was developed and is manufactured by Cinema Products under exclusive world-wide license.

The CP/TK-76 stabilized video camera system, available as a complete package exclusively from Cinema Products, is priced at approximately \$45,000. Other video cameras may also be modified for use with the Brown Stabilizer.

For further information, write to Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025, or Circle 399 on the reader service card.



*The CP/TK-76 Stabilized Video Camera System produces jitter free pictures.*

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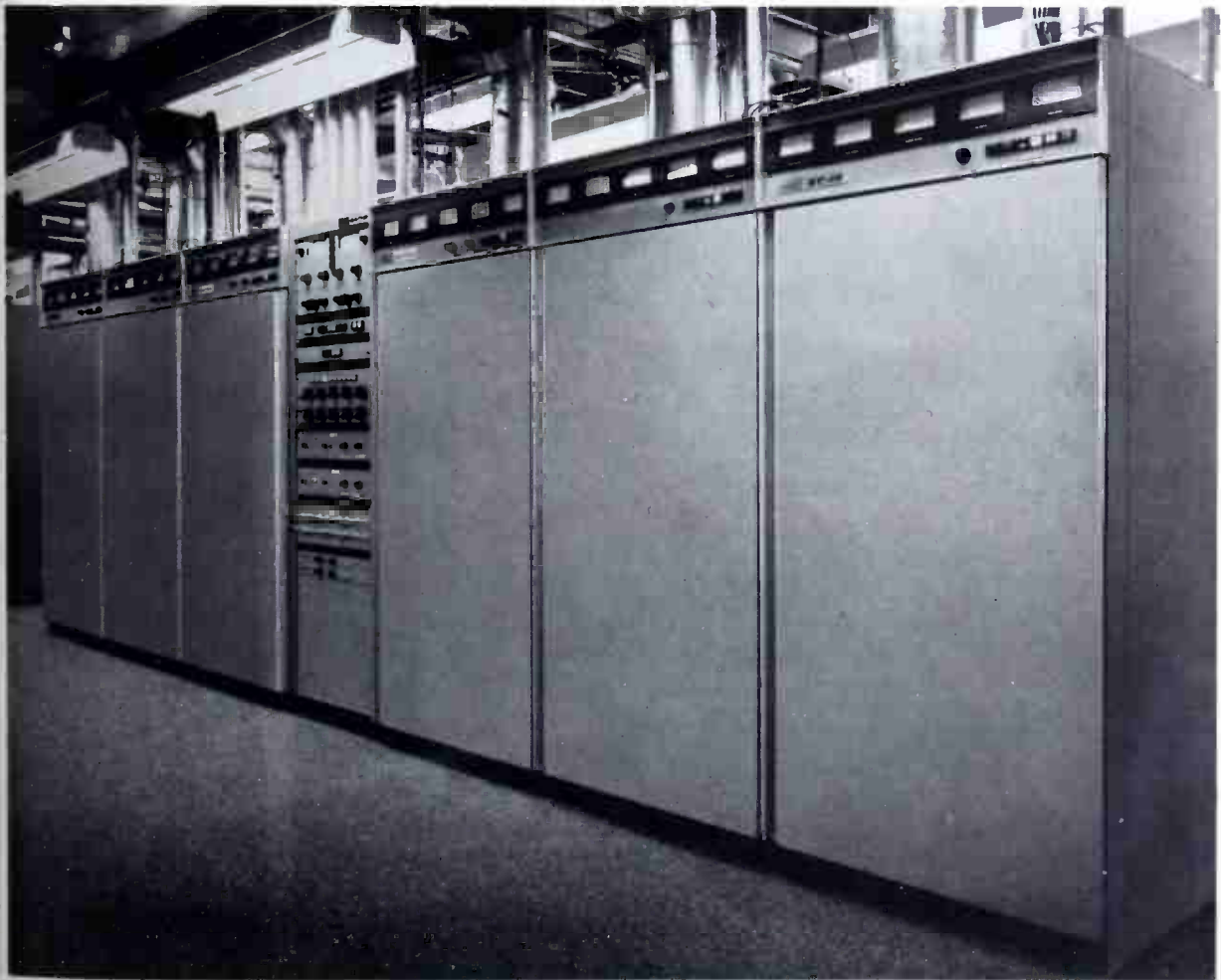
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Circle 138 on Reader Service Card

## ENG MINI EQUIPMENT

underweighs both Ikegami models (33s and 35s), as well as the Fernseh and is close to half the price of either. It has been a highly satisfactory choice for our purposes.

**Sony VO-3800.** Here the choices were obviously limited. Fortunately the VTR has been totally dependable to date. The deck has never failed to record properly and has never failed to produce tapes that could not be time base corrected to quad. There is a need for color playback in the field at times and a higher signal to noise recording would be advantageous due to the number of dubs involved in post-production before distribution copies are struck. We hope to add the Sony Broadcast BVU-100 VTR when it becomes available to meet these



Money News went to Choctaw Indian Reserve in Mississippi.

needs. Power supplies used are Cine60 packs with internal Sony BP-20A battery held in reserve. The combination is good for over six tapes during the course of the day and has not presented any real problems. Also performance of the deck is continually monitored by the use of the aforementioned standard tape. An RF playback module is used by the field producer to screen the days work each evening over the in-room TV receiver in order to better prepare scripts and the following day's schedule.

**Support Equipment.** The guideline here has been to keep everything as simple and compact as possible. Micro audio is recorded with the Sony ECM-50 lavalier microphone and wild sound with a Shure hand mic. The Tota-Lig camera is now primarily used due to its compact size and weight. The addition of the Asaca camera has required an additional case or so to transport the test equipment but it is still quite a mobile operation and easily manageable even on the longer flying trips. The accompanying photographs show how the system goes together. The carts used to mount the CCU and VTR on are the heaviest duty airport luggage carts available since the industrial hand trucks that many TV stations use could not be boarded on passenger planes.

In summing up the performance of the hardware to date, the field unit utilizes many of the basic ENG elements with some of the perhaps more overlooked pieces and comes up with a very workable ensemble. It of course draws on some extremely dedicated people in areas of involvement with the program who realize that this is a whole new process in which everyone is both teacher and student. BM

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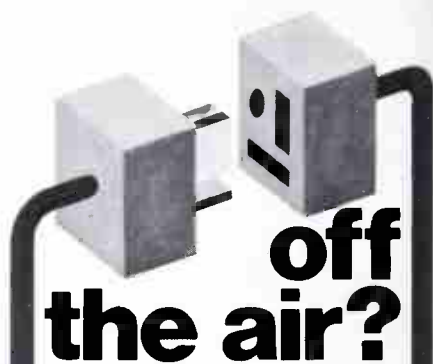
Mono Heads: \$19.00				Stereo Heads: \$69.50			
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# GREAT IDEA CONTEST

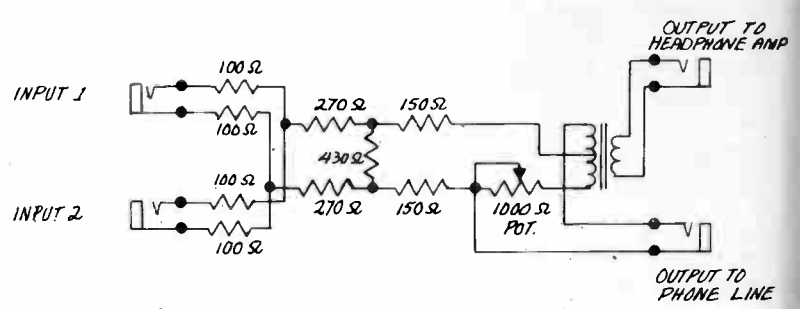
If you haven't done so already, send in your ideas for BM/E's most popular feature. Remember, there is no limit on the number of ideas that one contestant can submit. And don't forget to vote on all published ideas.

## 11. Easy Communication With Remote Operator.

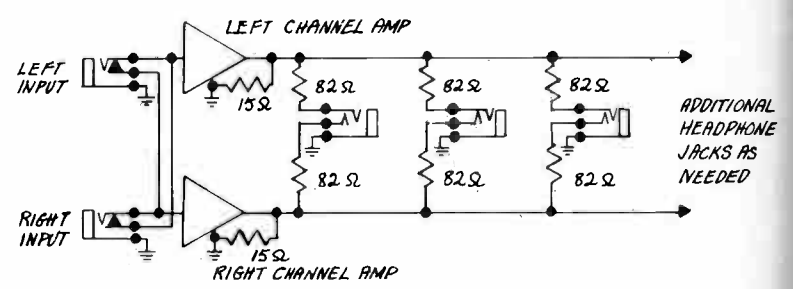
*Emeric S. Bennet, CE, WPVL, Painesville, Ohio.*

**Problem:** To be able to talk a remote broadcast operator during commercial breaks without a second phone line, or a lot of fumbling around.

**Solution:** We solve the problem using Telex model CS-90 head



Hybrid Mixer Circuit



Headphone Amp Modification

## Production Power

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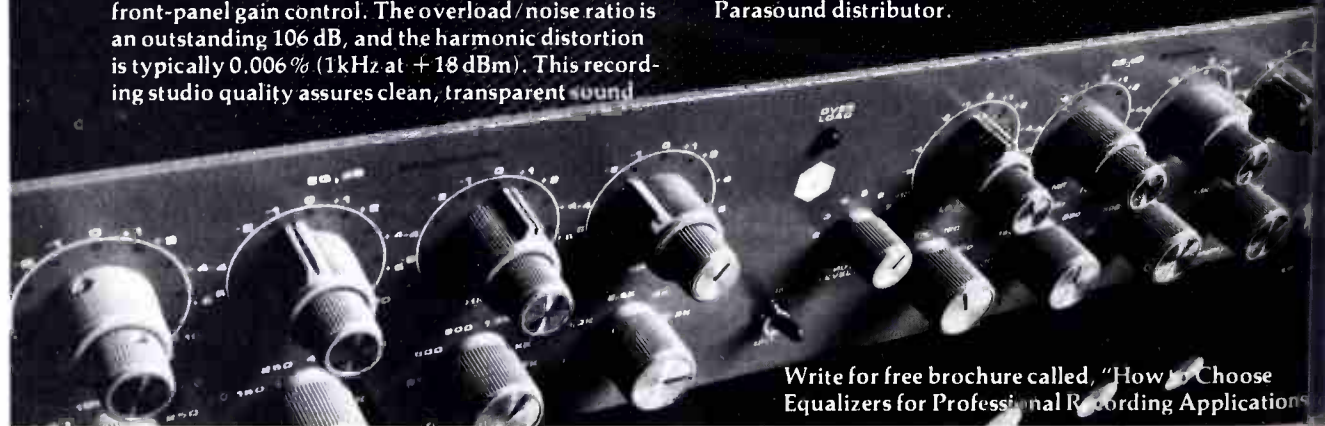
whether you use the Orban/Parasound Parametric in production or live on the air.

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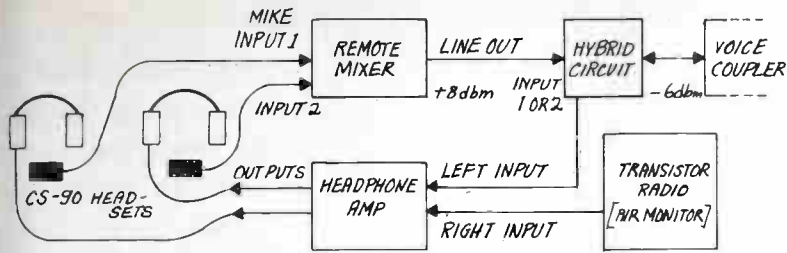
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or your local Orban/Parasound distributor.



Write for free brochure called, "How to Choose Equalizers for Professional Recording Applications"

Circle 142 on Reader Service Card





Bennet's overall system connection

bi-directional, allowing the signal on the phone line to come out the coupler's input jack. I suspect the entire system, except for the radio, can be built into a remote mixer providing sufficient room is available for the additional jacks and parts.

continued on page 68

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built in boom mikes instead of handheld mikes and separate headphones. These headsets have a low-Z impedance and two separately connected earphones. The mike is connected to a remote mixer as usual: one earphone gets a signal from a portable radio, the other earphone gets a signal from the phone line. Obtaining the signal off of the phone line is the main trick in this set-up. By using the hybrid coupler circuit shown in Fig. 1, the outputs of the mixer output and the radio in the studio, can be adjusted to be equal. This way, during the commercial breaks, the people at the remote site can talk to each other and the studio, without having to move their headsets. If the remote is in a location where radio reception is poor, simply unplug the radio's input from the amplifier. This will switch the signal from the phone line monitor circuit to both ears of the headset. The studio operator can now give a "go" over the phone before opening the console pot at the end of a commercial.

The headphone amp used is a small phono amp modified as shown in Fig. 2. The 82 ohm resistors in series with the output jacks will approximately balance the level in any pair of headphones used, regardless of their impedance. Up to 10 headphones can be connected in this manner, without overloading the amp.

The hybrid circuit shown in Fig. 1 has two input jacks for mixing the +8 dbm output from two separate mixers, if necessary. The output level is approximately -6 dbm, about correct for a voice coupler feeding a business phone line. There is essentially no change in its operation when only one radio is used. The pot is used to adjust the relative send and receive levels of the phone line. The pot is first set to match the mixer output in the headphones, and then turned slightly to one side until the levels are equal. To prevent a poor null and bad headphone quality resulting from frequency response errors, use a good quality transformer in the hybrid circuit.

Fig. 3 shows the overall system connection. The 30A Voice Coupler is



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## GREAT IDEAS

### 12. Simple Humidifier Eliminates Static Paper Jams on Teletype, Paper-Dust Buildup

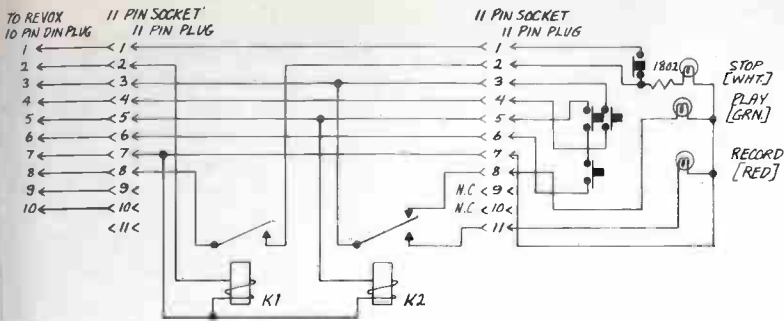
John C. Morgan, general manager,  
tech director, WFVA-WFVA-FM, I  
dericksburg, VA

**Problem:** We bought and installed Model 28 teletype for the E... Weather wire, and having no m... tinsel immediately available, we v... forthwith plagued with paper j... caused by static buildup.

**Solution:** We cut the top off a p... tic bottle, quart-size (such as bleac... copier-fluid, etc. come in—size li... are approximately 3½ inches diam... and up to 9 inches high). Then... made a wick out of cotton rag, abo... inches wide and 12 long. We fold... length-wise about four times and... pled with 3 or 4 staples to keep... folded. This was then placed in... bottle and stapled to it, with abo... inches hanging outside. The bottle... filled with water to about an inch... top and placed on rear of printer b...

This kept the inside of pr... cabinet well-humidified and preve... static build up, even in driest weat... The bottle has to be refilled every... or three days, of course. Many... found that the metal tinsel used to... charge static is not 100% reliabl... will fail occasionally—usually... after the last person has left for... night. The bottle worked without... alone, for several weeks. Howev... we then obtained some metal tin... and put it in place as a hedge ag... the possibility of forgetting to refil... bottle for several days.

The foregoing also solved an... problem we'd always accepted... normal: the buildup over a perio... several weeks of a coating of p... dust ("goofer feathers"), over all... faces of printer and inside of cab... This eventually mixes with oil... ribbon ink to form a viscous g... which can cause divers glitches. V... noticed this in our News printe... along, but since AP provided ma... nance we let them worry about it... so the Model 28. That's OUR p... lem; but though its been clac... along, 24 hours a day for 15 mo... there's never been any sign of g... feathers. The only maintenance w... done has been to keep the felt l... cating discs oiled, and about or... month, clean the type font, and... ole man river it has jest kep' re... along.



Ruck's Revox A-77 remote control adapter

and still have remote control of the three functions, except that the green "play" light will remain on whenever the machine is turned on and the other two lights will not light up.

I used Arrow/Hart 83500 series switch parts. All three switches use an A/H 83500-30 contact block while the "play" switch uses two contact blocks. The "stop" switch uses an A/H 83500-80 white square lens, the "play" switch uses an A/H 83500-82 green square lens and the "record" switch uses an 83500-81 red square lens

continued on page 70

about a month ago, the AP service performed a routine maintenance on the Model 15 news printer, and when he left I decided to try putting it in the bottle. Not a sign of goober letters yet! This unit has an irradiated cover over the paper where it feeds into the platen, and we'd never had any problem with static; however, I understand 15s do not have this feature, and depend on the tinsel for static control.

### 3 Status Lights For Revox Remote Control.

Ruck, CE, KUSF Radio, San Francisco, Calif.

**Problem:** While many people have figured out how to add a remote control to a Revox A-77 tape recorder, adding status lights is a bit more difficult due to the unusual relay logic that his machine has.

**Solution:** By adding two relays, one can have full status indication of "machine ready," "play," and "record" without modifying the tape recorder, with the circuit shown. The "stop" light will come on whenever the machine is turned on and this is threaded in the machine. The "play" light will come on whenever the machine is in the play mode, and the red "record" light will come on whenever the machine is in the "record" mode.

Relay K1 is a "helper" relay for the shutoff photocell amplifier and is required due to the extra current drawn by the status lights. Relay K2 is an "and" gate which turns the "record" light on when both the "record" and "play" relays in the tape recorder are energized. Without K2 the "record" light would also come on in the "standby" mode.

The circuit as shown has a record button in that both the play and record buttons must be depressed simultaneously to put the machine into "record." If you wire the circuit with 11 pin octal plugs and sockets as shown you can bypass the adapter box

# Spotmaster®

## THE MARVELOUS ONES

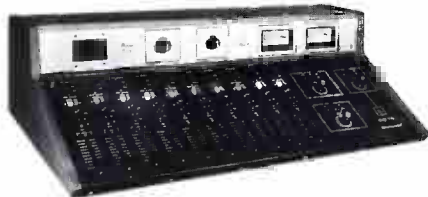
### SERIES 3000

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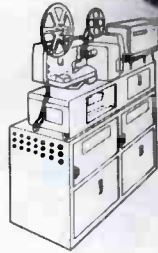
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KPTV, WCPO, KFMB, WTIC, WCKT,  
KNFM, WSMW, WTTV, KMGH,  
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Circle 148 on Reader Service Card

## GREAT IDEAS

lens. These switches also come round and PP2 rectangular shapes.

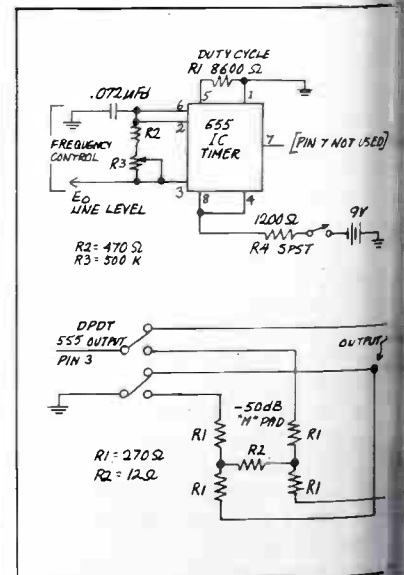
All three lamps are #334 bulbs used "crystal can" relays since I had a bunch on hand, but almost any sm 24 volt relay would work in this circuit. Finally, the 180 ohm resistor series with the "stop" light reduces the brightness of the white lens to match the red and green lenses.

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Ideas.**

### 14. Very Inexpensive Square-Wave Oscillator, Hz-20KHz, Needs No Switching

*John F. Moser, chief student engineer, WKHS, Kent Co. High School, Worton, MD*

**Problem:** To build a very low cost square wave audio generator which covers the entire 20 to 20000 Hz band with no range switching and the ability to switch from line to microphone level output.



**Solution:** A 555 IC timer may be adapted to make an audio generator whose frequency band (20 Hz-20K) is controlled by R<sub>3</sub>, a 500 K taper pot. R<sub>2</sub> sets the high frequency at 20,000 Hz. R<sub>1</sub> controls the duty cycle. 8.6K here provides a duty cycle of



approximately 50%.  
 A DPDT switch may be added along with an "H" pad to provide a microphone output for added versatility. This generator is portable and very handy for wire and signal tracing, and other audio applications. It fits in a small (4" x 2" x 2") metal cabinet, and cost is approximately \$6.

## Using Old EBS Receiver To Feed Audio To New Two-Tone Monitor

Douglas Booth, Jr., chief engineer, Miratel, New Orleans, LA

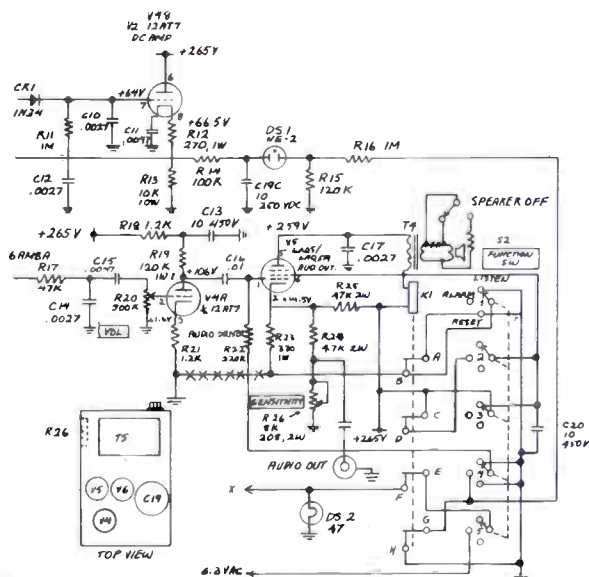
**Problem:** To find a way to use the old EBS receiver for audio feed to the new two-tone monitor, while retaining its alarm function.

**Solution:** When we got our new two-tone EBS monitor (decoder) we did not buy a new receiver, intending to use the audio from the old receiver, a Ballantine Miratel Air Alert I unit. We

wanted it to give us a constant audio feed, but also to alarm when the station to which it was tuned went off the air. Originally the receiver had no audio output when in the alarm condition, and was incapable of alarming at a carrier break when in the "listen" condition. The following changes were made to permit both functions at the same time (see schematic). 1. The lower end of R21 was removed from R23 and grounded. This enabled the audio driver to operate normally at all times. 2. An audio output jack was installed on the chassis, between the fuseholder and line cord strain reliever and connected to the junction of R24 and R26 by a dc-blocking capacitor. 3. A SPDT toggle switch with a 6 ohm resistor was installed on the left side of the speaker to mute the speaker and provide a dummy load to the amplifier while the speaker is off. 4. The volume control knob was removed and discarded, and a control locking nut assembly installed in place of the regular nut.

continued on page 78

Both using old EBS receiver to feed audio to new two-tone monitor.



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Model SIA-4	440 V.	Three phase	\$595.00

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# BROADCAST EQUIPMENT

For more information  
circle bold face numbers  
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**Film/sound console**, the AVEX-1, is a self-contained, 4 ft. film/sound production facility for TV and film producers. Some of the capabilities are direct tape to magnetic film strip transferring on 16 or 35 mm, work track preparation, fingertip control, pick-up recording, premixing with picture and synchronous 24 fps and high shuttle speed



in forward and reverse. Standard models are available with 1-, 3-, and 4-track master recorder, 16 and 35 mm, and can be interfaced with standard interlock systems, SMPTE time lock, TV and video servo systems. MULTI-TRACK MAGNETICS, INC. **300**

**Time base corrector**, the RAIM (Random Access Incremental Memory) 1000, is intended for the closed circuit and CATV television



systems. It features only two operating controls, an "On-Off" switch, and a "Correct-Bypass" switch. Also included are, instant lock-up of no more than .250 seconds, full picture above and below the head switch and several other features. \$2995.00 SYSTAMATICS, INC. **301**

**Stereo compressor/limiter** Model 162 with strapping for multi-tracking, is similar to the Model 160 single channel compressor/limiter and offers true RMS level detection with the threshold variable from 10 millivolts to 3 volts.

LED indicators show above and below threshold operation. The Model 162 is a fully professional, rack mounted



compressor/limiter with barrier terminal strip connectors and is ground loop compensated and protected against power turn-on, turn-off transients. DBX, Inc. **302**

**Color monitor receiver**, Model JU-970W, is a 100% solid state TV specially designed for numerous studio applications, including direct off-air and general purpose monitoring. RCA **303**

**New color television film chain**, The Producer 32, is a 2 x 2 slide projector capable of creating multispeed dissolves and numerous special effects on a single film chain. It is described as the first to incorporate in one unit, separate dissolve and special effects systems, a memory and audio tape programmer and full random access. A micro processor and most of the electronics are contained in a 19" rack mount controller wired through ribbon connectors for remote operation of the projector unit. SPINDLER & SAUPPE. **304**

**Digital stopwatches**, the STT II and STT III are new liquid crystal display (LCD) watches that feature 1500 hours use on a replaceable 9 volt battery, easy to read LCD, solid state electronics, readout in hundredths of a second to 59 minutes and 59.99 seconds, and split



functions of Taylor action (interval and standard (cumulative)). STT III \$99.50 and STT II, with memory \$149.50. FELDMAR WATCH CO INC. **31**

**Video Delay Units**, UN097, which will give accurate delay time of up to 665 ns, have been introduced. Users may connect or change delay time connections inside the box according to instructions supplied. Seven versions are available according to the delay time required. Minimum delay provided is in unit UN097A (15 ns to 165ns) and maximum is in unit UN097G (515 ns to 665 ns). TELEVISION EQUIPMENT ASSOCIATES. **3**

**Power Belt** supplies 30 volts dc at 400 ma from nickel-cadmium batteries for up to 30 minutes to a maximum 250 w load. Model F-30, now in use by three major USA TV networks power Hitachi, Ikegami, RCA, a Thomson ENG hand-held cameras well as portable camera lights such as Sun Gun and others. F-30 with trick charger for 120 volts ac, 50/60 Hz \$485.00 and Model F-30EXFA with external 30 minute rapid charger 120 volts ac, 50/60 Hz, \$650.00. FREZZOLINI ELECTRONICS, INC. **3**

**Nickel cadmium battery**, alternative for Sony Lead Acid BP-20A, fits recorders model no. Sony VO-38 and Sony camera, DXC-1600. It can be modified to fit Akai, as well. Nickel cadmium construction performs with higher discharge rates, longer discharge cycles and longer total life. Free placement guaranteed for six months. ALEXANDER MANUFACTURING CO. **3**

**Lens for 2/3 in., ENG cameras.** The 15x9.5 zoom lens offers very wide angle at the minimum focal length



9.5 mm with a 15x zoom range to provide a maximum focal length of 142.5 mm. Lens has the ability to focus down to 24 in., while still retaining zoom capability. The new lens will be available with both iris and zoom servo. The zoom control is incorporated in the



grip and a retrozoom attachment  
 table which attaches to the front  
 lens without altering the ap-  
 ANGENIEUX CORP. OF AMER-  
**309**

Sync Generator CSG-2 with  
 Burst is an EIA RS-170 sync  
 generator that features oven controlled  
 oscillator, front panel test  
 point, 19 in., rack mount or table top  
 operation, 3 subcarrier outputs (one  
 and 2 adjustable), front panel 360  
 phase adjustment, and front panel  
 frequency burst phase adjustment. VIDEO  
 SUPPLIES, INC. **310**

Four track quad console, the QM-12A  
 has an eight track monitor section  
 which enables the engineer to monitor  
 "takes" without disturbing the



monitoring chain. The four monitor  
 section also perform normal buss moni-  
 toring. A talkback mic and talkback  
 control allows communication  
 in the studio as well as providing  
 monitoring of tracks from the control  
 room. \$3295.00 QUANTUM AUDIO  
 SYSTEMS, INC. **311**

Speed audio tape copier, Model  
 4400 can turn out five professional  
 quality duplicates in four minutes. It  
 has a single capstan drive and spe-  
 cially designed heads to provide uni-  
 form frequency response ( $\pm 5$  dB of  
 flatness from 50 Hz to 15 KHz). GARNER  
 INDUSTRIES, INC. **312**

Reverberation System recreates the  
 natural ambience of a live per-



formance. The Model 4400's two inde-  
 pendent channels have a four band  
 graphic equalizer that allows the oper-  
 ator to tailor the reverb sound to simu-  
 late the qualities of a room. The input  
 level for each channel is set by AutoPad  
 control circuitry and constantly  
 monitored by VU meters. Each channel  
 has its own four band graphic equal-  
 izer. \$899.00 TAPCO. **313**

continued on page 74

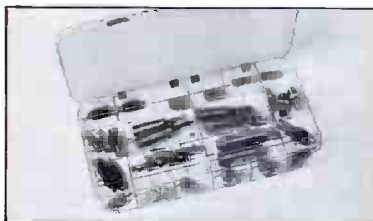
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 no production at all. They'll pay for themselves at least twice  
 over the first time you have to use them.



**AVDAP-1 contains:**

Qty.	Model #	Description
1	B-T	BNC Jack, Plug, Jack T
1	U-T	UHF Jack, Plug, Jack T
2	U-BL	UHF Jack to Jack
2	B-BL	BNC Jack to Jack
3	BP-UJ	BNC Plug to UHF Jack
3	BJ-UP	BNC Jack to UHF Plug
1	B-TM	BNC 75 ohm Terminator
2	SPP-PJ	Standard Phone Plug to Phono Jack
1	MP-PJ	Mini-Plug to Phono Jack
1	MP-SPJ	Mini-Plug to Standard Phone Jack
2	SPJ-PP	Standard Phone Jack to Phono Plug
2	SPJ-BL	Standard Phone Jack to Jack
2	PJ-BL	Phono Jack to Jack
1	XLRJ-SPJ	XLR Jack to Standard Phone Jack
1	XLRP-SPJ	XLR Plug to Standard Phone Jack
1	XLRJ-SPP	XLR Jack to Standard Phone Plug
1	XLRP-SPP	XLR Plug to Standard Phone Plug
1	XLRJ-BL	XLR Jack to Jack
1	XLRP-BL	XLR Plug to Plug
1	COMBOX 1	Custom Compartment Case with hinged lid

**AVCON-1 contains:**

Qty.	Model #	Description
4	UP	UHF Plug and Adapter for RG-59U
2	BP	BNC Plug for RG-59U
2	MP	Mini-Plug
2	PP	Phono Plug
2	SPP	Standard Phone Plug
2	XLRJ	XLR Jack
2	XLRP	XLR Plug
1	E8P	EIAJ 8-Pin Plug
1	E8PCM	EIAJ 8-Pin Plug, chassis mount
3	E8JCM	EIAJ 8-Pin Plug, chassis mount
1	E10P	EIAJ 10-Pin Plug
1	E10J	EIAJ 10-Pin Jack
1	E10JCM	EIAJ 10-Pin Jack, chassis mount
1	E10PCM	EIAJ 10-Pin Plug, chassis mount
1	D4P	DIN 4-Pin Plug
1	D6P	DIN 6-Pin Plug
1	D4JCM	DIN 4-Pin Jack, chassis mount
1	D6JCM	DIN 6-Pin Jack, chassis mount
1	COMBOX 1	Custom Compartment Case with hinged lid

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## PRODUCTS

**Modular professional recording/remixing/on-air audio control console**, the Model 110, is designed to accommodate multi-track recording/remixing. The free standing unit is expandable to 18 mixing positions, 36 inputs in 38 in., width. It offers complete metering, two echo send/receive channels, talkback communications, separate control room and studio monitoring, test oscillator, and a full line of matching accessories. **AUDIOTRONICS, INC. 314**

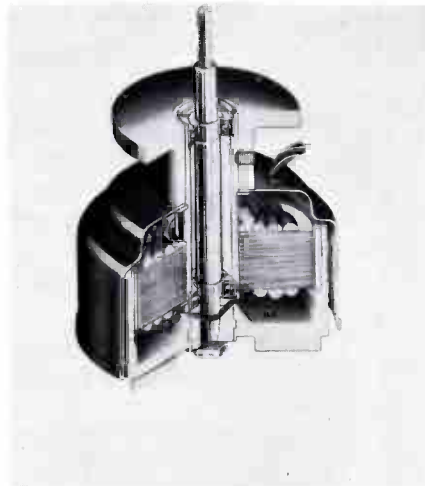
**Six Plate Console Editor, C-16**, features a seven motor drive system, 12



sided prism, rear screen projection, interlock switching and all metal con-

struction. It accepts an add-on picture module and MT-3 Mix Transfer module. Super 8 and 16 mm modules are available for quick change from gauge to gauge. \$3995.00 S.E.R.A. **315**

**Motor** for magnetic recording and instrumentation applications differs from a conventional motor since its stator



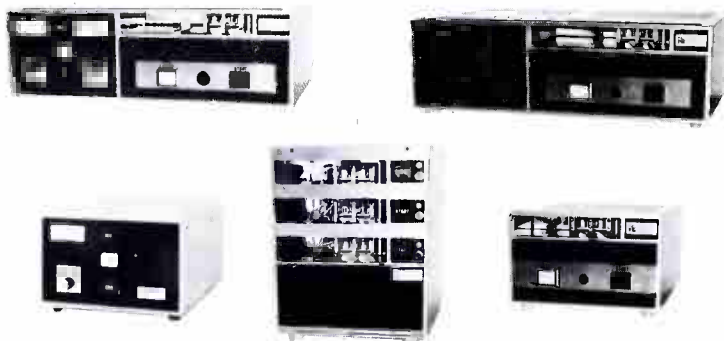
core and windings are the internal members, while the rotor is the external member. This diminishes the magnetizing current and results in about half the magnetizing losses in iron. **UMC ELECTRONICS CO. 316**

**Ektachrome video news film**, 7239 (daylight), like Ektachrome video news film type 7240 (tungsten) is pre hardened during manufacture. This allows the new film to be processed in process VNF-1, thus eliminating the prehardener and neutral solutions of process ME-4. The maining steps in VNF-1 are the same as those of ME-4. The film is rated EI 160. **EASTMAN KODAK CO.**

**Multi-coated, six element 2X extender** is available in the following lens mounts: Arriflex standard, E CM3 and Arriflex bayonet, which can be used with any Arriflex bayonet mounted zoom lens and certain focal length prime lenses. **ALAN GORDON ENTERPRISES, INC.**

**Digital frequency meter** can be used as a flow meter, tachometer, proportion rate monitor or dividing counter. Meter uses a programmable crystal time base and pre-scaler (input divider). Parallel binary coded decimal (BCD) data outputs can be connected to automatic controllers, small computers, computers or microprocessors. The meter measures 3 1/2-in. x 4 1/2-in. x 5/8-in. Priced from \$300; delivered to 6 weeks ARO. **NATIONWIDE ELECTRONIC SYSTEMS, INC.**

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**Gene D. Osborne** has been named Group Manager of Rust Craft Broadcasting. . . . McGraw-Hill Broadcasting announced that **Robert Hart** will act as chief operating officer for KMGH-TV.

**Chris Gredell** has been named General Manager of WBBM-FM, by CBS. . . . Universal Broadcasting Co., has named **Richard V. Marsh**, president of marketing.

NASA announced that **Dr. Robert Ober** will become its new director of the Goddard Space Flight Center, 1st.

**Tony Bolletino** has joined Di-Tech, as director of marketing . . . .

**Ronald Beier** has been named general distributor sales manager by Whcraft, Inc. . . . **Thomas R. King** has joined BSR (USA) Ltd., as west regional sales manager.

**John S. Larkworthy** has been named president and chief executive officer of Division Microtime, Inc., a subsidiary of Anderson Laboratories, Inc.

## Business Briefs

Poland has announced a long-term deal to install a \$71 million plant to produce 300,000 precision color television picture tubes. The company also has a \$1 million contract with Nationwide Communications, to purchase RCA broadcast equipment for its group stations to add their ENG and videotape cartridge systems. . . . **Dynair Electronics, Inc.**, of San Diego, CA, recently completed work on "the world's largest video switcher" with its 360 inputs and 100 outputs; the switcher is at Caltech's Jet Propulsion Lab near Pasadena and will be used for NASA's Viking Spacecraft when it lands on Mars this July 4th.

**Harris Corp.** has taken a \$97,000 order from WHAS Inc., of Louisville, KY for its new TF-100 film island and order for three Harris TC-50 color television cameras from the Blackhawk Baptist Church, Ft. Wayne, IN. . . . Harris has also started a new division, **Harris Satellite Communications**, in Melbourne, FL, to serve the commercial market for satellite communications equipment.

**CE International** received a \$3.5 million contract to provide the Republic of Ireland with microwave communications systems for its national television network, and a contract in excess of \$50,000 to provide New Zealand's television broadcasting network with a supervisory control system. . . . **RAPID-Q** line of tape cartridge

equipment and the STE-100 Stereo Phase Enhancer have joined the EDCO Group of products manufactured by **Engineered Devices Company**, 680 Bizzell Dr. Lexington, KY 40504. . . . **Eric Small & Associates**, Broadcast Audio Consultants, and Marketing Representatives for Urban/Broadcast have moved from 271 Columbus Avenue, San Francisco, to, 680 Beach Street, Suite 315, San Francisco, CA, 94109. . . .

**Data Communications Corp.**, Memphis, TN, announced that its BIAS (Broadcast Industry Automation System) division has signed six more TV stations for its services bringing its total client list to 147 stations in the U.S. and Canada. The six new stations are, WZZM-TV, Grand Rapids, MI, KMOL-TV, San Antonio, TX, KTUV-TV, Salt Lake City, UT, CKVU-TV, Vancouver, B.C., WBAL-TV, Baltimore, and WTAW-TV, Pittsburgh. . . .

Dale G. Moore, Chairman and Earl E. Morgenroth, President of Western Broadcasting Company announced the sale of radio station KIDO-AM, Boise, ID, to **MESABI Western Corporation**, the sale is contingent upon FCC approval. . . . **MICMIX Audio Products, Inc.**, has announced the appointment of Irving Rose Associates to represent their products in the Chicago area; while the eastern representatives, **Sphere Associates**, Washington, D.C., has installed a New York City telephone line, (212) 246-0176, to better serve the area. . . .

**TelePrompter Corp.** announced that the number of its basic cable subscribers has now passed the 1,100,000 mark, and that Signals & Video, Inc., Bronx, NY, has been added to the list of production companies using TelePrompter's Manhattan CATV color TV studio at 219th Street and Broadway. . . .

**Trans-World Communications, Inc.**, was scheduled to open the largest facility on the West Coast devoted exclusively to the mastering and duplication of video tapes; International Video Corporation completely equipped the facility. . . . Glenn R. Jones, Chief Executive Officer of **Jones Intercable, Inc.**, announced the acquisition of a CATV system in Mountain Home, ID, which currently serves more than 1,000 subscribers. . . .

**Warren G-V Communications**, Livingston, NJ, has named three Sales Representatives. Electro Rep Associates of Charlotte, will handle North and South Carolina; CSS Telecommunication Specialists of Mountain View, CA, will cover Alaska, Oregon, Hawaii, and Washington; Leonard Electric, Ltd., will be responsible for Canada with the exception of BC.

# On professional performance.



All too often, the use of the word professional is a self-serving device for conferring "excellence" on a mediocre product. And in the case of headphones, a half dozen examples come to mind.

But there is one headphone which, in the opinion of experts, is professional in every respect, the Beyer DT-48.

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As a matter of fact, the DT-48 has been designated by the German Bureau of Standards (PTB) as the preferred audiometric standard.

Oddly enough, we've never described the DT-48 as professional; we leave that to the experts.

Beyer DT-48 \$140  
Beyer DT-48K with plug-in coiled cable \$145

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# NEW LIT

For copies of these literature offerings, circle number for appropriate items on Reader Service Card.

The second edition of **The Theory of Electronic Lighting Control for Stage and Studio**, covers both theory and practical use of electronic lighting controls. The 16-page booklet is available from Skirpan Lighting Control Corp. **250**

Reprints of a 12-page article entitled **FCC Tests Due: March 31, 1976**, which discusses the new FCC proof-of-performance standards and describes how to test for each parameter, are now available from Jerrold Electronics. **251**

A pocket size chart that relates focal length to camera format to horizontal viewing angle is now available. The conversions are made simply and accurately with a new "See Key" which is explained in the chart from Achro Video Ltd. **252**

**Cable Television: Strategy for Penetrating Key Urban Markets**, is a new

book by James D. Scott. Professor Scott is the Sebastian S. Kresge Professor of Marketing at the Graduate School of Business Administration, University of Michigan, where he conducted the research for this book. The book provides an analysis of, and suggests plans for, the marketing necessary to help CATV realize its potential. The book is available for \$5.50. Michigan Business Reports No. 58. The University of Michigan, Ann Arbor, 48104.

**Troubleshooting in the Data Domain is Simplified by Logic Analyzers** (Application Note 167-5), is designed as an introduction to the operation of logic analyzers and is available from Hewlett Packard. **253**

"An authoritative, practical guide to microprocessor construction, operation, programming and applications," entitled **Microprocessor/Microprogramming Handbook** (TAB Book No. 785) is available for \$9.95, hardbound or \$6.95 paperback, Tab Books, Blue Ridge Summit, PA, 17214.

A descriptive 4-page **brochure on the new Philips LDK-11 Portable Color Camera** is available. The camera is battery or ac operated and features a 3-Plumbicon tube picture with bias

light, beam-split prism, linear material for colorimetry, H and V contour auto iris, auto white balance, genlock sync generator and built in color bar. Full details of the camera, backpack, remote control unit, power source and electronic viewfinder are contained in the brochure, from Broadcast Equipment Div., Philips Audio Video Systems Corp.

**SEED: Establishing an Industry Standard, and Duobond™**: Two Callback CostCutter, are two new color/sound films from Belden. The first film treats the development and operation of Belden's patented SEED test fixture. SEED is an acronym for Shield Effectiveness Evaluation Device. The second film uses SEED-based research to compare the shielding effectiveness of conventional dual-foil wrap-on laminate shields with new bonded-foil shield constructions such as Belden's Duobond. Both 12-minute films are available from Belden.

**MobCat 76** is a new 12-page catalog of Mobile Communications Support Test Equipment. The catalog concentrates on the 35 instruments most used for Mobile Communications service and is available from Bird Electronics Corp.

continued on page

## SPECIAL SALE!

### ASACA 7000 CAMERAS

(similar to Philips LDK-11)

Camera Head w/3  
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## Nickel Cadmium BATTERIES for ENG.



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Vital Industries  
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Phone: (904) 378-1581

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Video Engineers Experienced in Color Video Switching Systems. Excellent Opportunity for the right person.

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Vital Industries, Inc.  
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**GREAT IDEAS** cont. from pg. 71

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